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DATE DEC 2 6 2007
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KIMBERLY HELLWIG
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December 26, 2007

BY HAND DELIVERY AND EMAIL

Mr. Michael Monasmith
Project Manager, Siting Division
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814asf

Re: Carlsbad Energy Center Project (07-AFC-6)
Supplemental Air Modeling Information Submitted to the San Diego County Air Pollution Control District (Application Numbers 985745 - 985748)

Dear Mr. Monasmith:

Enclosed for docketing please find Carlsbad Energy Center LLC's supplemental information for the Carlsbad Energy Center Project, which was submitted to the San Diego County Air Pollution Control District on December 18, 2007. Also enclosed is a CD-Rom that contains the modeling data related thereto.

Should you have any questions, please do not hesitate to contact John McKinsey or me at (916) 447-0700.

Respectfully submitted,

Kimberly Hellwig
Paralegal

KJH:htn
Enclosures
cc: See attached Proof of Service

Portlnd3-1609932.1 0035434-00009

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

Application for Certification for the ***CARLSBAD ENERGY CENTER PROJECT***	**Docket No. 07-AFC-6** **PROOF OF SERVICE** **(As of 11/6/2007)**

DECLARATION OF SERVICE

I, Ha T. Nguyen, declare that on December 26, 2007, I deposited in the United States mail at Sacramento, California with first-class postage thereon fully paid and addressed to those identified below ***OR*** transmitted via electronic mail consistent with the requirements of the California Code of Regulations, Title 20, sections 1209, 1209.5, and 1210 the following documents:

CARLSBAD ENERGY CENTER LLC'S SUPPLEMENTAL AIR MODELING INFORMATION SUBMITTED TO THE SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT (APPLICATION NUMBERS 985745 - 985748)

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-6
1516 Ninth Street, MS-14
Sacramento, CA 95814-5512
docket@energy.state.ca.us

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Sacramento, CA 95814
esaltmarsh@eob.ca.gov

INTERVENORS
None as of 12/13/07

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I declare under penalty of perjury that the foregoing is true and correct.

Ha T. Nguyen

Carlsbad Energy Center LLC
1817 Aston Avenue, Suite 104
Carlsbad, CA 92008

Direct Phone: 760.710.2144

December 18, 2007

Dr. Steve Moore
San Diego County Air Pollution Control District
10124 Old Grove Road
San Diego, CA 92131

Subject: Supplemental Information for the Carlsbad Energy Center Project (Application Numbers 985745 – 985748)

Dear Dr. Moore:

We are pleased to provide the following additional information requested in the San Diego County Air Pollution Control District's (SDAPCD) October 17, 2007 letter regarding the proposed Carlsbad Energy Center Project.

BACT

Request 1: Please provide an estimate of potential particulate emissions resulting from the use of reclaimed water in the evaporative cooler at the combustion turbine inlet.

Response: As discussed in our October 10, 2007 letter to the SDAPCD, virtually all of the solids in the evaporative cooling water will be retained in the cooler blowdown and will not enter the turbine gas path. In addition, the gas turbine PM_{10} emission rate of 9.5 lbs/hr used for the proposed project was provided by the gas turbine vendor Siemens. The Siemens PM_{10} emission rate accounts for all project design features including the use of evaporative cooling. The Siemens PM_{10} emission rate reflects the use of evaporative cooling with a maximum water circulation rate of 110 gallons per minute (total for both gas turbines) and a maximum cooling water total dissolved solids (TDS) level of 500 ppmw. Please note that while the reclaimed water composition summary table in the AFC (Table 5.15F-1) shows TDS levels as high as approximately 922 ppmw, the cooling water for the evaporative cooling system will be processed by the reverse osmosis system to reduce the TDS level to design levels. Therefore, we do not believe that the proposed PM emission rates for the gas turbine need to be modified to account for the evaporative cooler.

Request 2: Provide the basis of the reclaimed water composition listed in Table 5.15F-1 in Appendix 5.15E.

Response: The basis for the reclaimed water composition shown in Table 5.15F-1 of the

September 12, 2007 permit application package for the proposed project originated from an Encina Wastewater Authority technical report. A copy of this report is enclosed as Attachment 1.

OPERATIONS ON LNG-DERIVED GAS

Request 3: *The latest fuel specification for the turbine model specified in the application.*

Response: The fuel specifications used by Siemens to perform the gas turbine performance runs for the proposed project were included in the September 12, 2007 permit application package submitted to the SDAPCD (see Table 5.1-18). There have been no changes to the fuel specification used for turbine performance runs since that submittal. In regards to the fuel specifications for LNG-derived gas for the proposed project, enclosed as Attachment 2 is a copy of a letter from San Diego Gas & Electric Company (SDG&E) regarding the expected specifications of LNG-derived gas entering their system. While the SDG&E letter also makes a general statement about the effect on NOx and CO emissions associated with the use of LNG-derived gas, SDG&E defers to the equipment vendor to provide the actual expected effect on emissions from the use of LNG-derived gas.

Request 4: *A guarantee that the combustion turbine in combination with the add-on emission control system will be able to meet the proposed exhaust stack emission limits in the application when operated over the expected Wobbe No. range of 1335-1385 and a description of any measures and ancillary equipment needed to achieve this guarantee.*

Response: Enclosed as Attachment 3 is a copy of a letter from Siemens concluding that the gas turbine emission levels proposed for the CECP will be achieved with a natural gas Wobbe Index ranging from 1335 to 1385 Btu/scf. Please note that the Siemens acceptable range of natural gas Wobbe Index is broader than that expected by SDG&E in their system with LNG derived natural gas (see Attachment 2). In addition, the CEC staff concluded recently in the final staff assessment for the Colusa Generating Station (06-AFC-9) that the use of LNG would not significantly impact the air pollution emissions for that power plant. A copy of the relevant pages from this document along with a copy of the supporting technical report are included as Attachment 4. Since both the Colusa Generating Station and the proposed project are gas turbine combined cycle designs, a similar conclusion can be reached for the proposed project with respect to the use of LNG.

Request 5: *The maximum allowable amount of ethane, propane, and/or higher hydrocarbons in the fuel that the combustion turbine in combination with the add-on emission control system can tolerate and still meet the proposed emission limits in application.*

Response: As discussed above, it is expected that emissions performance will account for the range of fuel properties expected for the proposed project, which will be any fuel that can be legally delivered to the site under the SDG&E tariff. In addition, as discussed above, the gas turbine emission levels proposed for the project are expected to be achieved for a range in the Wobbe Index of 1335 to 1385 Btu/scf. This acceptable variation in Wobbe Index is broader than that expected by SDG&E for their system with LNG derived natural gas. Since Wobbe Index is an important indicator of the hydrocarbon composition of fuel gas, the information provided by Siemens (see Attachment 3) also means that the CECP will meet the proposed gas turbine emission levels for the expected range of natural gas hydrocarbon compositions for the project.

Request 6: The maximum allowable rate of change in Wobbe No. that the combustion turbine in combination with the add-on emission control system can tolerate and still meet the proposed emission limits in application.

Response: As discussed above, the information provided by SDG&E and Siemens indicates that the proposed emission levels for the gas turbines will be met over the Wobbe Index range expected for the project.

Request 7: The maximum allowable rate of change in ethane, propane, and/or higher hydrocarbons fuel content that the combustion turbine in combination with the add-on emission control system can tolerate and still meet the proposed emission limits in application.

Response: As discussed above, the information provided by SDG&E and Siemens indicates that the proposed emission levels for the gas turbines will be met over the Wobbe Index range expected for the project. Since Wobbe Index is an important indicator of fuel gas hydrocarbon composition, this information also shows that the emission levels for the gas turbines will be met over the expected range of natural gas hydrocarbon compositions expected for the project.

AQIA MODEL

Request 8: If the air impact modeling was done using AERMOD version 06341, please resubmit the air impact modeling using the latest version of AERMOD or provide a demonstration that, for purposes of this project, AERMOD version 06341 and AERMOD version 07026 give the same results.

Response: The modeling included in the September 12, 2007 permit application package for the proposed project was inadvertently performed using a slightly older version of AERMOD (version 06341), rather the current version of AERMOD that was available near the end of January 2007 (version 07026). The modeling for the proposed project was re-run using AERMOD version 07026 and the results are summarized in Attachment 5. As shown in Attachment 5, there are only minor changes in the modeling results due to the use of the current version of AERMOD. The minor changes in ground-level concentrations in revised Table 5.1-28 can be either increases or decreases because the change in AERMAP produced slightly higher and lower ground elevations in different locations where modeling maxima occurred for different pollutant-averaging time combinations. These slight up and down changes in ground elevations also explain the slight up and down changes in maximum potential health impacts shown in revised Table 5.9-6. The detailed modeling files are included in the attached modeling CD.

AQIA ANALYSIS

Request 9: *In this case, the District requires an analysis considering the impacts on days when the background concentration does not exceed the standard. Please provide such an analysis for the impact of PM_{10} with respect to the state 24-hour standard. The District meteorology staff should be contacted for details of the analysis procedure.*

Response: Based on recent discussions between Sierra Research and the SDAPCD modeling/meteorology group, the PM_{10} analysis for the proposed project must include a review of the three years' worth of background ambient PM_{10} data collected at the Escondido monitoring station to identify days when the ambient PM_{10} levels are just below the state 24-hr standard of 50 $\mu g/m^3$. For these days, the project's maximum modeled 24-hr PM_{10} impact should be added to these ambient levels to determine if the proposed project will cause any additional exceedances of the state 24-hr average PM_{10} standard. Included as Attachment 6 is a summary of the Escondido monitoring station ambient PM_{10} levels for the three-year look-back period (2004 to 2006). As shown by these data, the PM_{10} levels just under the state 24-hr standard during this period are 42 $\mu g/m^3$ (2nd maximum) during 2004 and 43 $\mu g/m^3$ (2nd maximum) during 2006. No 2nd maximum levels are listed for 2005 because the maximum monitored PM_{10} level during that year is not above the state 24-hr standard. If the proposed project's maximum 24-hr PM_{10} impact of 2.2 $\mu g/m^3$ (see Attachment 5 for revised modeling results) is added to these background levels, the totals remain below the state 24-hr standard of 50 $\mu g/m^3$. Consequently, the proposed project will not cause any additional exceedances of the state 24-hr PM_{10} standard.

Request 10: *Provide a key to identify all of the source groups used in the AERMOD calculations. In addition, provide a plain language summary of the electronic files submitted with the application so that they can be easily related to the information in the report. The summary should include a description of each source group being modeled.*

Response: An improved "read me" file for the revised air quality impact modeling is included in the enclosed modeling CD. This file includes the identification of all source groups and a "plain language" summary of the electronic modeling files. A hardcopy of this file is included as Attachment 7.

Request 11: *Confirm that air quality impact calculations were made without considering emissions decreases from the eventual retirement of the three existing boilers.*

Response: All ambient air quality impacts discussed in the September 12, 2007 permit application package for the proposed project and included in Attachment 5 of this letter are for the new equipment only and do not include any benefits associated with the shutdown of the three existing boilers at the Encina Power Station.

HRA ANALYSIS

Request 12: *Explain why cancer risk is calculated using more than the Office of Environmental Health Hazard Assessment (OEHHA) Derived (Adjusted) Method. It makes the review process more cumbersome and makes it more difficult for the public to evaluate the analysis and report. Moreover, it results in much lengthier AERMOD model runs and reports than are needed.*

Response: Table 5.9-6 in the AFC Public Health Section 5.9 reports cancer risk using only the OEHHA's Derived (Adjusted) Method as requested by SDAPCD staff. The other methods of calculating cancer risk are also included in the air dispersion modeling for the following reasons:

- They are described in OEHHA guidance documents;
- They are available in the HARP software published by the ARB;
- They provide more complete information on the potential range of cancer risk; and
- They satisfy the CEQA requirement for public disclosure of the full range of potential environmental impacts. The additional risk methods were included in response to a request from the staff of the California Air Resources Board several years ago.

Request 13: *A key to identify all of the source groups used in the AERMOD calculations. In addition, provide a plain language summary of the electronic files submitted with the application specifically for the health risk assessment so that they can be easily related to the information in the report. The summary should include a description of each source group being modeled.*

Response: Enclosed as Attachment 7 is a "plain language" summary of the electronic files related to the health risk assessment (HRA) performed for the proposed project. This summary includes the identification of the source groups used in the AERMOD runs.

Request 14: *Information on whether health risk calculations were made with or without considering emissions decreases from the eventual retirement of the three existing boilers.*

Response: The HRA performed for the proposed project does not include emission decreases from shutting down existing Encina Power Station Boiler Units 1-3.

Request 15: A separate calculation of health risk for startup and commissioning activities and an explanation as to how this risk was analyzed and incorporated into the overall health risk estimates including a description of exactly which commissioning activities were analyzed. If estimates of health risk under these conditions are expected to be negligible, this needs to be clearly demonstrated.

Response: Separate calculations of health risk for startup and commissioning are not needed because the conservative toxic air contaminant (TAC) emission rate calculation starts with the highest possible hourly heat input rate under any operating condition (i.e., commissioning, startup, and normal) as indicated in the September 12, 2007 permit application package for the proposed project (see Footnote 2 to Tables 5.9B-1 and 5.9B-2 "short-term commissioning containing the uncontrolled emission factors for acrolein, benzene, and formaldehyde"). Maximum possible hourly and annual fuel flows were also used for the HRA (see Tables 5.9B-1 and 5.9B-2, Footnotes 4 and 6). Therefore, no higher TAC emission rates can be generated by separate calculations for startup and commissioning. All commissioning activities are automatically considered by the above approach because the TAC emission factors are on a fuel basis (i.e., MMscf of natural gas), and the maximum possible hourly and annual fuel flows are used. The stack exhaust conditions of temperature and velocity are selected to be the combination determined by screening runs for 1-hour and annual averaging times and three ambient temperatures (i.e., extreme hot, annual average, and extreme cold). The worst-combination exhaust conditions for the annual averaging time give the maximum potential cancer risk and non-cancer chronic health hazards, while the worst-combination exhaust conditions for the 1-hour averaging time give the maximum potential non-cancer acute health hazard.

Request 16: Identification of the computer file(s) that contain the maximum health risk impacts will be found [sic]. Health risk results should not just be stated, but should be clearly referenced.

Response: The HRA performed for the proposed project is based on maximum potential gas turbine fuel flow rates, maximum TAC emission rates, and maximum possible ground-level concentrations. The maximum potential health impacts are contained in the computer files described in Attachment 7.

STARTUP, SHUTDOWN, AND COMMISSIONING

Request 17: Provide representative measured or calculated minute-by-minute exhaust stack temperature, fuel flow rate, oxygen content, and turbine load and controlled and uncontrolled carbon monoxide (CO) emissions, volatile organic compound (VOC) emissions, and oxides of nitrogen (NOx) emissions during a representative warm startup (overnight or shorter shutdown), cold startup (weekend shutdown) and supporting information. The data should extend until the steam turbine has reached *full load.*

Response: Minute-by-minute emissions and/or stack parameters during gas turbine startups, shutdowns, or commissioning tests are not available from Siemens. The modeling of gas turbine startups, shutdowns, and commissioning tests for the proposed project was performed using stack parameters associated with the gas turbine operating at 50% load for an entire hour. The hourly emission rates used for this modeling were provided by Siemens and are summarized in Tables 5.1B-7, 5.1B-8, and 5.1B-9 of the September 12, 2007 permit application package for the proposed project. As shown in these tables, Siemens provides the total mass emissions that would occur during the first 22 minutes of a gas turbine startup. Based on the footnotes for Table 5.1B-8, within the first 12 minutes of the startup the gas turbine achieves 100% load. The CO control during the first 12 minutes is 20%, with CO control achieving 90% following this period. Full NOx control is achieved after 22 minutes. For the remainder of the hour it is assumed the gas turbine is operating with normal emissions at a gas turbine load of 100%. It would be possible to break up a gas turbine startup hour into the following three parts:

- First 12 minutes: gas turbine load ranges from full speed no load to 100% load, 20% CO control, NOx control varies an unknown amount
- Next 10 minutes: gas turbine at 100% load, full control of CO, NOx control varies an unknown amount
- Final 38 minutes: gas turbine at 100% load, full control of NOx and CO

Since the gas turbine achieves 100% load within 12 minutes, the modeling analysis performed for the proposed project is conservative since it assumes the gas turbine is operating with dispersion parameters comparable to 50% load for the entire hour during a startup. While it would be possible to break up the startup hour into three parts and model each part separately, the results are not expected to be higher then those found using the conservative 50% gas turbine load approach.

Request 18: Provide representative measured or calculated minute-by-minute exhaust stack temperature, fuel flow rate, oxygen content, and turbine load and controlled and uncontrolled NOx and CO emissions, VOC emissions, and NOx emissions during a representative shutdown and supporting information.

Response: Please see the response to Request 17.

Request 19: Provide the basis for assuming that CO emissions are reduced by 20% during the first 12 minutes of a startup and by 90% during the final 10 minutes of a startup during normal operations (Table 5.1 B-8).

Response: The CO level control of 20% during the period from ignition to 100% gas turbine load (12 minute period) and a CO control level of 90% after the gas turbine achieves 100% load were provided by Siemens. Please see startup note number 5 in Table 5.1B-8 of the September 12, 2007 permit application package for the proposed project.

Request 20: *The approximate minimum load at which the combustion turbine is able to achieve the proposed best available control technology emission limits for and CO.*

Response: The gas turbines will be able to meet their proposed best available control technology (BACT) CO emissions limit of 2.0 ppmv @ 15% O_2 during normal operation for gas turbine loads ranging from 60% to 100%.

Request 21: *During combustion turbine commissioning operations without add-on air pollution control equipment in place, provide exhaust stack temperature and oxygen content when the turbine is operating at full speed no load, 10% load, 25% load, and 40% load.*

Response: Enclosed as Attachment 8 are the stack parameters for a gas turbine operating at full speed no load (FSNL), 10% load, 25% load, and 40% load (see operating cases 16 to 20 and 27 to 31). Please note that the enclosed gas turbine performance runs were provided by Siemens for units proposed for the El Segundo Generating Station, which are identical to the units proposed for CECP. Consequently, the ambient site conditions (ambient temperature and humidity) shown in the enclosed performance runs are different than those for the CECP. However, these differences in ambient conditions between the two project sites will have minimal effects on the stack parameters at low gas turbine loads (40% load and less).

Request 22: *Details of combustion turbine commissioning activities indicating the approximate amount time in each operating mode during the activity.*

Response: The detailed gas turbine commissioning schedule, including the duration of each commissioning test, is shown in Table 5.1B-9 of the September 12, 2007 permit application package for the proposed project.

TOXIC AIR CONTAMINANT EMISSION FACTORS

Request 23: *The footnotes to Table 5.9B-1 indicate that the emission factors for acrolein, benzene, and formaldehyde are based on Table 3.1-1 in EPA's AP-42 emission factor compilation. In addition, the footnotes indicate that no control factor for the oxidation catalyst has been applied to these emission factors to account for startups when the oxidation catalyst may have less or no effectiveness. However, a comparison of Table 5.9B-1 to Table 3.1-1 in AP-42 indicates that control factors of approximately 50%, 75%, and 50% have been applied to the AP-42 acrolein, formaldehyde, and benzene emission factors, respectively to generate the emission factors in Table 5.9B-1. At a minimum (see below), please revise the hourly emission rates in Table 5.9-1 and the health risk assessment to reflect no emission control factor for acrolein, formaldehyde, and benzene or provide a justification of the control factors used.*

Response: The commentor's observation about the reduced emission factors is correct, except that the approximate 75% reduction was applied to benzene, not formaldehyde; and the correct AP-42 table is Table 3.1-3, not Table 3.1-1. The footnote should have been worded differently to note that the emission factors in Table 5.9B-1 of the September 12, 2007 permit application package were purposefully reduced to reflect the ability of the oxidation catalyst to control emissions of these three toxic air contaminants during normal gas turbine operation.

The footnote would have been less confusing if it had been worded as follows: "All factors are from AP-42, Table 3.1-3, 4/00 except PAHs, hexane, propylene, and the following three that are reduced according to the control effectiveness of the oxidation catalyst: acrolein (42.4%), benzene (72.8%), and formaldehyde (49.3%). Individual PAHs, hexane and propylene are CATEF mean results because AP-42 does not include factors for these compounds. The substantial reduction in the emission factors for acrolein, benzene, and formaldehyde, which were taken from USEPA (2000),[1] are based on measurements taken with and without a CO oxidation catalyst over the full range of turbine loads."

Request 24: The District also notes that the AP-42 emission factors or emission factors measured at high loads for toxic air contaminants may not be applicable to operations at low load operations that occur during startup, shutdown, and commissioning operations. The District may request the use of alternative emission factors for some air pollutants during low load operations. The District recommends providing any available test information for toxic air contaminant emissions for the model of combustion turbine proposed in the application, or a similar model, when operating at low load (i. e., not in the lean-premix combustion mode).

Response: For early commissioning activities, when an oxidation catalyst is not installed, the uncontrolled emission factors for toxic air contaminants available in AP-42 Table 3.1-3, including those for acrolein, benzene, and formaldehyde, are used in emission calculations as presented in Table 5.1B-2 of the September 12, 2007 permit application package. For this table, the original Footnote 1 is accurate.

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[1] USEPA. *Emission Factor Documentation for AP-42 Section 3.1 Stationary Gas Turbines,* Table 3.4-1, April 2000, http://www.epa.gov/ttn/chief/ap42/ch03/index.html.

ANNUAL EMISSION RATES

Request 25: A comparison of Table 5.9B-1 to Table 3.1-1 in AP-42 indicates that control factors of approximately 50%, 75% and 50% have been applied to the AP-42 acrolein, formaldehyde, and benzene emission factors to generate the annual emission rates listed in Table 5.9B-1. Please revise the annual emission rates in Table 5.9-1 and the health risk assessment to reflect no emission control factor for acrolein, formaldehyde, and benzene or provide a justification of the control factors used.

Response: As discussed in the response to Request 23, the commentor's observation about the reduced emission factors is correct, except that the approximate 75% reduction applied to benzene, not formaldehyde; and the AP-42 table is Table 3.1-3, not Table 3.1-1. The annual emission rates listed in Table 5.9B-1 of the September 12, 2007 permit application package (not Table 5.9-1) do not need to be revised to account for the higher uncontrolled emission factors of acrolein, benzene, and formaldehyde because the reduced emission factors are appropriate for normal operation. The higher uncontrolled emission factors of acrolein, benzene, and formaldehyde are properly used to calculate short-term emission rates for commissioning in Table 5.9B-2 of the September 12, 2007 permit application package because the oxidation catalyst is not installed for early commissioning activities.

If you have any questions regarding this application package, please contact me at (760) 710-2144 or Tom Andrews with Sierra Research at (916) 444-6666.

Sincerely,
Carlsbad Energy Center LLC

Tim Hemig
Vice President

Attachments

cc: John McKinsey, Stoel Rives
CEC Dockets Office (07-AFC-06)
Tom Andrews, Sierra Research

ATTACHMENT 1

BASIS FOR RECLAIM WATER COMPOSITION

ENCINA WASTEWATER AUTHORITY
Serving North San Diego County

ENCINA WASTEWATER AUTHORITY

A Public Agency

6200 Avenida Encinas
Carlsbad, CA 92011-1095
Telephone (760) 438-3941
FAX (760) 438-3861 (Plant)
(760) 431-7493 (Admin)

January 29, 2007

Ref: EC. 07-0051

ATTN: POTW Compliance Unit
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Attention: Mr Eric Becker, POTW Compliance Unit

SUBJECT: Submittal of Technical Reports – Order No. 2001-352

Enclosed are the December 2006 monthly, October through December 2006 quarterly and the 2006 annual reports for the Carlsbad Water Recycling Facility.

Very truly yours,

Michael T. Hogan
General Manager

DJC:MTH:dc

SELF-MONITORING REPORT REVIEW

TO: POTW COMPLIANCE UNIT
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION
9174 SKY PARK COURT, SUITE 100
SAN DIEGO, CALIFORNIA 92123

DISCHARGER: CARLSBAD WATER RECYCLING FACILITY
ORDER NO. 2001-352

REPORT FOR: DECEMBER 2006

REPORT DUE: FEBRUARY 1, 2007

OUR REVIEW OF THE ATTACHED SELF-MONITORING REPORT REVEALS THE FOLLOWING VIOLATION (S):

1. The annual limit for manganese was exceeded over the last 12 month period (page 4).
2. On December 2, at 11:00 a.m. it was discovered that the turbidity meter had failed. The The meter reading had been 0.0 NTU since 6:00 a.m. We immediately stopped incoming flow to the plant. The meter was replaced and sub sequent readings were in compliance.

THE FOLLOWING REMEDIAL ACTION WILL BE TAKEN TO CORRECT THE MONITORING PROBLEMS LISTED ABOVE

1. Currently performing a study to identify manganese levels in our service area.
2. Developing programming for a low level turbidity alarm in the SCADA system.

CARLSBAD WATER RECYCLING FACILITY

ORDER NUMBER 2001-352

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

John Jardin
Operations Superintendent

ORDER 2001-352

MONTHLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: DECEMBER 2006 | REPORT DUE: FEBRUARY 1, 2007

REPORT FREQUENCY: MONTHLY | SAMPLING POINT: METERING STATIONS

SAMPLES COLLECTED BY: VARIOUS | SAMPLES ANALYZED BY: VARIOUS

DAILY FLOW MONITORING

DATE	INFLUENT FLOW (MGD)	RECLAIMED TO DISTRIBUTION FLOW (MGD)	EWPCF RETURN FLOW (MGD)	BRINE OUTFALL FLOW (MGD)	CHLORINE CONTACT TANK FLOW (MGD)	IN STORAGE TANK
MAXIMUM PERMITTED	**N/A**	**N/A**	**N/A**	**N/A**	**4.0**	
1	No reclaim					
2	1.2000	0.1000	1.315	0.000	0.850	1.500
3	1.8000	1.6100	0.490	0.000	1.500	0.860
4	0.6850	0.6600	0.5000	0.010	0.207	1.380
5	0.3100	0.3100	0.3100	0.000	0.020	1.320
6	0.9550	0.6300	0.510	0.009	0.257	0.750
7	1.3220	0.7300	0.530	0.000	0.958	0.967
8	No reclaim					
9	0.6880	0.1400	0.520	0.000	0.425	2.063
10	1.2600	1.3000	0.510	0.002	1.400	1.720
11	1.3080	0.5000	0.510	0.000	1.065	2.360
12	1.2000	0.5300	0.440	0.000	0.833	2.620
13	No reclaim					
14	0.5900	0.7600	0.510	0.000	0.000	2.230
15	0.7440	0.4200	0.510	0.000	0.0000	1.830
16	1.0890	0.8600	0.5100	0.039	0.3600	0.899
17	1.2700	1.0400	0.490	0.000	0.900	0.501
18	1.1200	0.9000	0.520	0.000	0.813	0.620
19	No reclaim					
20	No reclaim					
21	No reclaim					
22	No reclaim					
23	0.6762	0.7000	0.510	0.000	0.412	1.580
24	0.6760	0.5300	0.430	0.000	0.429	1.400
25	No reclaim					
26	No reclaim					
27	0.8040	1.2600	0.520	0.010	0.436	1.598
28	No reclaim					
29	No reclaim					
30	No reclaim					
31						

No Water Distributed*

ORDER 2001-352

MONTHLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: DECEMBER 2006
REPORT FREQUENCY: MONTHLY
SAMPLES COLLECTED BY: VARIOUS

REPORT DUE: FEBRUARY 1, 2007
SAMPLING POINT: EFFLUENT STATION
SAMPLES ANALYZED BY: ENCINA LAB

DAILY EFFLUENT MONITORING

DATE	SAMPLE TIME & SAMPLE BY:	7-DAY MEDIAN COLIFORM (cfu/100ML)	TOTAL COLIFORM (cfu/100ML)	MINIMUM CHLORINE RESIDUAL (MG/L)	MODAL CONTACT TIME (MG-MIN/L)	CHLORINE CONTACT TIME (MINUTES)
MAXIMUM PERMITTED		**2.2**	**1 @ >23**	**N/A**	**MIN=450**	**MIN=90**
1		NWD*				
2	IW/0810	<1	<1	4.6	1021	222.0
3		NWD*				
4		NWD*				
5		NWD*				
6		NWD*				
7	RW/0805	<1	<1	10.2	2499	245.0
8	JL/0810	<1	<1	14.3	3518	246.0
9	IW/0855	<1	<1	8.7	2192	252.0
10		NWD*				
11	TL/1300	<1	<1	3.7	947	256.0
12		NWD*				
13		NWD*				
14		NWD*				
15		NWD*				
16	IW/0915	<1	<1	6.3	1670	265.0
17		NWD*				
18	TL/0800	<1	<1	12.5	3288	263.0
19		NWD*				
20		NWD*				
21		NWD*				
22	JL/0805	<1	<1	4.8	1214	253.0
23		NWD*				
24		NWD*				
25		NWD*				
26		NWD*				
27		NWD*				
28		NWD*				
29		NWD*				
30		NWD*				
31		NWD*				

No Water Distributed*
I certify that the above information is accurate to the best of my knowledge and that the samples were preserved, prepared, and analyzed according to EPA protocol.
Laboratory Supervisor Signature: Doug Campbell

ORDER 2001-352

MONTHLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: DECEMBER 2006

REPORT DUE: FEBRUARY 1, 2007

REPORT FREQUENCY: MONTHLY

SAMPLING POINT: EFFLUENT STATION

SAMPLES COLLECTED BY: VARIOUS

SAMPLES ANALYZED BY: ENCINA STAFF

DAILY EFFLUENT MONITORING

DATE UNITS	24-HOUR AVERAGE TURBIDITY (NTU)	DAILY MAXIMUM TURBIDITY (NTU)	95 PERCENTILE EFFLUENT TURBIDITY (%/24 HOUR)
MAXIMUM PERMITTED	**2.0**	**10**	**>5 NTU @ 5%**
1	NWD*		
2	0.9	2.6	0.0
3	NWD*		
4	NWD*		
5	NWD*		
6	NWD*		
7	0.9	1.0	0.0
8	0.6	0.7	0.0
9	1.0	1.2	0.0
10	NWD*		
11	1.2	1.4	0.0
12	NWD*		
13	NWD*		
14	NWD*		
15	NWD*		
16	0.4	0.5	0.0
17	NWD*		
18	0.7	0.9	0.0
19	NWD*		
20	NWD*		
21	NWD*		
22	0.8	1.1	0.0
23	NWD*		
24	NWD*		
25	NWD*		
26	NWD*		
27	NWD*		
28	NWD*		
29	NWD*		
30	NWD*		
31	NWD*		

No Water Distributed*

Please see spread sheet for continuous NTU data.

ORDER 2001-352

QUARTERLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: OCTOBER 2006

REPORT DUE: FEBRUARY 1, 2007

REPORT FREQUENCY: QUARTERLY

SAMPLING POINT: CCT EFFLUENT

SAMPLES COLLECTED BY: **OFF LINE**

SAMPLES ANALYZED BY: ENCINA LAB & DEL MAR ANALYTICAL

MONTHLY EFFLUENT MONITORING

ANALYSIS	UNITS	DAILY MAX	**DAILY LIMIT**	30 DAY AVERAGE	**30-DAY AVERAGE LIMIT**
BOD	MG/L	4.0	**45**	4.0	**30**
TSS	MG/L	1.4	**45**	1.4	**30**
VSS	MG/L	1.3		1.3	
pH*	UNITS	7.19	**6 thru 9**	7.19	
CHLORIDE	MG/L	263	**400**	263	**350**
SULFATE	MG/L	182	**400**	182	
MANGANESE	MG/L	0.087	**0.06**	0.063	
IRON	MG/L	0.12	**0.4**	0.12	**0.3**
BORON	MG/L	0.4	**0.75**	0.4	**0.75**
TDS	MG/L	922	**1,200**	922	
SAMPLE DATE/TIME:		10-10/11-06	0800-0800	10/11/2006	8:02 AM
SAMPLE TYPE:		Composit		GRAB*	

I certify that the above information is accurate to the best of my knowledge and that the samples were preserved, prepared, and analyzed according to EPA protocol.

Laboratory Supervisor Signature: ______________________

ORDER 2001-352

QUARTERLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: NOVEMBER 2006

REPORT DUE: FEBRUARY 1, 2007

REPORT FREQUENCY: QUARTERLY

SAMPLING POINT: CCT EFFLUENT

SAMPLES COLLECTED BY: VARIOUS

SAMPLES ANALYZED BY: ENCINA LAB & DEL MAR ANALYTICAL

MONTHLY EFFLUENT MONITORING

ANALYSIS	UNITS	DAILY MAX	**DAILY LIMIT**	30-DAY AVERAGE	**30-DAY AVERAGE LIMIT**
BOD	MG/L	3.0	**45**	3.0	**30**
TSS	MG/L	3.5	**45**	3.5	**30**
VSS	MG/L	2		2	
pH*	UNITS	7.19	**6 thru 9**	7.19	
CHLORIDE	MG/L	283	**400**	283	**350**
SULFATE	MG/L	186	**400**	186	
MANGANESE	MG/L	0.062	**0.06**	0.055	
IRON	MG/L	0.15	**0.4**	0.15	**0.3**
BORON	MG/L	0.40	**0.75**	0.40	**0.75**
TDS	MG/L	925	**1,200**	925	
SAMPLE DATE/TIME:		11/7-8/2006	0800-0800	11/8/2006	13:00PM
SAMPLE TYPE:		COMPOSITE		GRAB*	

I certify that the above information is accurate to the best of my knowledge and that the samples were preserved, prepared, and analyzed according to EPA protocol.

Laboratory Supervisor Signature: [signature]

ORDER 2001-352

QUARTERLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: DECEMBER 2006

REPORT DUE: FEBRUARY 1, 2007

REPORT FREQUENCY: QUARTERLY

SAMPLING POINT: CCT EFFLUENT

SAMPLES COLLECTED BY: VARIOUS

SAMPLES ANALYZED BY: ENCINA LAB & DEL MAR ANALYTICAL

MONTHLY EFFLUENT MONITORING

ANALYSIS	UNITS	DAILY MAX	**DAILY LIMIT**	30-DAY AVERAGE	**30-DAY AVERAGE LIMIT**
BOD	MG/L	2.8	**45**	2.8	**30**
TSS	MG/L	4.7	**45**	4.7	**30**
VSS	MG/L	0.4		0.4	
pH*	UNITS	7.09	**6 thru 9**	7.09	
CHLORIDE	MG/L	271	**400**	271	**350**
SULFATE	MG/L	189	**400**	189	
MANGANESE	MG/L	0.074	**0.06**	0.064	
IRON	MG/L	0.12	**0.4**	0.12	**0.3**
BORON	MG/L	0.42	**0.75**	0.42	**0.75**
TDS	MG/L	882	**1,200**	882	
SAMPLE DATE/TIME:		12/5-6/2006	0900-0900	12/6/2006	07:55AM
SAMPLE TYPE:		COMPOSITE		GRAB*	

I certify that the above information is accurate to the best of my knowledge and that the samples were preserved, prepared, and analyzed according to EPA protocol.

Laboratory Supervisor Signature: [signature]

ORDER 2001-352

MONTHLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: DECEMBER 2006

REPORT FREQUENCY: MONTHLY

SAMPLES COLLECTED BY: VARIOUS

REPORT DUE: FEBRUARY 1, 2007

SAMPLING POINT: EFFLUENT STATION

SAMPLES ANALYZED BY: ENCINA LAB

12 MONTH EFFLUENT MONITORING

ANALYSIS	**TOTAL COLIFORM** HIGH VALUE CFU/100ML	**SULFATE** 12 MONTH AVERAGE (MG/L)	**MANGANESE** 12 MONTH AVERAGE (MG/L)	**IRON** 12 MONTH AVERAGE (MG/L)	**BORON** 12 MONTH AVERAGE (MG/L)	**TDS** 12 MONTH AVERAGE (MG/L)
MAXIMUM PERMITTED	**240**	**350**	**0.05**	**0.3**	**0.75**	**1100**
JANUARY	<1	239	0.04	0.1	0.37	894
FEBRUARY	<1	249	0.05	0.1	0.41	986
MARCH	NA	NA	NA	NA	NA	NA
APRIL	NA	NA	NA	NA	NA	NA
MAY	<1	189	0.08	0.1	0.45	842
JUNE	1	193	0.08	0.1	0.38	911
JULY	2	251	0.09	0.1	0.40	968
AUGUST	<1	229	0.07	0.1	0.39	987
SEPTEMBER	<1	201	0.07	0.2	0.44	927
OCTOBER	<1	182	0.07	0.1	0.42	922
NOVEMBER	<1	186	0.06	0.1	0.40	925
DECEMBER	<1	189	0.06	0.1	0.42	882
AVERAGE	**<2**	**211**	**0.07**	**0.1**	**0.41**	**924**

ORDER 2001-352

QUARTERLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: OCTOBER THROUGH DECEMBER 2006

REPORT FREQUENCY: QUARTERLY

SAMPLES COLLECTED BY: JOEL CAMARILLO

REPORT DUE: FEBRUARY 1, 2007

SAMPLING POINT: CCT EFFLUENT

SAMPLES ANALYZED BY: ENCINA LAB

QUARTERLY EFFLUENT MONITORING

ANALYSIS	UNITS	SAMPLE DATE TIME	SAMPLE TYPE	VALUE
% SODIUM	%	10/10-11/2006 8am-8am	COMPOSITE	0.02
ASAR		"	"	5.52
EC	mS/m	"	"	161.9

I certify that the above information is accurate to the best of my knowledge and that the samples were preserved, prepared, and analyzed according to EPA protocol.
Laboratory Supervisor Signature: ______________________

ORDER 2001-352

ANNUAL MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: JANUARY THROUGH DECEMBER 2006
REPORT FREQUENCY: ANNUAL
SAMPLES COLLECTED BY: VARIOUS

REPORT DUE: FEBRUARY 1, 2007
SAMPLING POINT: EFFLUENT STATION
SAMPLES ANALYZED BY: ENCINA LAB & TEST AMERICA

ANNUAL EFFLUENT MONITORING

ANALYSIS	UNITS	SAMPLE DATE TIME	SAMPLE TYPE	VALUE	12 MONTH AVERAGE LIMIT
ALUMINUM	MG/L	7/11-12/2006. 0900 - 0900	COMPOSITE	0.043	
ARSENIC	"	"	"	<0.005	
BARIUM	"	"	"	0.033	
CADMIUM	"	"	"	<0.005	
CHROMIUM	"	"	"	<0.005	
COPPER	"	"	"	<0.010	
LEAD	"	"	"	<0.005	
MERCURY	"	"	"	<0.0002	
NICKEL	"	"	"	<0.010	
SELENIUM	"	"	"	<0.01	
SILVER	"	"	"	<0.010	
ZINC	"	"	"	<0.02	
FLUORIDE	"	"	"	0.50	1.0
MBAS	"	"	"	0.07	0.5

I certify that the above information is accurate to the best of my knowledge and that the samples were preserved, prepared, and analyzed according to EPA protocol.
Laboratory Supervisor Signature: ______________________

MONTHLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

REPORT FOR: DECEMBER 2006 REPORT DUE: FEBRUARY 1, 2007

REPORT FREQUENCY: MONTHLY SAMPLING POINT: CCT EFFLUENT

SAMPLES COLLECTED BY: CONTINUOUS SAMPLES ANALYZED BY: ENCINA STAFF

MONTHLY CONTINUOUS NTU MONITORING

Date and Time Stamp		(NTU)
12/2/2006	00:22:32	1.30
12/2/2006	00:52:32	1.10
12/2/2006	01:22:32	1.20
12/2/2006	01:52:32	1.30
12/2/2006	02:22:32	0.00
12/2/2006	02:52:32	1.50
12/2/2006	03:22:32	1.30
12/2/2006	03:52:32	1.30
12/2/2006	04:22:32	1.20
12/2/2006	04:52:32	1.60
12/2/2006	05:22:32	1.60
12/2/2006	05:52:32	1.30
12/2/2006	06:22:32	0.00
12/2/2006	06:52:32	0.00
12/2/2006	07:22:32	0.00
12/2/2006	07:52:32	0.00
12/2/2006	08:22:32	0.00
12/2/2006	08:52:33	0.00
12/2/2006	09:22:33	0.00
12/2/2006	09:52:33	0.00
12/2/2006	10:22:33	0.00
12/2/2006	10:52:33	0.00
12/2/2006	11:22:33	0.00
12/2/2006	11:52:33	0.00
12/2/2006	12:22:33	0.00
12/2/2006	12:52:33	0.00
12/2/2006	13:22:33	0.00
12/2/2006	13:52:33	0.00
12/2/2006	14:22:34	0.00
12/2/2006	14:52:34	0.00
12/2/2006	15:22:34	0.80
12/2/2006	15:52:34	1.10
12/2/2006	16:22:34	1.70
12/2/2006	16:52:34	1.60
12/2/2006	17:22:34	2.00
12/2/2006	17:52:34	2.90
12/2/2006	18:22:34	1.90
12/2/2006	18:52:34	1.30
12/2/2006	19:22:34	1.90
12/2/2006	19:52:34	1.40
12/2/2006	20:22:34	2.30
12/2/2006	20:52:34	2.20
12/2/2006	21:22:34	2.30
12/2/2006	21:52:34	1.20
12/2/2006	22:22:34	2.10
12/2/2006	22:52:34	1.30
12/2/2006	23:22:34	1.40
12/2/2006	23:52:34	1.40

Date and Time Stamp		(NTU)
12/7/2006	00:22:52	1.00
12/7/2006	00:52:52	1.00
12/7/2006	01:22:52	1.00
12/7/2006	01:52:52	1.00
12/7/2006	02:22:52	1.00
12/7/2006	02:52:52	1.00
12/7/2006	03:22:52	1.00
12/7/2006	03:52:52	1.00
12/7/2006	04:22:53	1.00
12/7/2006	04:52:53	1.00
12/7/2006	05:22:53	1.00
12/7/2006	05:52:53	1.00
12/7/2006	06:22:53	1.00
12/7/2006	06:52:53	1.00
12/7/2006	07:22:53	1.00
12/7/2006	07:52:53	1.00
12/7/2006	08:22:53	1.00
12/7/2006	08:52:53	1.00
12/7/2006	09:22:53	1.00
12/7/2006	09:52:53	1.00
12/7/2006	10:22:53	1.00
12/7/2006	10:52:53	1.00
12/7/2006	11:22:53	1.00
12/7/2006	11:52:53	1.00
12/7/2006	12:22:53	1.00
12/7/2006	12:52:53	1.00
12/7/2006	13:22:53	1.00
12/7/2006	13:52:53	1.00
12/7/2006	14:22:54	0.90
12/7/2006	14:52:54	0.90
12/7/2006	15:22:54	0.90
12/7/2006	15:52:54	0.80
12/7/2006	16:54:00	0.80
12/7/2006	17:24:00	0.80
12/7/2006	17:54:00	0.80
12/7/2006	18:24:00	0.80
12/7/2006	18:54:00	0.80
12/7/2006	19:24:00	0.80
12/7/2006	19:54:00	0.80
12/7/2006	20:24:00	0.80
12/7/2006	20:54:00	0.70
12/7/2006	21:24:00	0.70
12/7/2006	21:54:00	0.70
12/7/2006	22:24:00	0.70
12/7/2006	22:54:00	0.70
12/7/2006	23:24:00	0.70
12/7/2006	23:54:01	0.70

Date and Time Stamp		(NTU)
12/8/2006	00:24:01	0.70
12/8/2006	00:54:01	0.60
12/8/2006	01:24:01	0.60
12/8/2006	01:54:01	0.60
12/8/2006	02:24:01	0.60
12/8/2006	02:54:01	0.70
12/8/2006	03:24:01	0.70
12/8/2006	03:54:01	0.60
12/8/2006	04:24:01	0.70
12/8/2006	04:54:01	0.60
12/8/2006	05:24:01	0.70
12/8/2006	05:54:01	0.60
12/8/2006	06:24:01	0.60
12/8/2006	06:54:01	0.60
12/8/2006	07:24:01	0.50
12/8/2006	07:54:01	0.50
12/8/2006	08:24:01	0.50
12/8/2006	08:54:01	0.50
12/8/2006	09:24:01	0.50
12/8/2006	09:54:02	0.50
12/8/2006	10:24:02	0.50
12/8/2006	10:54:02	0.50
12/8/2006	11:24:02	0.50
12/8/2006	11:54:02	0.50
12/8/2006	12:24:02	0.50
12/8/2006	12:54:02	0.50
12/8/2006	13:24:02	0.50
12/8/2006	13:54:02	0.50
12/8/2006	14:24:02	0.50
12/8/2006	14:54:02	0.50
12/8/2006	15:24:02	0.50
12/8/2006	15:54:02	0.60
12/8/2006	16:24:02	0.60
12/8/2006	16:54:02	0.60
12/8/2006	17:24:02	0.60
12/8/2006	17:54:02	0.60
12/8/2006	18:24:02	0.60
12/8/2006	18:54:02	0.60
12/8/2006	19:24:02	0.60
12/8/2006	19:54:03	0.60
12/8/2006	20:24:03	0.60
12/8/2006	20:54:03	0.60
12/8/2006	21:24:03	0.60
12/8/2006	21:54:03	0.60
12/8/2006	22:24:03	0.60
12/8/2006	22:54:03	0.60
12/8/2006	23:24:03	0.60
12/8/2006	23:54:03	0.60

Date and Time Stamp		(NTU)
12/9/2006	00:24:03	0.60
12/9/2006	00:54:03	0.70
12/9/2006	01:24:03	0.70
12/9/2006	01:54:03	0.70
12/9/2006	02:24:03	0.80
12/9/2006	02:54:03	0.90
12/9/2006	03:24:03	0.80
12/9/2006	03:54:03	0.90
12/9/2006	04:24:03	0.90
12/9/2006	04:54:03	1.00
12/9/2006	05:24:03	1.00
12/9/2006	05:54:03	0.90
12/9/2006	06:24:03	0.90
12/9/2006	06:54:04	0.90
12/9/2006	07:24:04	0.90
12/9/2006	07:54:04	1.00
12/9/2006	08:21:57	1.00
12/9/2006	08:51:52	0.90
12/9/2006	09:21:52	1.00
12/9/2006	09:51:52	1.00
12/9/2006	10:21:52	1.00
12/9/2006	10:51:52	1.00
12/9/2006	11:21:53	1.00
12/9/2006	11:51:53	1.00
12/9/2006	12:21:53	1.00
12/9/2006	12:51:53	1.00
12/9/2006	13:21:54	1.00
12/9/2006	13:51:54	1.00
12/9/2006	14:21:54	1.00
12/9/2006	14:51:54	1.00
12/9/2006	15:21:54	1.00
12/9/2006	15:51:54	1.00
12/9/2006	16:21:54	1.00
12/9/2006	16:51:54	1.00
12/9/2006	17:21:54	1.00
12/9/2006	17:51:54	1.00
12/9/2006	18:21:54	1.00
12/9/2006	18:51:54	1.00
12/9/2006	19:21:54	1.00
12/9/2006	19:51:55	1.00
12/9/2006	20:21:55	1.00
12/9/2006	20:51:55	1.20
12/9/2006	21:21:55	1.10
12/9/2006	21:51:55	1.10
12/9/2006	22:21:55	1.10
12/9/2006	22:51:55	1.10
12/9/2006	23:21:55	1.10
12/9/2006	23:51:55	1.10

Date and Time Stamp		(NTU)
12/11/2006	00:21:59	1.30
12/11/2006	00:51:59	1.30
12/11/2006	01:21:59	1.30
12/11/2006	01:51:59	1.40
12/11/2006	02:21:59	1.30
12/11/2006	02:51:59	1.30
12/11/2006	03:21:59	1.30
12/11/2006	03:51:59	1.30
12/11/2006	04:21:59	1.30
12/11/2006	04:51:59	1.30
12/11/2006	05:21:59	1.30
12/11/2006	05:51:59	1.30
12/11/2006	06:21:59	1.30
12/11/2006	06:51:59	1.30
12/11/2006	07:21:59	1.30
12/11/2006	07:51:59	1.30
12/11/2006	08:21:59	1.30
12/11/2006	08:51:59	1.30
12/11/2006	09:21:59	1.30
12/11/2006	09:51:59	1.30
12/11/2006	10:21:59	1.30
12/11/2006	10:51:59	1.30
12/11/2006	11:21:59	1.30
12/11/2006	11:51:59	1.30
12/11/2006	12:22:00	1.30
12/11/2006	12:52:00	1.30
12/11/2006	13:22:00	1.30
12/11/2006	13:52:00	1.30
12/11/2006	14:22:00	1.30
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ATTACHMENT 2

LNG DERIVED NATURAL GAS SPECIFICATIONS

SDGE
A Sempra Energy utility

Dinah Willier
Account Manager, Energy Markets
San Diego Gas and Electric
8306 Century Park Court
Mail Location: CP-42K
San Diego, CA 92123-1593
Office: (858)654-1135
Fax: (858)654-1117
dwillier@semprautilities.com

December 12, 2007

Mr. Tim Hemig
Vice President
NRG Energy
1817 Aston Avenue, Suite 104
Carlsbad, Ca 92008

RE: Gas Specifications of Gas Derived LNG from Energia Costa Azul (ECA) and NOx Emissions Levels

Dear Mr. Hemig,

As follow up to our meeting last week, you requested Gas Specifications for the gas derived LNG entering SDG&E territory starting in the first quarter of 2008. Also, you requested effects of NOx emissions levels due to the higher Wobbe on turbines.

Attached please find a comparison chart of the ECA Send-Out Gas Specifications for ECA Start-Up Supply, Primary Supplies, Potential Spot Supply and Current Pipeline Supply. This information is provided by Sempra LNG.

Generally, the emissions level will depend on whether the proposed turbine units are being equipped with an active tuning system and how effectively that system performs. Without active tuning one can expect the NOx and CO to change with Wobbe number. If the oxidation catalyst and SCR are designed properly, these increases can be controlled. However, your turbine manufacturer will need to confirm emission guarantees over the stated Wobbe range provided.

If there are any questions, please do not hesitate to contact me.

Sincerely,

Dinah Willier

ECA Send-Out Gas

	ECA Start-Up Supply	ECA Primary Supplies	Potential Spot Supply	Current Pipeline Supply
Wobbe Index, Btu/Scf	1371 - 1385	1368 – 1385	1371 – 1385	1342
Gross Heating Value, Btu/Scf	1031 - 1073	1034 - 1099	1031 - 1114	1027
Methane	92.6 – 97.9%	88.9 – 97.0%	84.4 – 97.9%	95.8%
Ethane	2.1 – 6.0%	2.0 – 5.9%	2.1 – 10.9%	2.0%
Propane	0.0 – 0.9%	0.4 – 1.8%	0.0 – 2.7%	0.4%
Butanes+	0.0%	0.2 – 1.4%	0.0 – 1.3%	0.2%
Total Inerts	0.0 – 0.3%	0.3 – 2.0%	0.0 – 2.7%	1.6%
Methane Number	92 - 103	80 - 100	76 - 103	99

Standard Conditions - 14.73 psi & 60° F

ATTACHMENT 3

SIEMENS LETTER

SIEMENS

December 17, 2007

Mr. Chris Doyle
Regional Development Engineering Manager
NRG West
1817 Aston Avenue, Suite 104
Carlsbad, CA 92008

Subject: Encina Plant Air Emissions

Dear Chris,

This letter is to confirm that the natural gas fired two unit Siemens 1x1 SCC6-5000F plant will be designed to meet the following air emissions limits between 60% and 100% gas turbine loads:

- Oxides of Nitrogen (NOx) = 2 ppmvd @ 15% O_2
- Carbon Monoxide (CO) = 2 ppmvd @ 15% O_2
- Volatile Organic Compounds (VOC) = 2 ppmvd @ 15% O_2
- Ammonia Slip (NH_3 Slip) = 5 ppmvd @ 15% O_2
- Particulate Matter less than 10 Microns Diameter (PM10) = 9.5 lbs/hr

Also, Siemens confirms that natural gas with a Woobe Index of 1335-1385 will not affect Siemens ability to comply with the above limits, assuming the fuel is in compliance with Siemens fuel specification ZDX555-DC01-MBP-2500-01.

Sincerely

James W. Heller

James W. Heller
New Generation Sales Manager

Cc: Kevin Hull, SPG

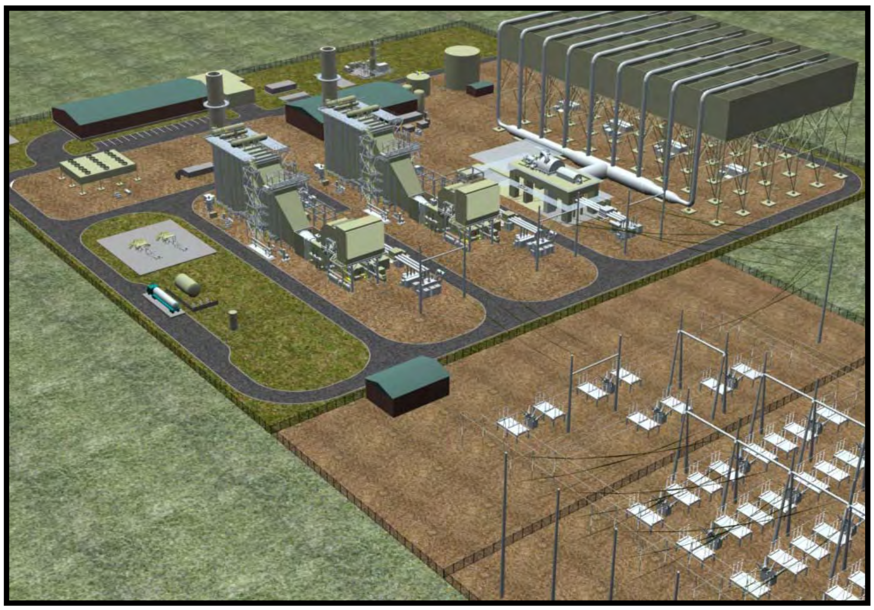
ATTACHMENT 4

CEC INFORMATION ON LNG

Final Staff Assessment

COLUSA GENERATING STATION

Application For Certification (06-AFC-9)
Colusa County



CALIFORNIA ENERGY COMMISSION

DOCKET 06-AFC-9	
DATE	
RECD.	NOV 30 2007

STAFF REPORT

NOVEMBER 2007
(06-AFC-9)
CEC-700-2007-003-FSA

PROOF OF SERVICE (REVISED 8/22/07) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 11/30/07
MS

Final Staff Assessment

CALIFORNIA ENERGY COMMISSION

COLUSA GENERATING STATION

Application For Certification (06-AFC-9)
Colusa County

STAFF REPORT

NOVEMBER 2007
(06-AFC-9)
CEC-700-2007-003-FSA

CALIFORNIA ENERGY COMMISSION

SITING OFFICE

Jack Caswell
Project Manager

Roger E. Johnson
Siting Office Manager

SYSTEMS ASSESSMENT & FACILITIES SITING DIVISION

Terrence O'Brien
Deputy Director

Therefore, staff's finding of no significant air quality impacts considers the fact that the project area is in attainment of the federal ambient air quality standards, the project will not cause any new exceedances of those standards, and that the ambient air quality standards are protective of human health and ecosystems.

The paragraph on page 4.1-36 was provided to answer a specific comment on sulfur dioxide impacts provided by Emerald Farms and referenced on that page. Sulfur dioxide emission concentrations in Colusa County are low in comparison with many other agricultural areas in California and much lower than in other parts of the United States that have concentrations more than an order of magnitude higher than experienced in the Sacramento Valley. The worst-case modeled 3-hour concentration from project operation is 51.1 $\mu g/m^3$ (project impact plus background from AIR QUALITY Table 23), which is well below the 1300 $\mu g/m^3$ ambient level required by the U.S.EPA secondary standard (3-hour standard of 0.5 ppm or 1300 $\mu g/m^3$, 40 CFR Sec. 50.5). Staff stands behind the statement that these low concentrations of sulfur dioxide are not expected to cause significant crop damage.

Comment: Emerald Farms 13. The modeling analysis appears to be done improperly, an independent analyst should have been hired to review the modeling analysis, and ozone modeling should have been performed.

Response: The modeling analysis was reviewed by an independent analyst, Mr. William Walters who is a California Registered Professional Engineer, and through this review comments were made requiring significant revision to both the emission and modeling analyses. These revised modeling analyses meet all CCAPCD modeling requirements, U.S. EPA PSD modeling procedures, and were found to be completely proper by the Energy Commission's independent analyst.

Unlike other criteria pollutants, ozone will not be directly emitted by the project. Ozone is formed through a series of complex photochemical reactions involving NOx and VOC, which will be emitted by the project. Due to the complex formation mechanisms, ozone modeling is performed on a regional scale using three-dimensional photochemical grid models, whereas point source Gaussian plume models are generally used for the other directly emitted pollutants. California and federal permitting regulations do not require ozone impact analyses for stationary source permitting.

Comment: Emerald Farms 14. There is no discussion of the potential future use of LNG and its related impacts.

Response: The use of LNG should not significantly impact the air pollutant emissions from the power plant. First, any LNG that is added to the main PG&E pipeline providing natural gas to the CGS will be diluted by other natural gas sources. Second, the heat rate and other characteristics of received LNG will be regulated. Third, the PG&E pipeline gas will have to meet CPUC regulated composition standards. And fourth, LNG has a zero fuel sulfur content upon receipt (which is raised slightly by adding mercaptan odorants to meet federal pipeline regulation standards) so SOx emissions would be reduced. Finally, if the composition of the pipeline natural gas is impacted, within acceptable PG&E composition limitations, the project's CEMS will ensure compliance with permit emission limits and the power plant can tune combustors to accommodate any long term changes to the natural gas heat content, if necessary. A study completed by the CEC on the impacts of LNG and heat rate variations to power plants operation and pollutant emissions can be downloaded from:

http://www.energy.ca.gov/2006publications/CEC-700-2006-001/CEC-700-2006-001.PDF

Comment: Emerald Farms 15. The CCAPCD, CEC and CARB had a meeting regarding the PDOC without allowing participation of Emerald Farms, an intervenor in the siting case.

Response: To perform its function effectively staff commonly meets or otherwise consults with other regulatory agencies. There is no requirement that Emerald Farms, the applicant, or other intervenors be included in such meetings, and they normally are not. CARB has not been part of any meetings with the CEC and CCAPCD.

Comment: Emerald Farms 16. The Delevan Compressor Station is not being adequately monitored for compliance by the CCAPCD.

Response: Staff cannot speak to the adequacy of the CCAPCD compliance monitoring for the Delevan Compressor Station; however, unlike the Delevan Compressor Station, the CGS project will also be monitored for ongoing compliance of the Conditions of Certification, which include the CCAPCD conditions, by the CEC.

Comment: Emerald Farms 17. The CCAPCD is not adequately responding to California Public Records Act requests, which indicates that the CGS will not be adequately monitored. Emerald Farms needs assurance that the power plant will not impact their organic certification.

Response: Public Records Acts requests to another regulatory agency are the responsibility of that agency, not the Energy Commission. As noted in above in response to Comment 16 the CGS will be monitored by both the CCAPCD and the CEC. As noted in the response to Comment 1 the power plant will not impact organic crop certification.

Comment: Emerald Farms 18. Regional air quality has not been adequately addressed, and additional mitigation should be required on a regional basis. A discussion of ozone formation being a regional issue was not provided.

Response: The project's emission mitigation, in the form of ERCs is a regional mitigation. Emission offsets for the ozone precursor emissions of NOx and VOC mitigate regional impacts of ozone formation. The potential for significant localized impacts are dealt with through Best Available Control Technology mitigation and remaining localized impacts are analyzed through air dispersion modeling. The dispersion modeling analysis found that the project's NOx emissions, prior to the use of offsets, did not cause significant localized air quality impacts.

NATURAL GAS QUALITY: POWER TURBINE PERFORMANCE DURING HEAT CONTENT SURGES

CONSULTANT REPORT

Prepared For:

CALIFORNIA ENERGY COMMISSION

Prepared By:

Aspen Environmental Group

MAY 2006
CEC-700-2006-001

Prepared By:
Aspen Environmental Group
Will Walters
Agoura Hills, California
Contract No. 700-02-004

Prepared For:

California Energy Commission

Mary Dyas
Contract Manager

Dave Maul
Project Manager

Dave Maul
Manager
Natural Gas & Special Projects Office

Rosella Shapiro
Deputy Director
Fuels and Transportation Division

B. B. Blevins
Executive Director

Acknowledgements

We would like to thank the following individuals who participated in preparing this report. The principal technical author is William Walters, P.E., of Aspen Environmental Group. The California Energy Commission staff members participating in the preparation of this report include Dave Maul, Chuck Najarian, Mike Purcell, and Joseph Merrill. Additional support in preparing the report was provided by Suzanne Phinney and Judy Spicer of Aspen Environmental Group and Jacque Gilbreath and Andy Churchill of the Energy Commission.

We are particularly indebted to Michael Kowalewski of the Pacific Gas and Electric Company for providing advanced notification of the natural gas high heating content event detailed in this report, and most particularly C. David Zeiger and Diane Tullos of Calpine Corporation, Russ Bennett of the City of Redding Electric Department, and Greg Jans of Midway Sunset Cogeneration Company for providing the natural gas composition and gas turbine operations data cited in this report.

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ACRONYMS AND TERMS

Acronyms

Btu:	British thermal unit (a unit of heat)
CO:	Carbon Monoxide
CT:	Combustion Turbine
DLN:	Dry Lo-NOx (A turbine combustor design that controls NOx emissions)
HHV:	Higher heating value
Lbs/hr:	pounds per hour
LMEC:	Los Medanos Energy Center
MMBtu/hr:	Million Btus per hour
NOx:	Nitrogen Oxides
PG&E:	Pacific Gas & Electric Company
Ppm:	parts per million
SCAQMD:	South Coast Air Quality Management District
Scf:	standard cubic foot
SCR:	Selective Catalytic Reduction (a NOx control technology)
SoCalGas:	Southern California Gas Company
SRI:	Southern Research Institute

Terms

C6 +:	Hydrocarbons with six or more carbon molecules.
Inerts:	Non combustible components of natural gas (e.g. nitrogen and carbon dioxide).
Mole percent:	Composition in percent of the total number of molecules for that given component. For gases it is the same as volume percent composition.
SCONOx:	Trademarked name for a NOx/CO control technology. SCONOx, unlike SCR, does not use ammonia and has no ammonia slip emissions.
Wobbe index:	An index of fuel gas interchangeability. It is the higher heating value (Btu/scf) of the gas divided by the square root of the density of the gas (air density = 1)

EXECUTIVE SUMMARY

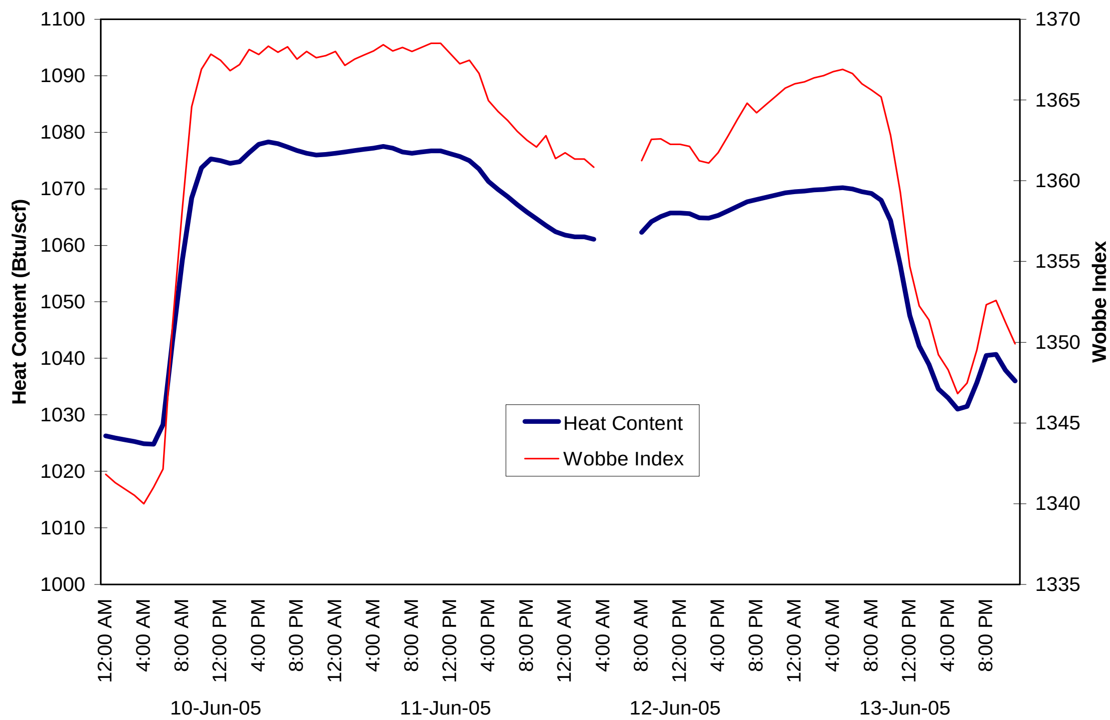
This study reports the testing results on emissions and performance of various electrical generating facilities in commercial operation that burned higher than normal heating value natural gas. During the second week of June 2005, a natural gas liquids extraction plant in Canada failed, which resulted in higher than normal heating value gas to travel south through the Pacific Gas and Electric Company (PG&E) pipeline system. The flow of natural gas occurred for three days, which allowed for testing and data collection to document and analyze the emissions and performance impacts on large gas turbines at the Redding, Sutter, Los Medanos, and Delta facilities.

There is a great deal of interest in the heat content of natural gas, with many studies, tests, and papers completed over the past several years regarding the effects of higher and lower heat content natural gas. Much of this work has been conducted to support efforts to develop natural gas interchangeability regulations/specifications. These efforts have included testing many residential and commercial combustion sources; however, to date little direct data from on-line large gas turbines serving the power industry have been available. This study attempts to provide data to begin filling this gap in empirical knowledge.

Natural Gas Heat Content Excursion

The natural gas in the PG&E pipeline excursion event showed an approximate 5 percent increase in heat content, from approximately 1,025 British thermal unit per standard cubic foot (Btu/scf) to 1,078 Btu/scf, and an approximate 2 percent increase in Wobbe index, from 1340 to 1369. Figure ES-1 shows the heat content data, as measured by PG&E from June 10 through June 13, 2005, in Pittsburg, California.

Figure ES-1: Pipeline Natural Gas Heat Content at Pittsburg



The heat content excursion varied over time, decreasing from the peak that occurred early in the excursion. The excursion lasted approximately 3.5 days at Pittsburg. The start and end time of the excursion varied based on location as the natural gas traveled from north to south through the pipeline.

A more complete description of the pipeline natural gas and as-used fuel natural gas is provided in Chapter 2.

Gas Turbine Operational Effects

In general, the heat content excursion caused little or no noticeable effect in facility operations or exhaust emissions based on the available data. The only effects that could be shown statistically are minor increases in pre-control system nitrogen oxides (NOx) and NOx control system ammonia use. The post-control system NOx emissions did not show any trend versus fuel heat content or Wobbe index. Using the results from the Sutter Plant as an example, Figure ES-2 shows the Pre-Selective Catalytic Reduction (SCR) NOx (@ actual O_2 levels) versus fuel Wobbe index for Sutter Combustion Turbine 2 (CT2) during high load operation.

Figure ES-2 – Sutter CT2 Pre-SCR NOx Levels versus Wobbe Index

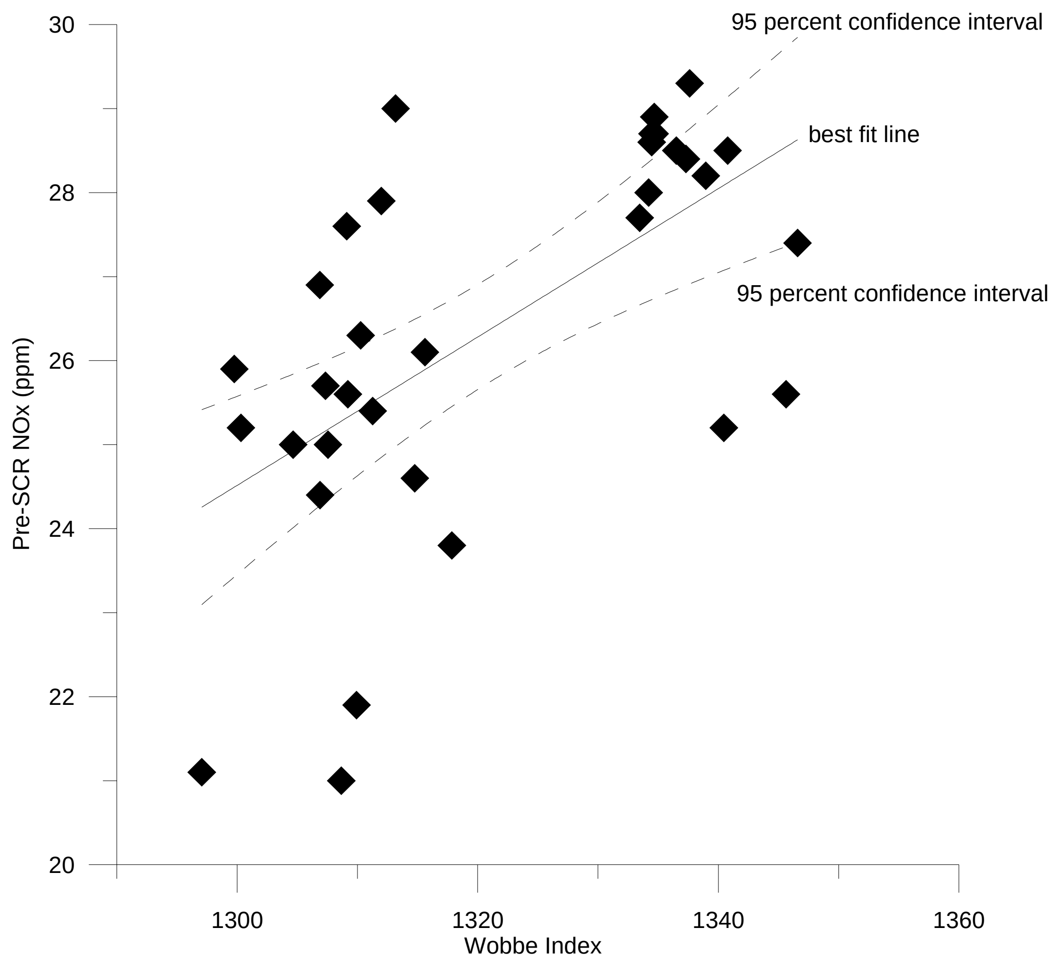
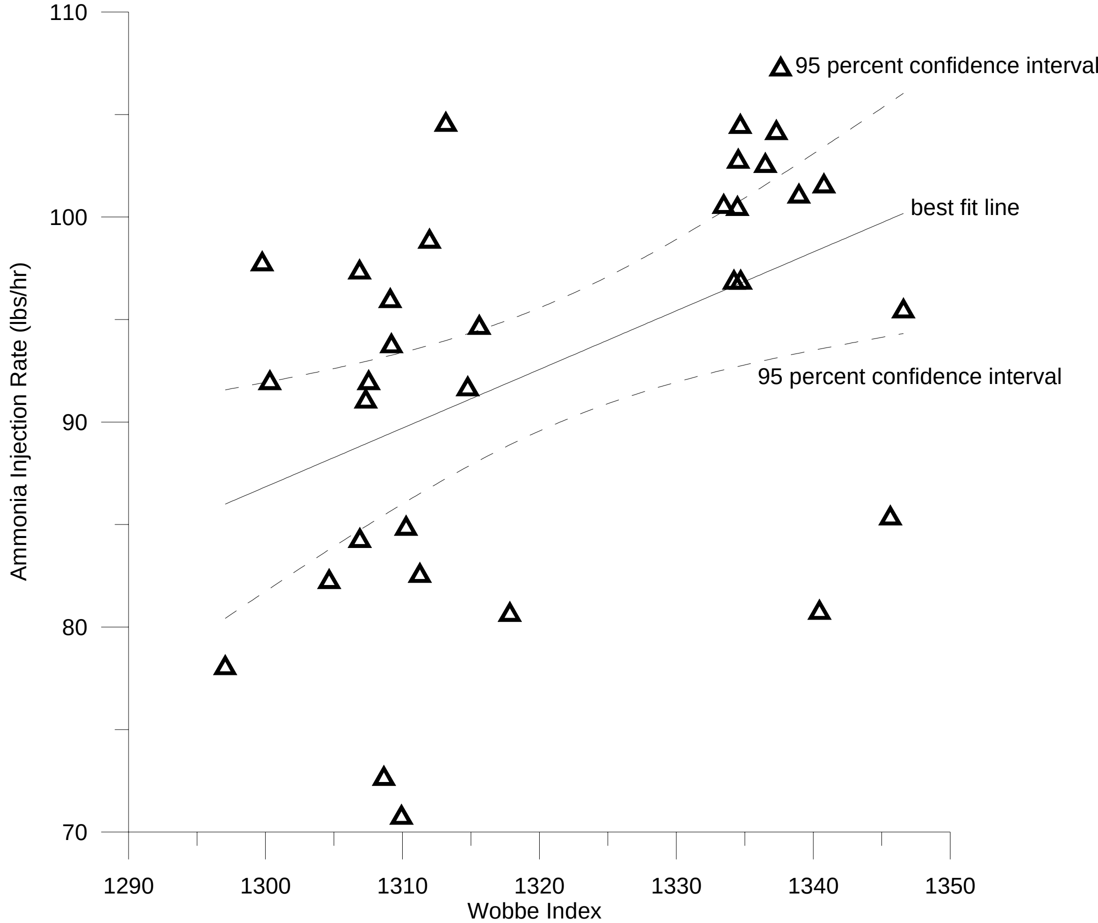


Figure ES-2 shows the best fit linear equation line with a 95 percent confidence interval for that fit. The high load interval presented in the figure is for high load hours that range in heat input from 1,700 and 1,800 million Btu per hour (MMBtu/hr). An approximate 15 percent increase in pre-SCR NOx concentration for a 3.5 percent increase in Wobbe index is predicted. Additional pre-control system NOx concentration data compared to heat content and Wobbe index are presented in Section 4.

Figure ES-3 shows the SCR system ammonia use versus natural gas heat content for the Sutter facility CT2.

Figure ES-3: Sutter CT2 Ammonia Use versus Wobbe Index



The ammonia consumption rates during the same high turbine load interval for Sutter CT2 are shown in Figure ES-3 with a best linear fit and 95 percent confidence interval for that fit. An approximate 10 percent increase in SCR ammonia use for a 3.5 percent increase in Wobbe index is predicted.

While the Sutter CT2 pre-SCR NOx emission concentrations and ammonia injection rates show a minor increase with increased Wobbe Index at high loads, the post-SCR NOx concentrations do not show any significant increase with Wobbe index. Figure ES-4 shows the post-SCR NOx levels (@15% O_2) for the Sutter CT2 at the same high load interval shown in Figures ES-2 and ES-3.

Figure ES-4: Sutter CT2 Post-SCR NOx versus Wobbe Index

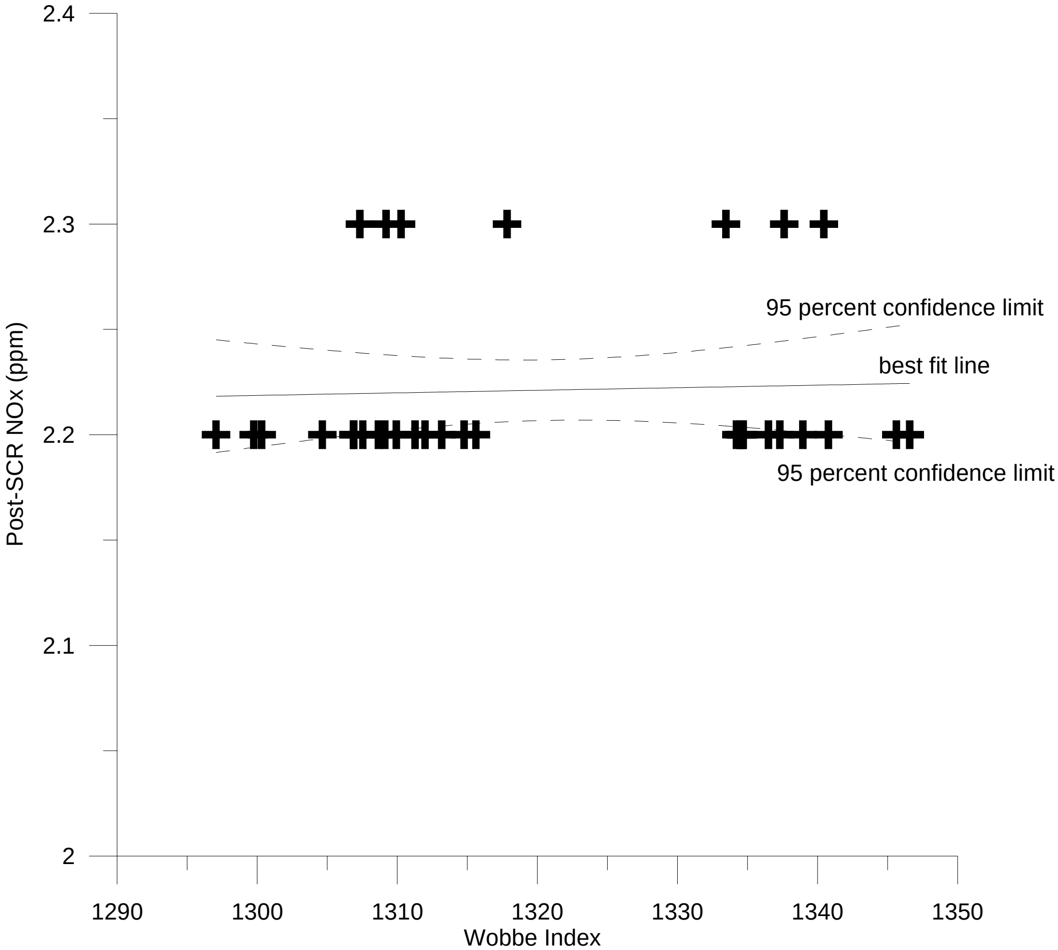


Figure ES-4 includes a best linear fit and a 95 percent confidence interval for that fit. No apparent trend in controlled NOx concentrations at the higher load interval is predicted. Additional data on controlled NOx concentrations for the other facilities are provided in Section 4.

Summary

The increase in heat content/Wobbe index caused a small increase in pre-SCONOx and pre-SCR NOx emissions of the Redding and Sutter facilities, respectively, and an increase in ammonia use, indicating an increase in pre-SCR NOx emissions, at the Delta and Los Medanos facilities.

At no time during normal operations did any of the controlled NOx concentrations at any of the facilities included in this study exceed their air quality permit limits. The NOx control systems for these facilities were able to adjust to counteract the increased turbine NOx emissions.

CHAPTER 1: INTRODUCTION

Event Introduction

In June 2005, Pacific Gas and Electric Company (PG&E) notified the California Energy Commission (Energy Commission) that a slug of high heating value gas, resulting from an outage at a liquids extraction plant in Canada, would be moving through the PG&E system.

An increase in heating value of approximately 6 percent, from about 1,020 to about 1,080 Btu per cubic foot, lasted for approximately 3 days. Customers south of Stockton and San Jose had lower increases in the energy content of their gas.[1]

The Energy Commission requested both natural gas testing and gas turbine operating data, including emissions data, from several electric generating plants that used gas from the affected pipeline for several days surrounding this event. The electric generating plants that voluntarily participated include the City of Redding Generating Unit #5 (Redding),[2] the Sutter Power Plant (Sutter),[3] the Los Medanos Energy Center Los Medanos or LMEC),[4] and the Delta Energy Center (Delta).[5] The pipeline route and participating facilities are shown on Figure 1-1.

Collected Event Data

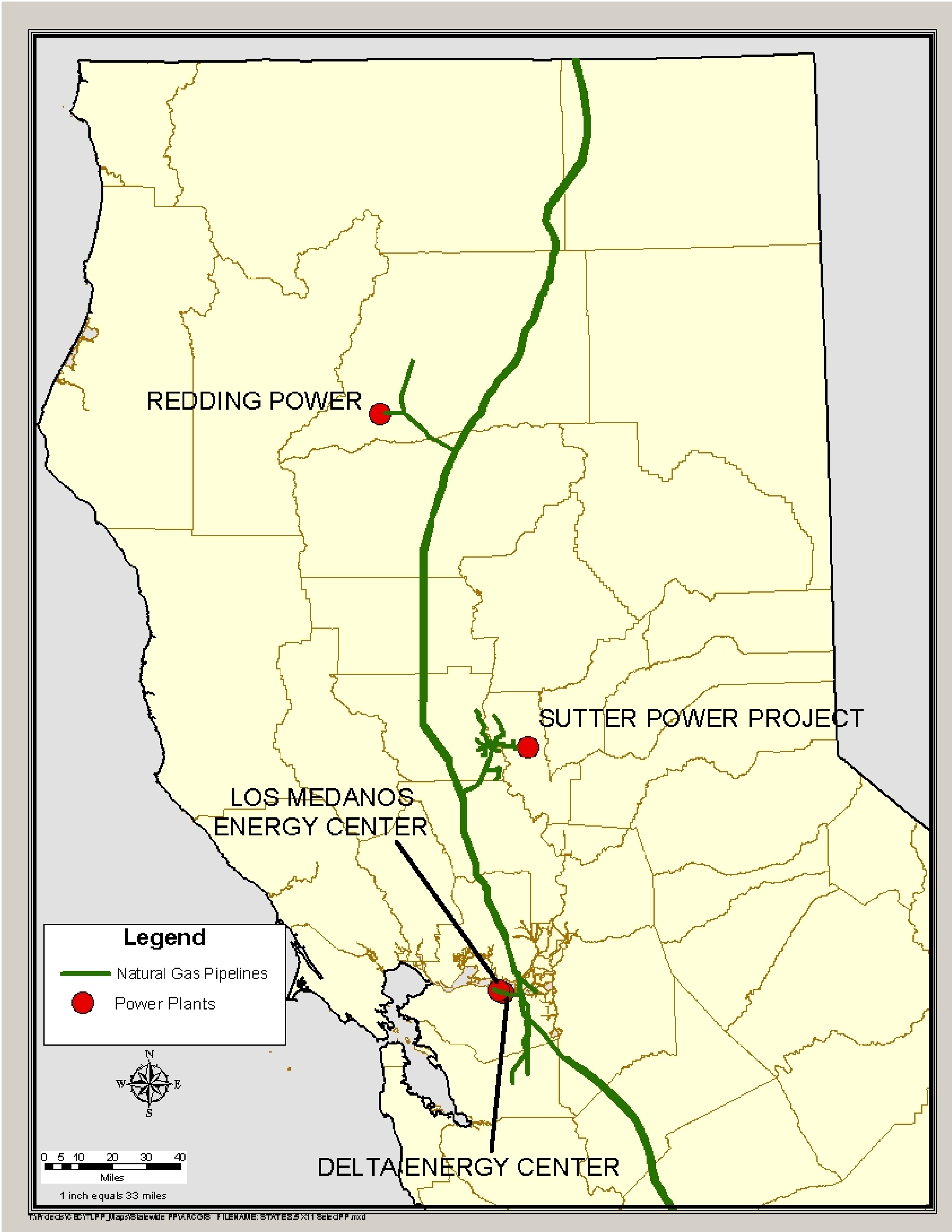
The data that were available and collected from each of the power facilities varied due to facility design and data access. A summary of the natural gas and facility operating data provided from each plant is provided in Table 1-1. The collected data are presented in Appendix A.

Table 1-1: Power Plant Collected Event Data

	Natural Gas Data				Performance Data					Exhaust Data					
Facility	Btu Content (as-used)	Pipeline Gas Hydrocarbon Composition	Pipeline Gas Inert Composition	Pipeline Gas Specific Gravity	Heat or Fuel Input	MW Output (GT only)	Efficiency Estimate	Ammonia Flow	Process Status	Pre-SCONOx/Pre-SCR NOx	Controlled NOx	Controlled CO	Oxygen Content	Turbine/Stack Exhaust Temperatures	SCR Catalyst Temperature
Redding	X	-	-	-	X	-	-	N/A	X	X	X	X	X	-/-	N/A
Sutter	X	- [1]	-	-	X	X	-	X	X	X	X	X	X	X/X	X
LMEC	X	X [2]	X [2]	-	X	X	X	X	-	-	X	X	X	X/-	-
Delta	-	X [2]	X [2]	x	X	X	X	X	-	-	X	X	X	X/-	-

1 – Data supplied were limited to the as-used blended gas composition data.
2 – Data supplied from PG&E pipeline adjacent to Delta gas blending facility, but blended gas composition data for Delta were not available.

Figure 1-1: PG&E Pipeline Route and Power Plant Locations



One limitation of this study is the fact that the three Calpine facilities (Sutter, LMEC, and Delta) all used blended gas fuels, either exclusively or partially, during the excursion event. The data available for these blended gas streams, excepting Sutter, did not include enough data to calculate Wobbe index, so most of the excursion event effect comparisons use gas heat content rather than Wobbe index.

Study Goals

The goals of this study were to obtain quality data for the gas heat content excursion event and corresponding gas turbine operational data during the event as well as to determine any perceived effects to the gas turbine operations due to the increased natural gas heat content. To determine operational effects, the levels of NOx emissions (as measured leaving the turbine) and controlled NOx emissions (as measured following NOx control technology) were analyzed. Ammonia injection rates were also analyzed, since ammonia is used for NOx control at three of the four facilities.

This study will support the assessment of the potential impacts of natural gas variability and natural gas interchangeability rulemaking (CPUC R.04-01-25) on the operations of large natural gas-fired power production facilities. Comments on this study will be used to help define future work necessary to adequately assess this subject.

CHAPTER 2: NATURAL GAS EVENT DATA SUMMARY

Natural gas data were obtained both at the pipeline and for gas mixtures used at various gas turbine sites, with the exception of the Delta facility where the as-used blended fuel gas heat content and composition data were not available.

Pipeline Natural Gas Data

Pipeline specific data for the natural gas excursion were monitored at two locations, Redding and Pittsburg. The Redding natural gas data are from Redding Power Unit #5, which uses the pipeline gas without blending. The Redding natural gas data are limited to Btu content. The Pittsburg natural gas data are from the PG&E Los Medanos pipeline just upstream of a blending station used for the Delta and Los Medanos facilities. The Pittsburg natural gas data include Btu content, specific gravity, and other compositional data (hydrocarbon, inerts, etc.).

Figure 2-1 presents the Redding and Pittsburg pipeline natural gas heat content data, and Pittsburg pipeline natural gas Wobbe index for June 8 through June 13, 2005. The available Pittsburg natural gas data begin June 10.

Figure 2-1: Pipeline Natural Gas Heat Content and Wobbe Index

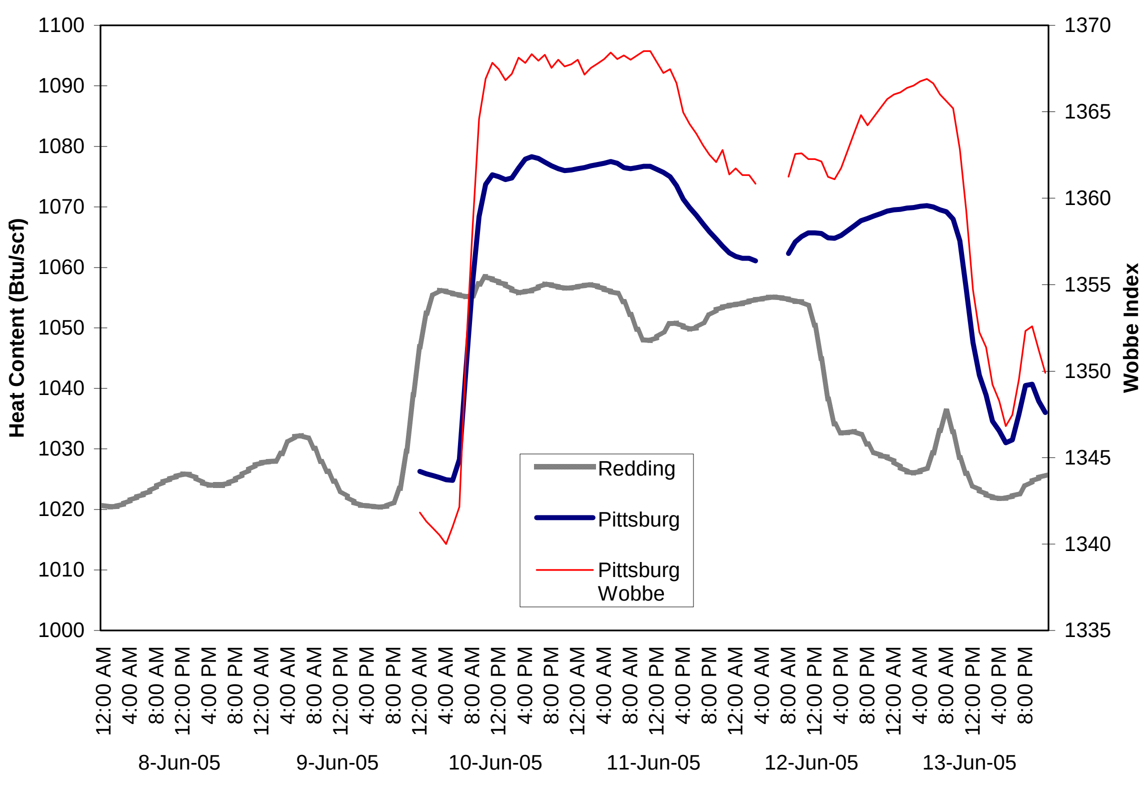
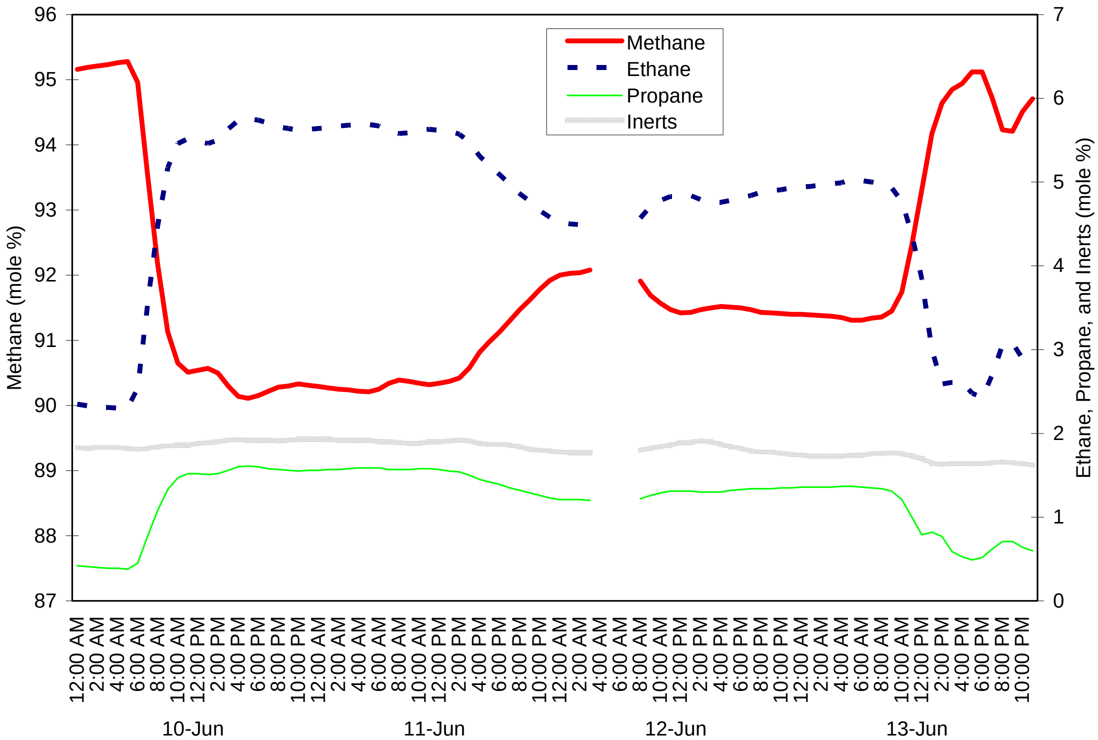


Figure 2-1 shows that the data for the excursion event at the two separate pipeline locations have a very similar shape with a time lag of several hours for the gas to flow from Redding to Pittsburg. However, the total Btu contents and increases during the excursion event are different - both the heat content and duration of the excursion are greater at Pittsburg. The excursion event heat content and Wobbe index increase at Pittsburg was 5 percent and 2 percent, respectively, during the excursion event, while the heat content increase at Redding was a little less than 4 percent during the excursion event. There does not appear to be any reason why the duration and heat contents should be significantly different in these two locations.

Figures 2-2 and 2-3 present the Pittsburg natural gas compositional data from June 10 through June 13, 2005. For graphing purposes, the data are grouped by components with similar content levels.

Figure 2-2: Pittsburg Natural Gas Major Component Composition Data



As would be predicted, Figure 2-2 shows that during the excursion the methane concentrations decreased by 4 to 5 percent while the ethane and propane concentrations essentially doubled. The higher heating value of the gas is the result of greater percentages of non-methane components such as ethane and propane. The inerts concentrations, which were shown to be entirely nitrogen and carbon dioxide, increased very slightly during the excursion event, with the nitrogen content decreasing and the carbon dioxide content increasing at a greater level to create the overall slight increase in total inerts.

Figure 2-3: Pittsburg Natural Gas Minor Component Composition

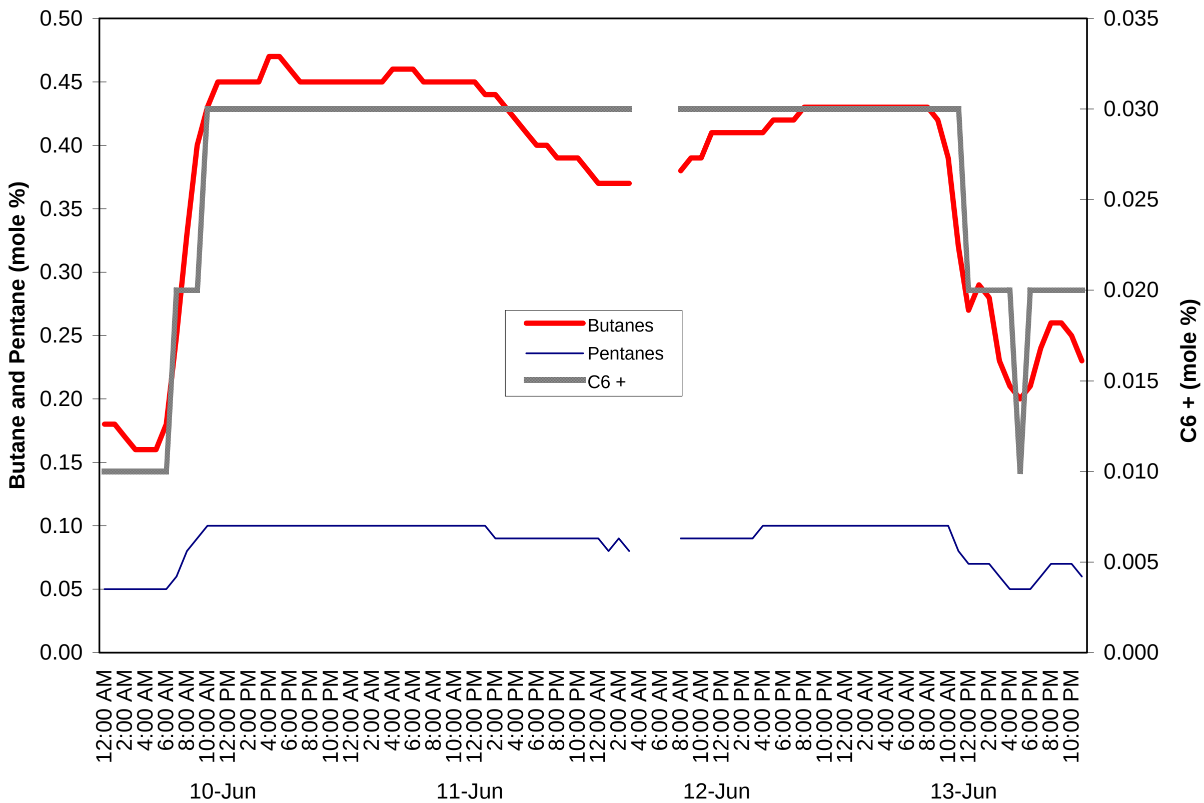


Figure 2-3, like Figure 2-2, shows an increase in the heavier hydrocarbon composition during the heat content excursion event. The total butane (i-butane and n-butane) and total C6 + hydrocarbon concentrations (hydrocarbons with six or more carbon molecules) essentially tripled during the excursion and the total pentane (i-pentane and n-pentane) concentration doubled during the excursion.

The natural gas specific gravity measured at Pittsburg increased by a maximum of just over six percent during the excursion event.

Turbine Fuel Data

The turbine fuel heat content and composition for the Sutter and Los Medanos facilities are not the same as the pipeline fuel since the as-used fuel for each is a blend of sources.

Sutter

Figure 2-4 provides the heat content and Wobbe index data for the Sutter facility fuel during the excursion period.

Figure 2-4: Sutter Natural Gas Heat Content and Wobbe Index

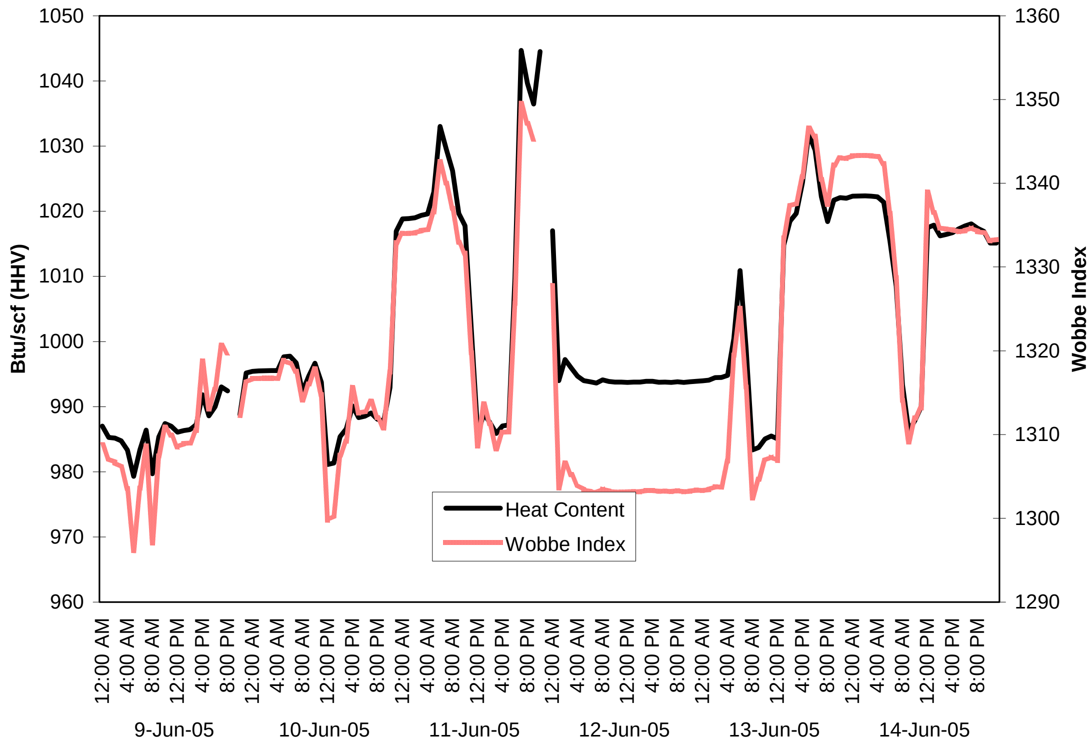


Figure 2-4 shows that the heat content and Wobbe index of the natural gas were variable during the excursion period and do not match the excursion event curve shown in Figure 2-1. The mixing of separate fuel sources allowed the Sutter facility to buffer the impact of the heat content excursion for most of the excursion period; however, the overall heat content and Wobbe index variations during short periods are as large as, or greater than, that shown for the Pittsburg pipeline gas in Figure 2-1.

Limited composition data were also available from the Sutter facility fuel gas. These are presented in Figures 2-5 and 2-6.

Figure 2-5: Sutter Natural Gas Major Component Composition

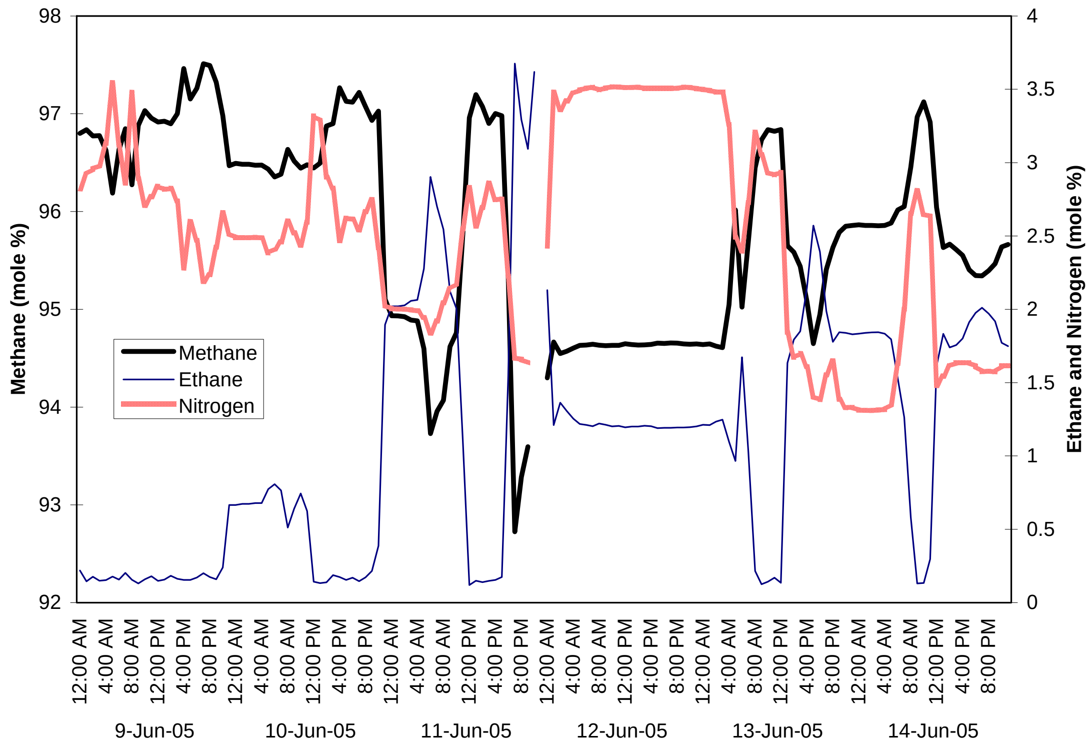
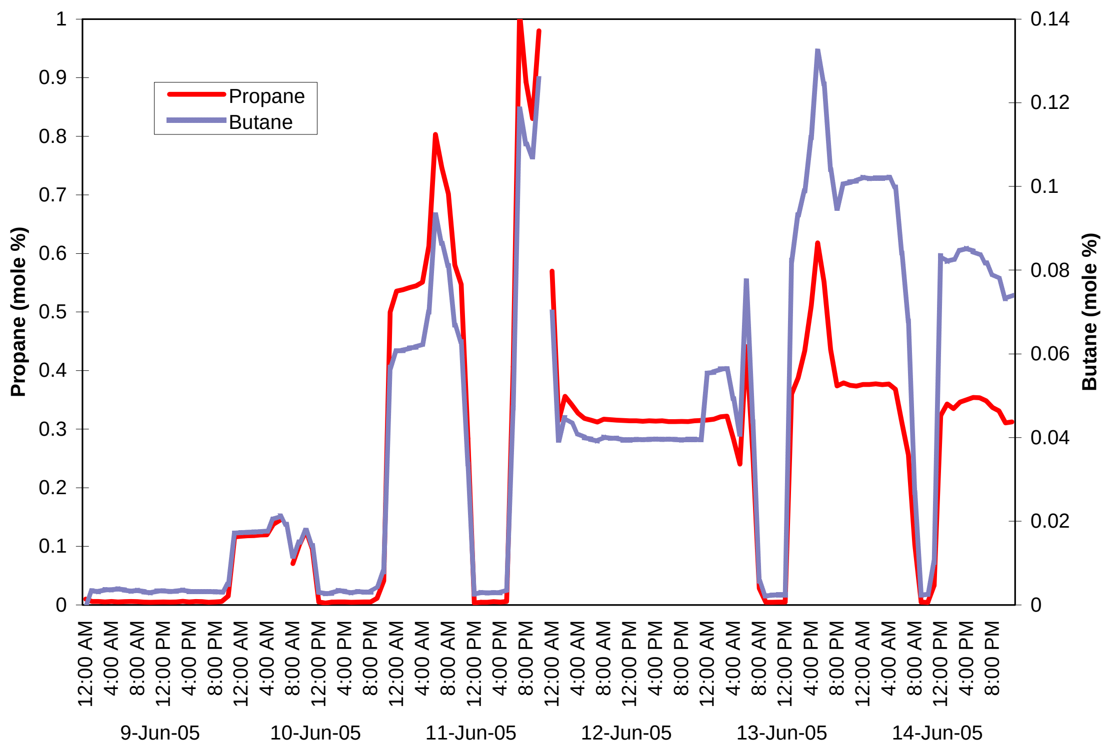


Figure 2-5 shows that the composition of the major components varied significantly during the excursion period. The variable mixture of different fuel sources created a highly variable fuel mix. The methane composition varies by almost 5 percent, the ethane composition varies from near 0 percent to over 3.5 percent, and the nitrogen content varies by nearly a factor of 3.

A critical review of the Sutter natural gas fuel data indicates that the non-pipeline fuel source being used in the blend contains an almost exclusive mixture of methane (~97 percent) and nitrogen (~3 percent) with very little ethane (~0.1 percent) and essentially no propane or butane. Using this composition assumption for the non-pipeline blend gas, Figure 2-6 shows clearly when pipeline gas with its higher propane and butane content is being used in the fuel gas blend.

Figure 2-6: Sutter Natural Gas Minor Component Composition

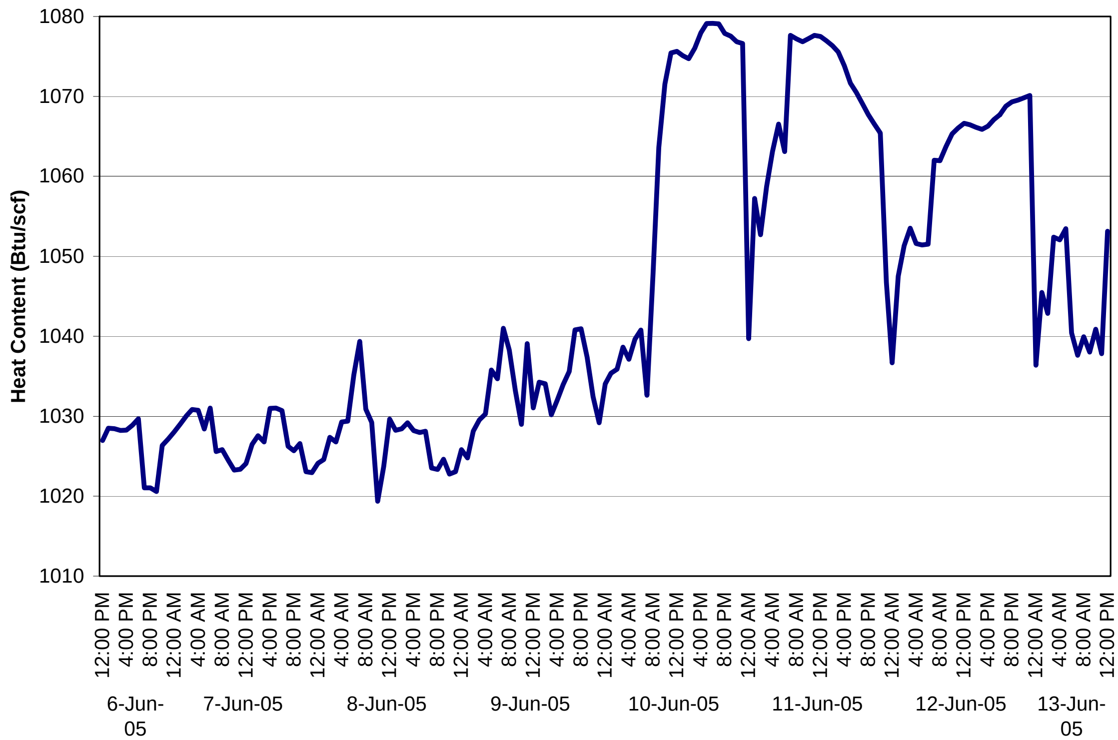


Overall, the monitored propane and butane concentrations at Sutter are significantly lower than the pipeline concentrations monitored at Pittsburg due to the fuel bending.

Los Medanos

Figure 2-7 shows the heat content of the natural gas used at the Los Medanos facility during the excursion event.

Figure 2-7: Los Medanos Natural Gas Heat Content Data



This figure matches much of the Pittsburg pipeline gas excursion curve, but due to the facility occasionally accepting the Calpine/PG&E mixed gas, as well as the unmixed pipeline gas, the curve is broken up with areas of lower Btu content. For periods of time during the excursion event, this facility consumed gas with a Btu content that was nearly 5 percent higher than the average heat content for the days prior to the excursion event.

Natural Gas Composition Definitions and Regulations

The data presented above were compared to rules and regulations regarding the content of natural gas. Current relevant natural gas definitions and regulations are as follows:

1. PG&E Rule 21 requires pipeline natural gas to have a heating value that is consistent with the standards established by PG&E for each Receipt Point(s), and requires gas interchangeability in accordance with the methods and limits presented in American Gas Association (AGA) Bulletin 36.[6]

2. SoCalGas Rule 30 requires pipeline natural gas to meet lower and upper Btu limits of 970 and 1150 Btu/scf (HHV, Higher Heating Value), respectively, and to meet AGA Bulletin 36 interchangeability indices.[7]

3. The U.S. Environmental Protection Agency (EPA), for the purposes of its New Source Performance Standard regulation for gas turbines (40 CFR Part 60 Subpart GG), defines natural gas as containing at least 70 percent by volume methane or having a Btu content of 950 to 1100 Btu (HHV).[8]

It should be noted that PG&E Rule 21 does not include the Wobbe index in its natural gas definitions, limits, or specifications.

The natural gas in the pipeline during the excursion event remained within the higher end of the Btu limit of these definitions, and the methane content remained over 90 percent during the excursion. The Btu content of the gas stayed within the maximum allowable PG&E specification for that pipeline (1080 Btu/scf).

Additionally, the variability of the Wobbe index, as evidenced at Pittsburg, would have complied with SoCalGas Rule 30 specifications and remained well below 1400.

CHAPTER 3: GAS TURBINE DATA SUMMARY

As noted previously, four facilities provided natural gas and turbine performance data. The gas turbine model and number and associated emission control technologies for each of those facilities are as follows:

Table 3-1: Gas Turbine Description Summary

Facility	Turbine Type (Number)	MW (Turbine/Plant)	Emission Control Technologies
Redding	Alstom GTX100 (1)	43/56 (Unit 5 only)	SCONOx
Sutter	Westinghouse 501FD (2)	175/540	DLN, SCR, and Oxidation Catalyst
Delta	Westinghouse 501FD (3)	175/861	DLN, SCR
LMEC	General Electric 7FA (2)	172/555	DLN, SCR, and Oxidation Catalyst

All four facilities have NOx controls which will adjust to maintain preset NOx exhaust concentration limits. Three of the four facilities use ammonia to control NOx emissions; only the SCONOx technology, used at the Redding facility, does not use ammonia.

Redding

The Redding facility provided natural gas heat content data, and gas turbine fuel use and certain exhaust emission parameters. As noted above, this facility does not use ammonia. The operating heat input of the gas turbine during the excursion is provided in Figure 3-1.

Figure 3-1: Redding Turbine Operating Heat Input Load Data

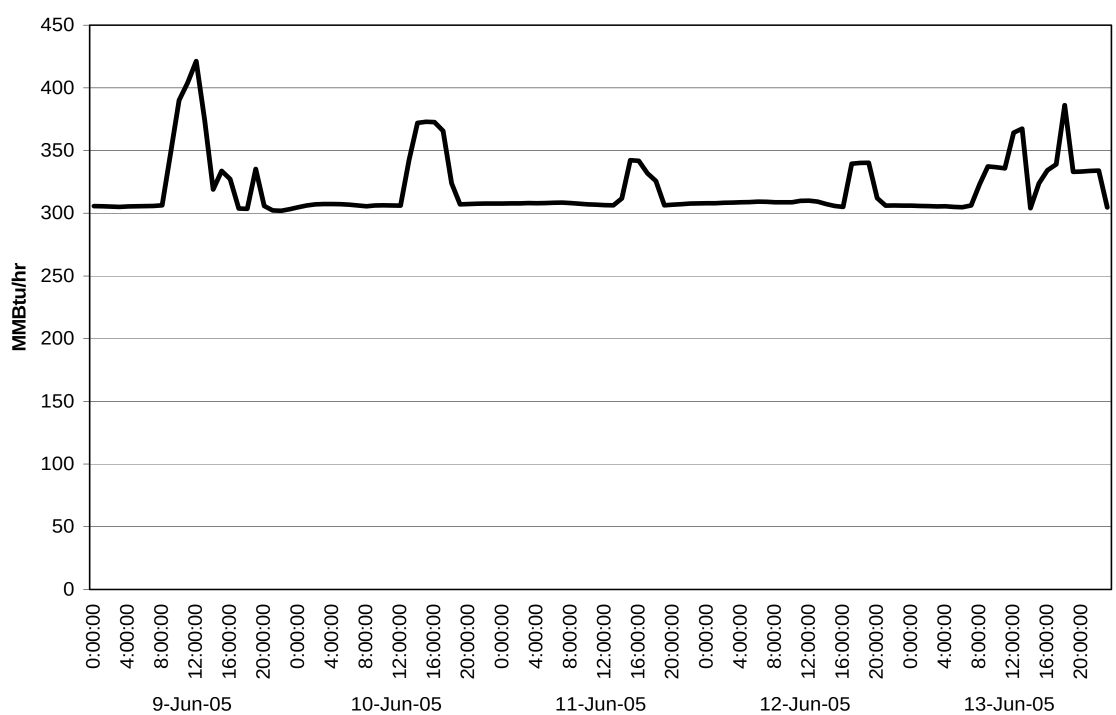
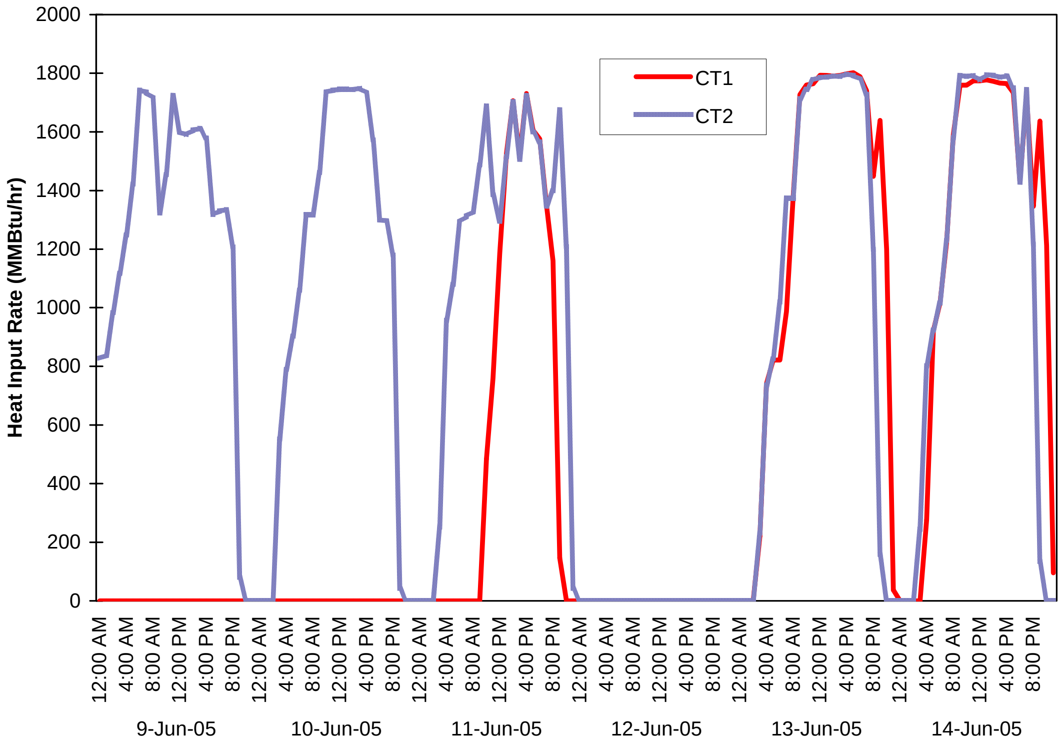


Figure 3-1 shows that the facility was running in a fairly consistent reduced load mode with daily increases in load during the afternoon. Less variable operating conditions are desired when determining the effect of the gas heat content increase on turbine operations. The more operating parameters that are static during the excursion event, the more likely that actual effects can be observed.

Sutter

The Sutter facility provided natural gas Btu content and composition data, gas turbine fuel use, MW production, and certain exhaust emission parameters. Ammonia is used for NOx control at this facility. The operating heat input of the two gas turbines during the excursion event is provided in Figure 3-2.

Figure 3-2: Sutter Turbines Operating Heat Input

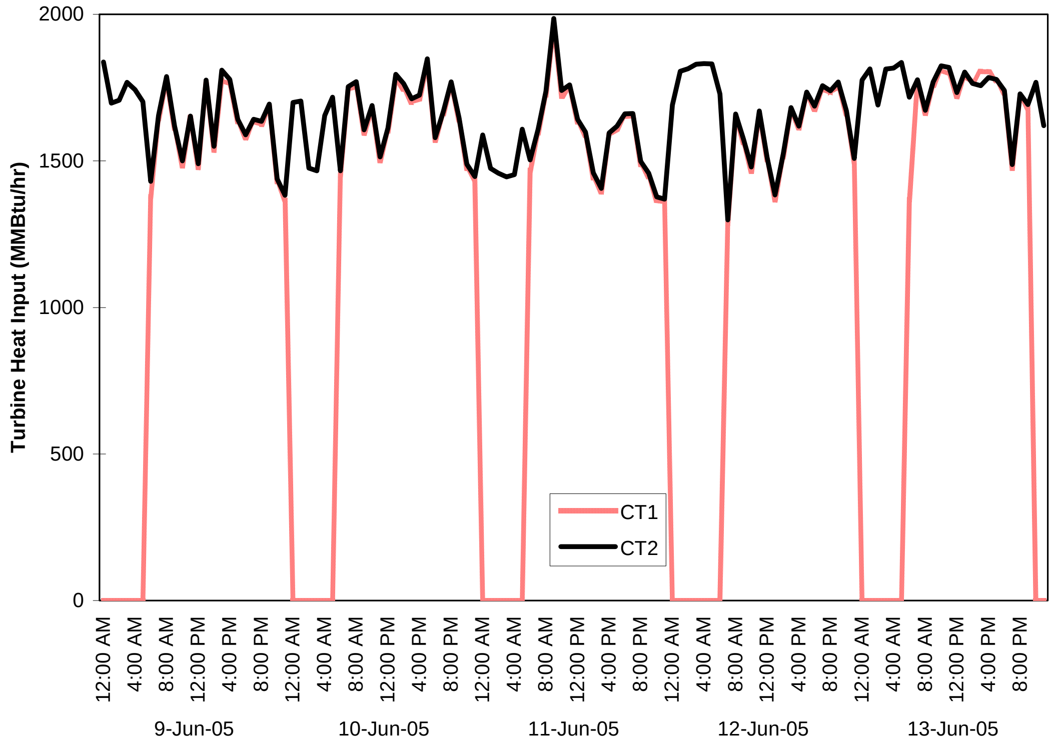


This figure shows that the Sutter facility operations were variable during the excursion period. However, there are three times when operations were consistent for a few hours at a time (on June 10, June 13, and June 14) that may provide some useful effects data. However, the rest of the period either represents down time, startup or shutdown periods, or is otherwise considered too variable for comparative purposes.

Los Medanos

The LMEC facility provided natural gas heat content, gas turbine fuel use and MW output, and certain exhaust emission parameters. The facility uses ammonia for NOx control. The operating heat input of the two gas turbines during the excursion is provided in Figure 3-3.

Figure 3-3: LMEC Turbine Operating Heat Input

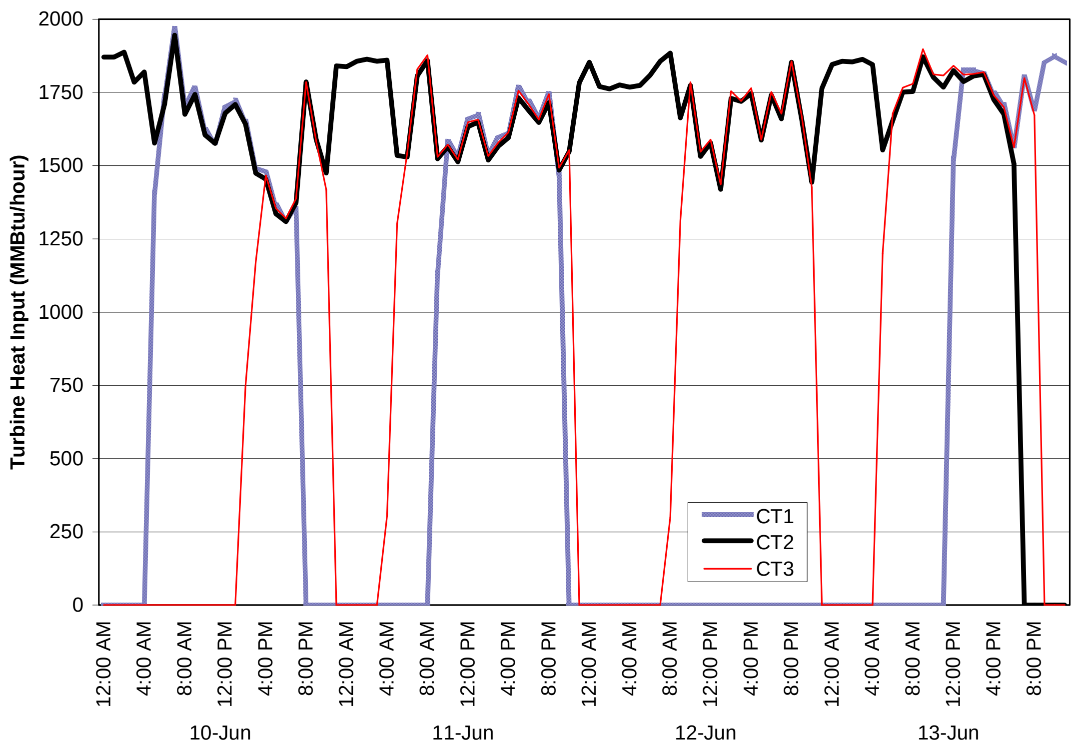


As shown in Figure 3-3, the load input of Turbine 2 (CT2), while somewhat variable, ranged between approximately 1300 and 2000 MM Btu/hr for the entire period of the heat content excursion, while Turbine 1 (CT1) underwent many startup/shutdown cycles during the period. The major limitation for using LMEC data to determine effects of the higher Btu gas is that only controlled emissions data were available. Therefore, the ammonia injection quantities will be the main variable assessed to determine if any effects were shown during the excursion event. However, due to the hourly load variability, the normal ammonia injection rate variability may be greater than what would occur due from an increase in gas heat content/Wobbe index.

Delta

This facility was operating in load following mode during the period of the excursion. Similar to LMEC, the small quantity of highly variable operating data that was obtained has limited use in predicting effects from the natural gas heat content excursion. This is exacerbated by the fact that actual as-used natural gas heat content data are not available for the period of the excursion event. However, for information purposes, the operating heat input data for the three Delta turbines are presented in Figure 3-4.

Figure 3-4: Delta Turbine Operating Heat Loading and MW Output



As shown in Figure 3-4, the load is highly variable and Turbines 1 (CT1) and 3 (CT3) went through numerous startup and shutdowns during the period. Turbine 2 (CT2) operated more consistently than the other two turbines.

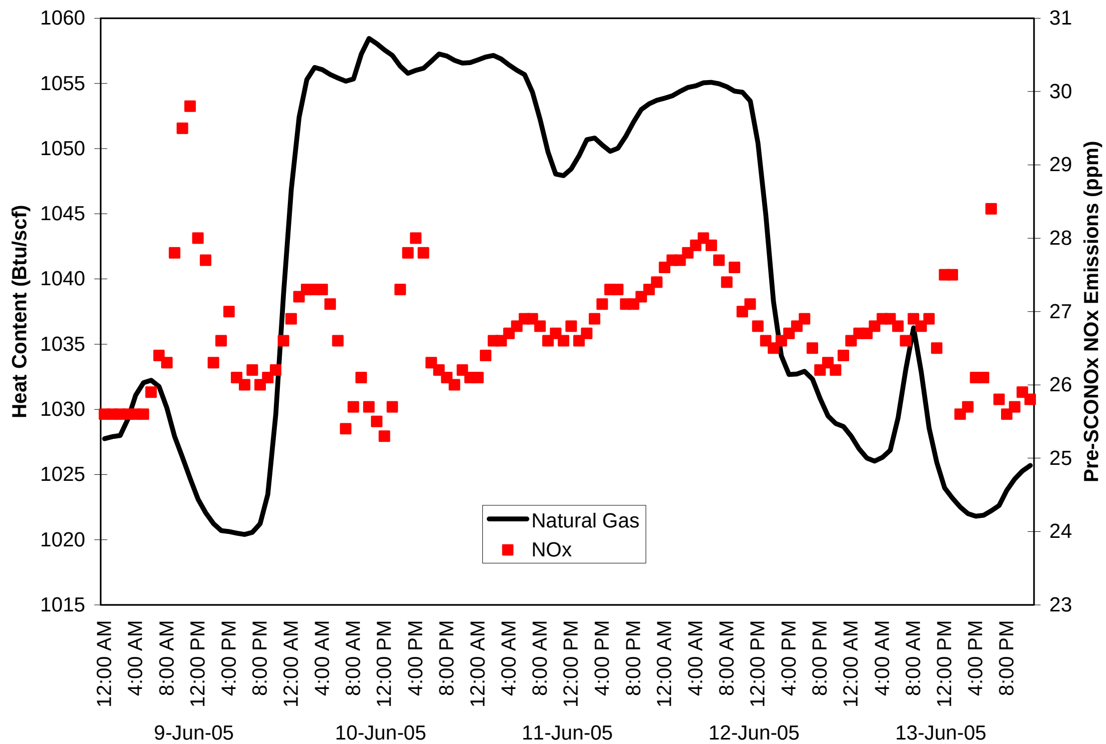
CHAPTER 4: OBSERVED EVENT EFFECTS

The observed effects are presented facility by facility and for each turbine, if multiple turbine data are available.

Redding

The data obtained for the Redding gas turbine included pre- and post SCONOx NOx levels. The Redding facility operated with some consistency during the excursion event period so determining the relationship between the heat content of the gas and NOx emissions is fairly straightforward. Figure 4-1 shows the pre-SCONOx NOx emissions (@ actual O_2 levels), the gas turbine heat input, and the natural gas heat content for the data collection period.

Figure 4-1: Redding Turbine Pre-SCONOx NOx Levels and Fuel Heat Content



As noted previously, and shown in Figure 3-1, the load increased every afternoon to handle additional demand, so the increases in NOx concentrations seen in the afternoon are at least partially due to the increase in load. By removing these peaking load periods a more definitive relationship can be established. This relationship is shown in Figure 4-2.

Figure 4-2: Redding Turbine Pre-SCONOx NOx Emissions Trend with Increased Fuel Heat Content

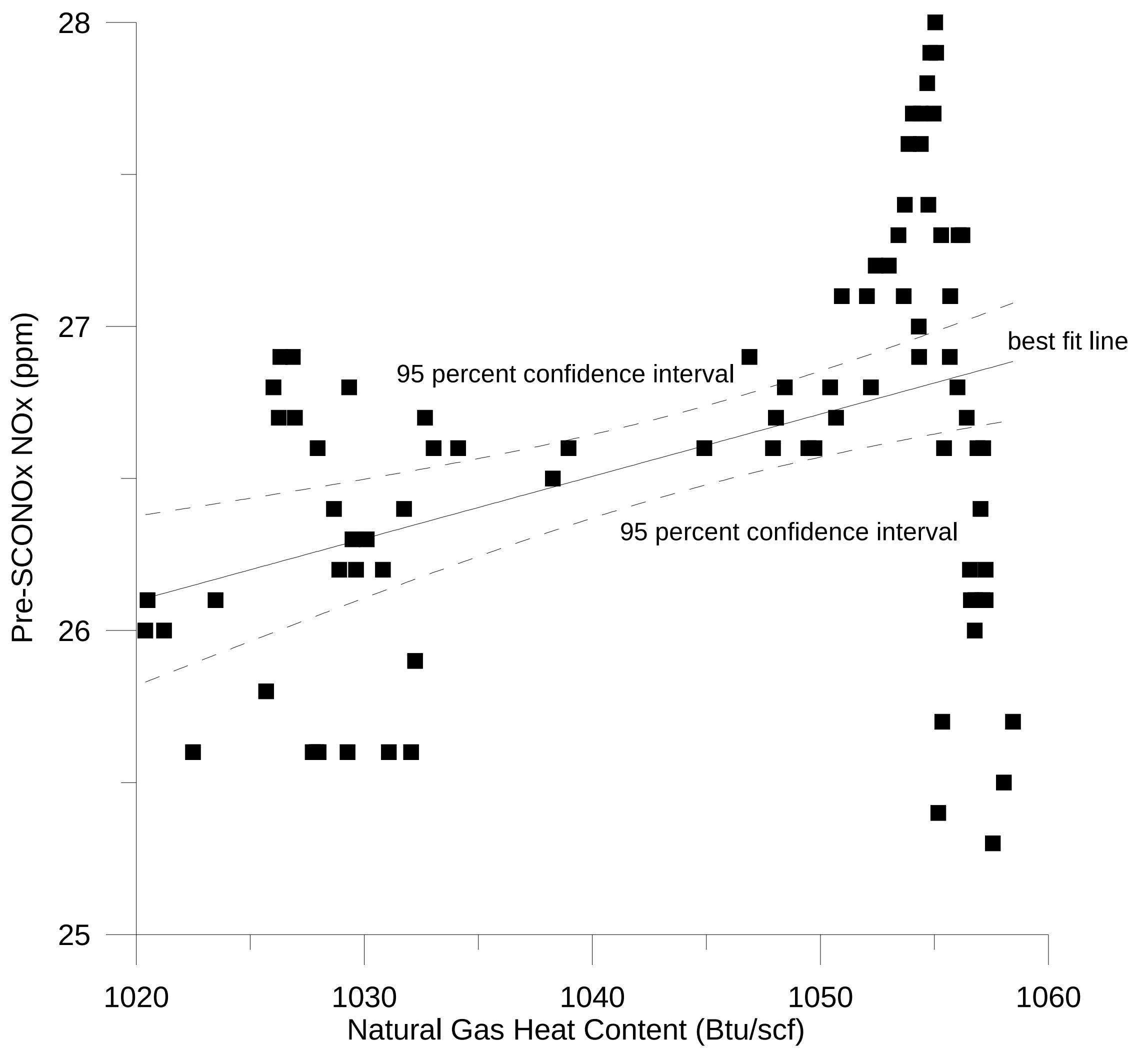
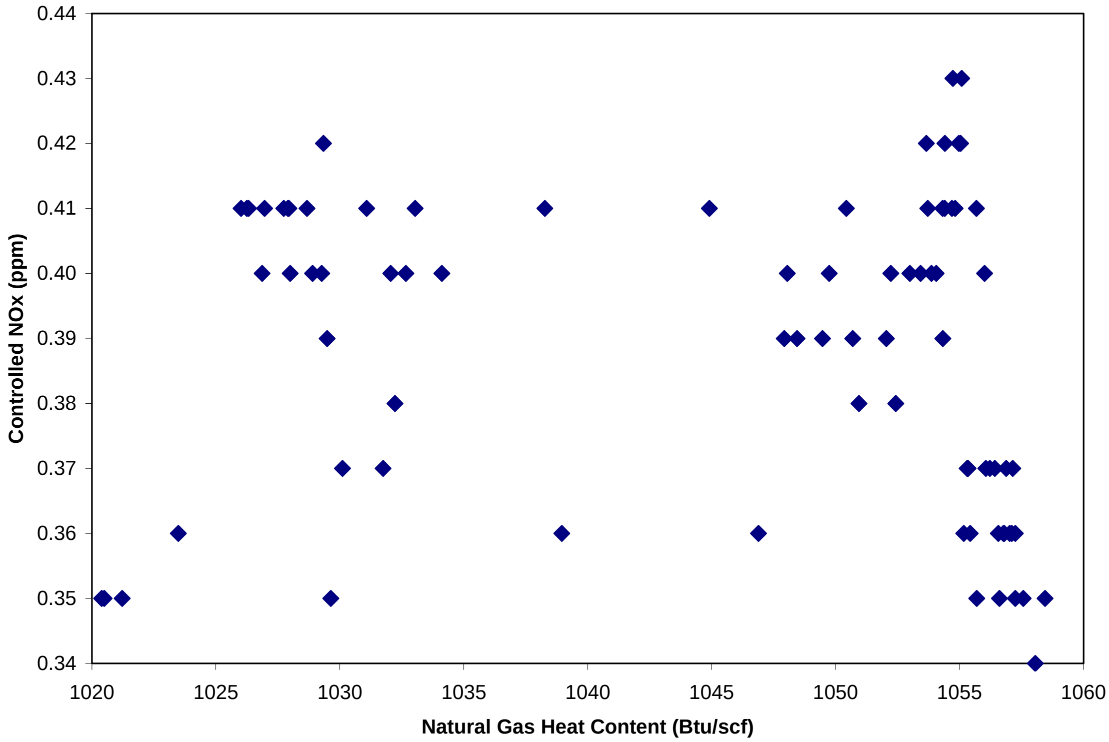


Figure 4-2 predicts that, for the range of natural gas heat contents observed, the pre-SCONOx NOx emissions will increase approximately 4 percent for a heat content increase of 4 percent. The turbine load represented by this data was limited to approximate values between 300 and 310 MMBtu/hr heat input (see Figure 3-1), which is approximately 60 percent of full load. It is possible that the effects shown in Figure 4-2 would be more pronounced at full load. Figure 4-2 also presents a linear regression best fit line and a 95 percent confidence interval for that fit.

Figure 4-3, using the same load level range as in Figure 4-2, shows that there appears to be no such pattern for the controlled NOx emissions (@15% O_2). The SCONOx system appears to be able to compensate for the apparent increase in pre-SCONOx NOx emissions caused by the increase in natural gas heat content/Wobbe index.

Figure 4-3: Redding Turbine Controlled NOx Concentration versus Natural Gas Heat Content

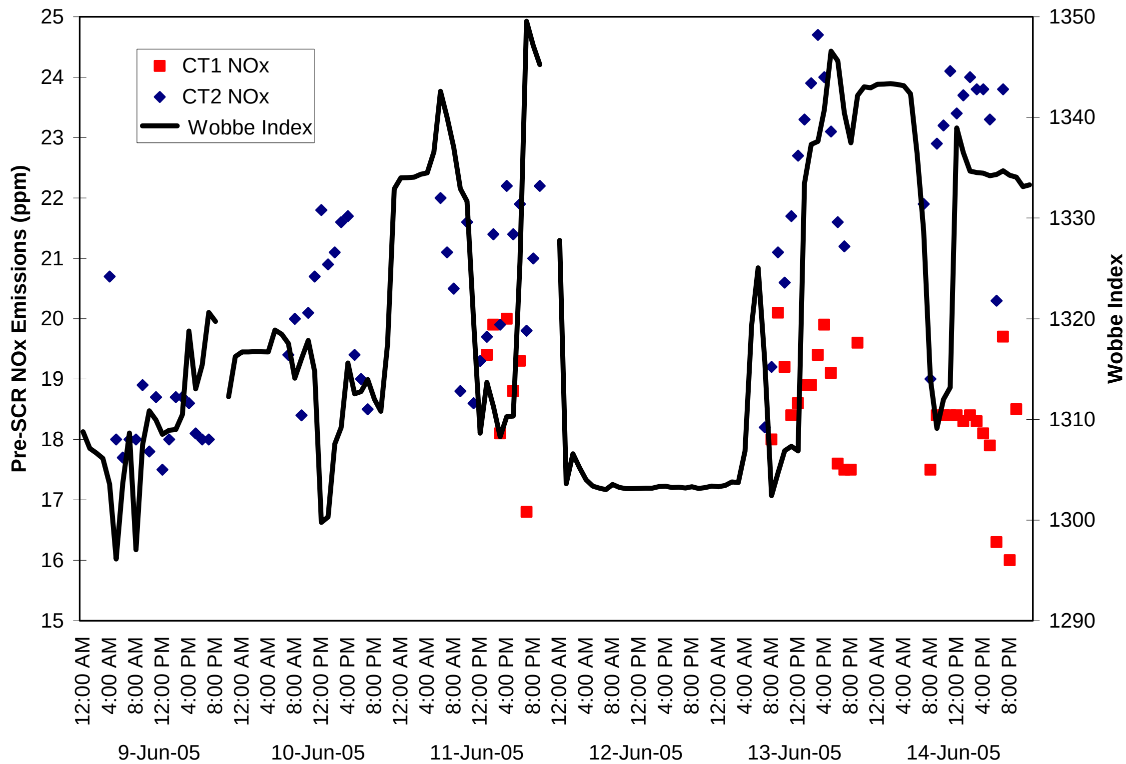


In conclusion, the increased heat content of the natural gas caused a slight increase in pre-SCONOx NOx emissions; however, the SCONOx control system was able to compensate so that the exhaust emissions did not increase by the same factor.

Sutter

The data obtained for the Sutter gas turbines include pre- and post-SCR NOx levels and ammonia injection rates. The Sutter facility operated for two periods of stable load during the excursion event (see Figure 3-2); data from these periods are used in the analysis. Figure 4-4 shows the pre-SCR NOx emissions (@15% O_2) for normal operating hours and fuel Wobbe index during the entire data collection period.

Figure 4-4: Sutter Pre-SCR NOx Emissions and Wobbe Index



The data in Figure 4-4 can be somewhat misleading since the data cover all normal operating data regardless of turbine load, and turbine load will clearly affect NOx emissions. By focusing on Sutter CT2 and its periods with stable loads, a more definitive relationship between pre-SCR NOx levels and fuel heat content/Wobbe index can be established. This relationship is shown in Figures 4-5 and 4-6 (NOx levels not corrected to 15% O_2).

Figure 4-5: Sutter CT2 Pre-SCR NOx Levels versus Natural Gas Heat Content

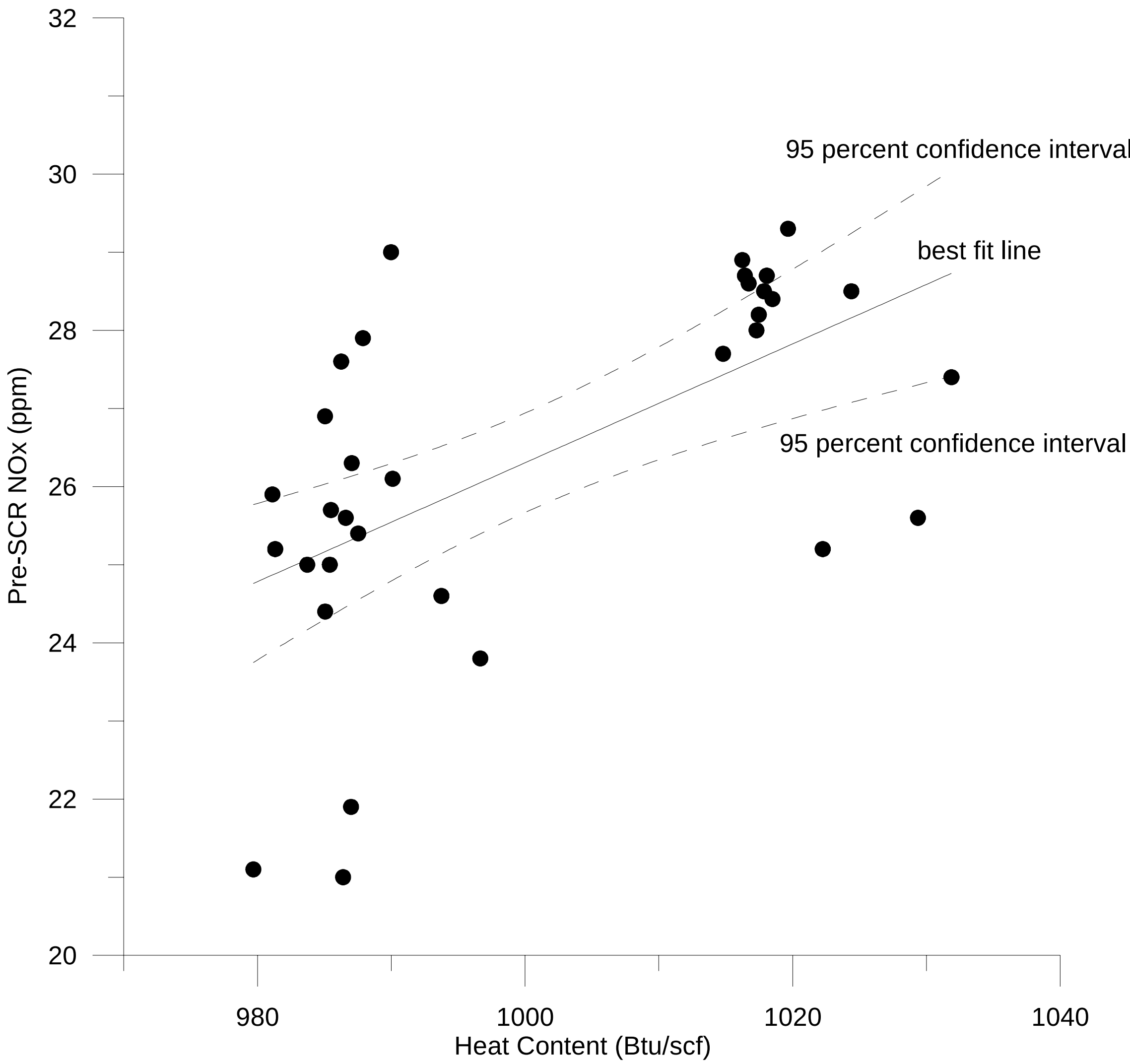


Figure 4-5 predicts that, for the range of natural gas heat contents observed, the pre-SCR NOx emissions will increase approximately 15 percent for a heat content increase of 5 percent at high turbine loads (1700 to 1800 MMBtu/hr). Figure 4-5 also presents a linear regression best fit line and 95 percent confidence interval for that fit.

Figure 4-6: Sutter CT2 Pre-SCR NOx Levels versus Wobbe Index

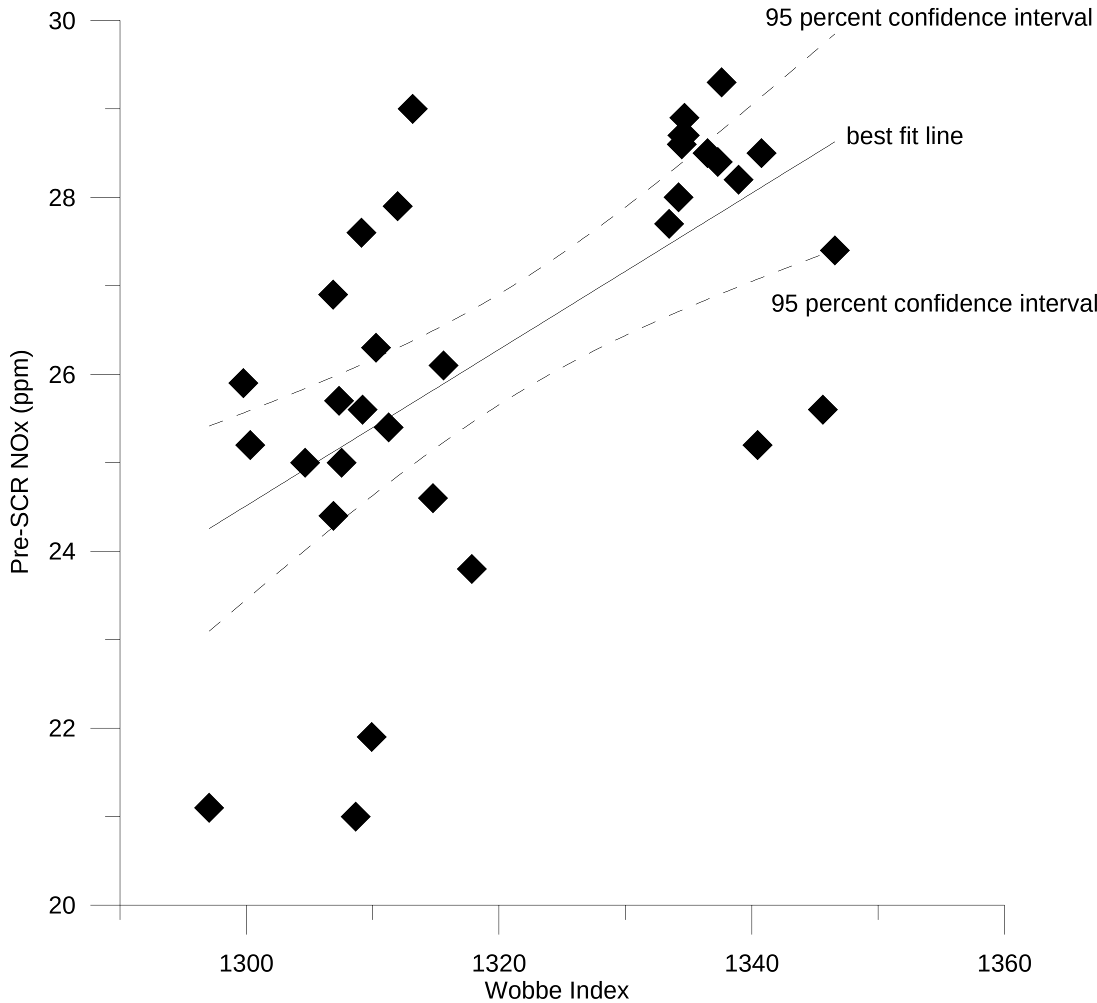


Figure 4-6 predicts that, for the range of Wobbe index observed, the pre-SCR NOx emissions will increase approximately 15 percent for a Wobbe index increase of 3.5 percent at high turbine loads (1700 to 1800 MMBtu/hr). Figure 4-6 also presents a linear regression best fit line and 95 percent confidence interval for that fit.

A similar relationship between ammonia injection and natural gas heat content/Wobbe index is shown in Figures 4-7 and 4-8.

Figure 4-7: Sutter Turbines Ammonia Use versus Natural Gas Heat Content

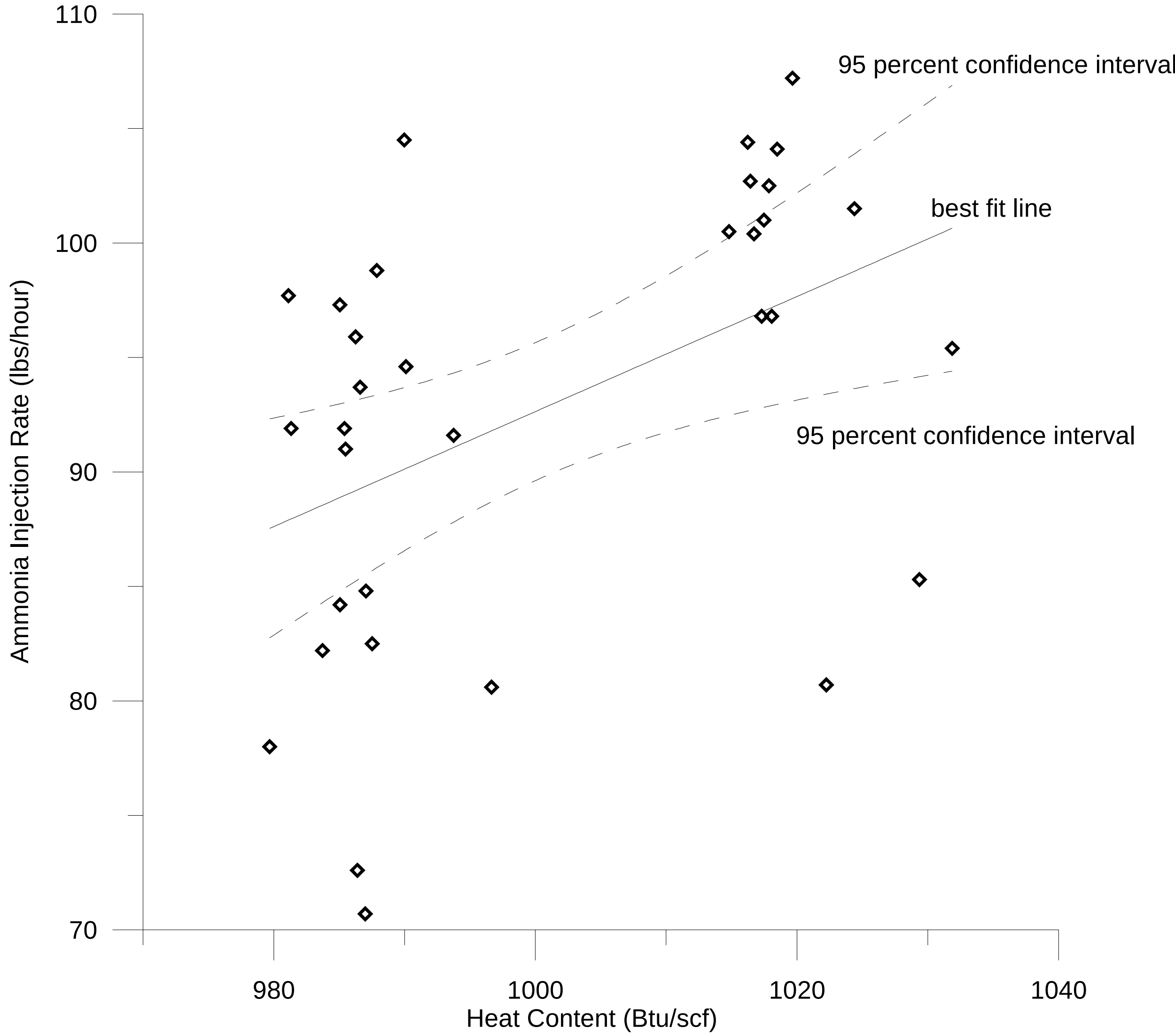


Figure 4-7 predicts that, for the range of natural gas heat contents observed, the ammonia consumption will increase approximately 10 percent for a heat content increase of 5 percent. Figure 4-7 also presents a linear regression best fit line and a 95 percent confidence interval for that fit.

Figure 4-8: Sutter Turbines Ammonia Use versus Wobbe Index

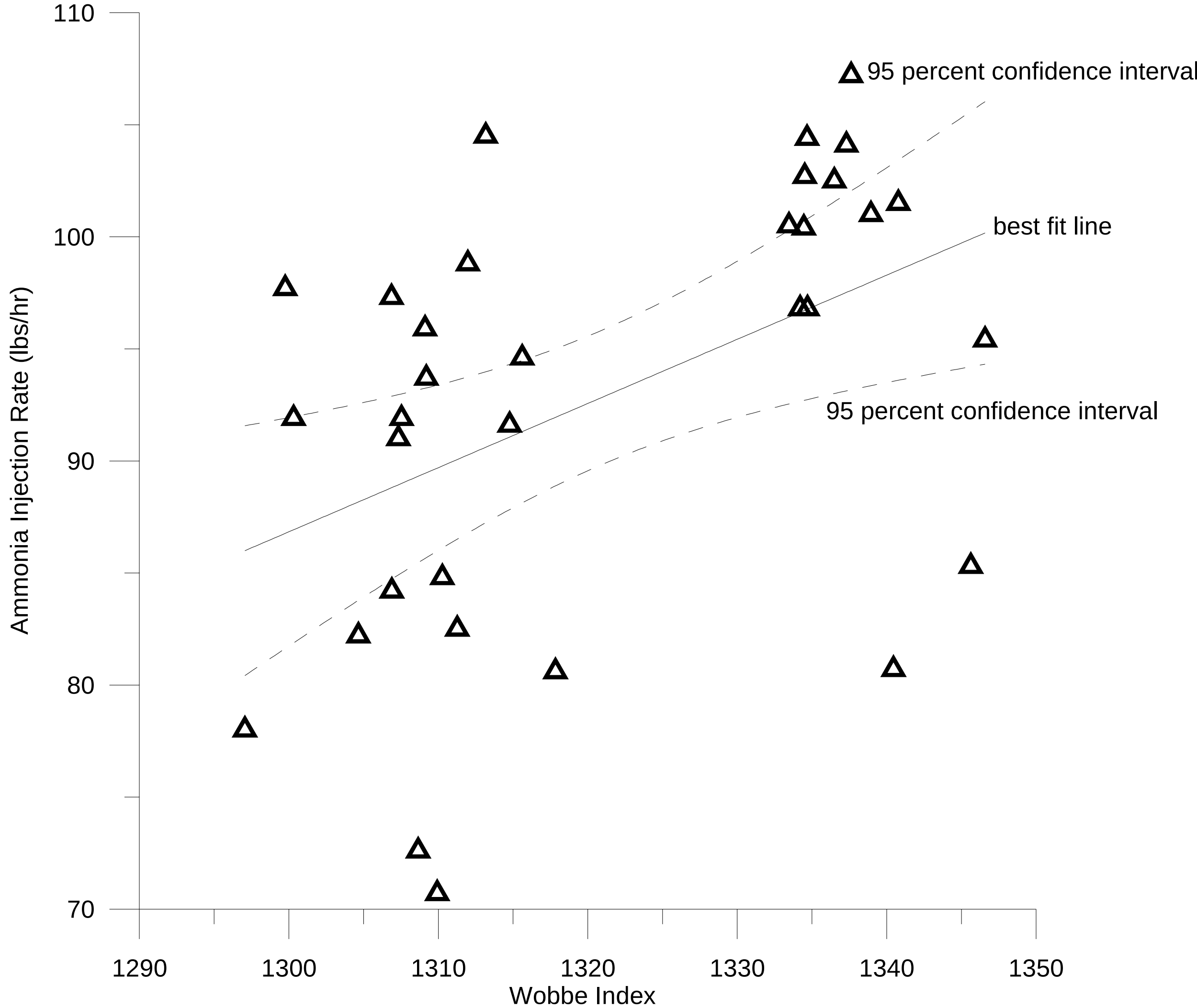


Figure 4-8 predicts that, for the range of natural gas heat contents observed, the ammonia consumption will increase approximately 10 percent for a 3.5 percent increase in Wobbe index. Figure 4-8 also presents a linear regression best fit line and a 95 percent confidence interval for that fit.

Figures 4-9 and 4-10 show that the controlled NOx emissions (@15% O_2) do not appear to be affected by the increase in fuel heat content/Wobbe index. With the exception of one value for Turbine 1, the SCR system controlled the NOx emissions to 2.2 to 2.3 parts per million (referenced to 15 percent O_2).

Figure 4-9: Sutter Turbines Controlled NOx Concentration versus Natural Gas Heat Content

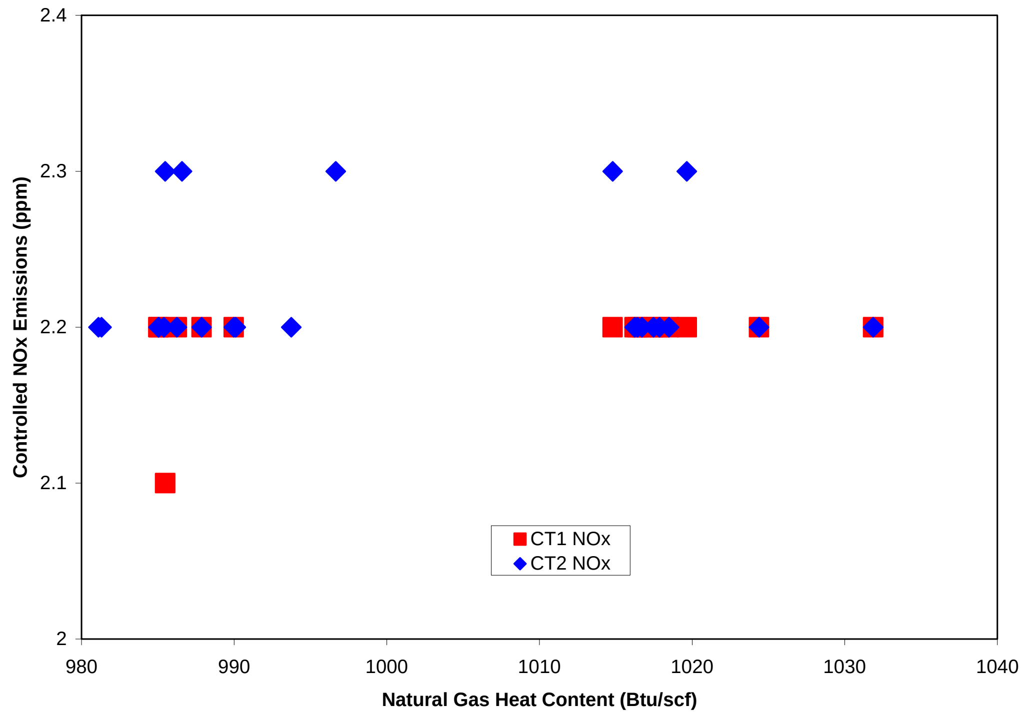
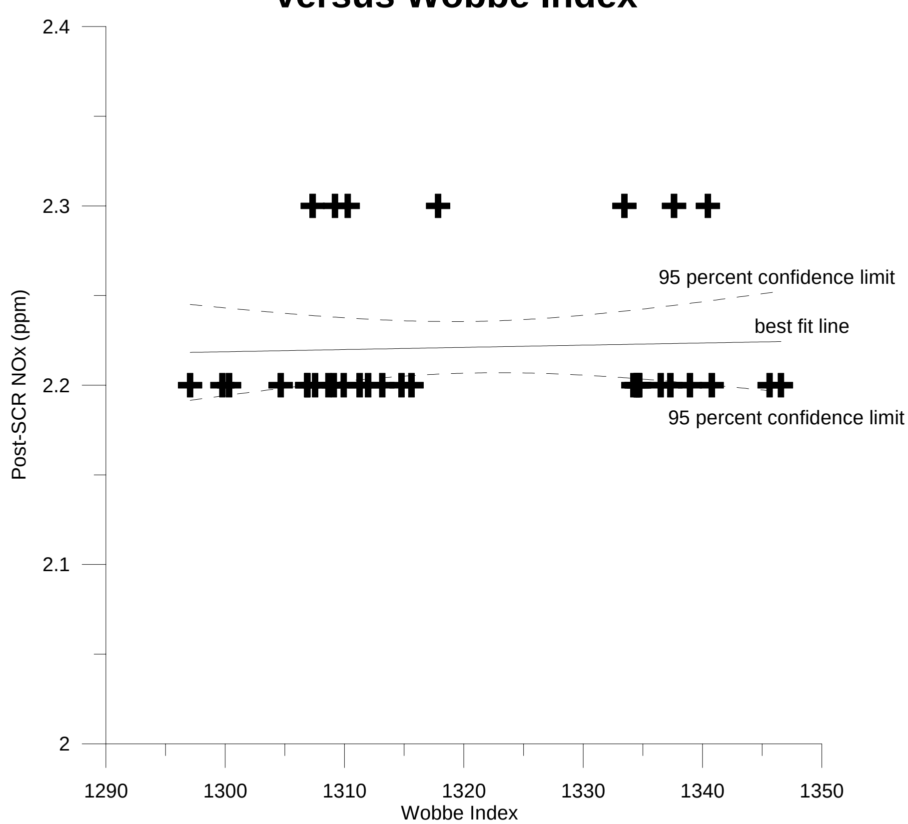


Figure 4-10: Sutter Turbines Controlled NOx Concentration versus Wobbe Index



In conclusion, the increase in natural gas heat content/Wobbe index does not significantly affect the controlled NOx concentrations at the Sutter facility but does seem to cause a small increase in pre-SCR NOx emissions and a corresponding increase in the NOx control system's ammonia consumption.

Los Medanos

The data obtained for LMEC did not include pre-SCR NOx emissions, so it will be more difficult to determine observable effects of the natural gas heat content excursion. This is exacerbated by the extreme load fluctuations that occurred during the period of the excursion event, and the fact that the natural gas fuel data provided for LMEC do not overlap well enough with the periods before and after the excursion event to be able to show the effects of increases in heat content/Wobbe index. Figures 4-11 through 4-13 show ammonia injection rate data and relationships and Figure 4-14 provides NOx emission concentrations during the period for both turbines. The corresponding as-fired natural gas heat content data are also shown on Figures 4-11 and 4-14. The turbine operating data shown are for normal operations excluding startup hours.

Figure 4-11: LMEC Gas Turbines Ammonia Injection Rates

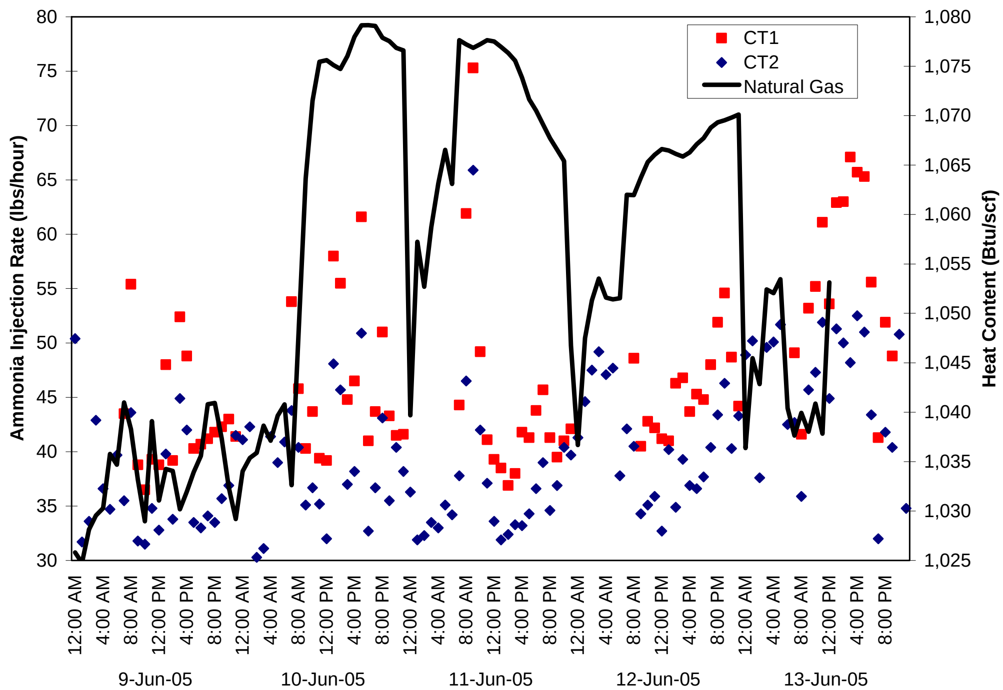


Figure 4-11 shows a potential minor increase in ammonia flow versus increased natural gas heat content. This relationship has been further compared in Figure 4-12 which plots ammonia injection rates per unit heat rate versus the natural gas heat content.

Figure 4-12: LMEC Turbine Heat Load Adjusted Ammonia Injection Rate versus Fuel Heat Content

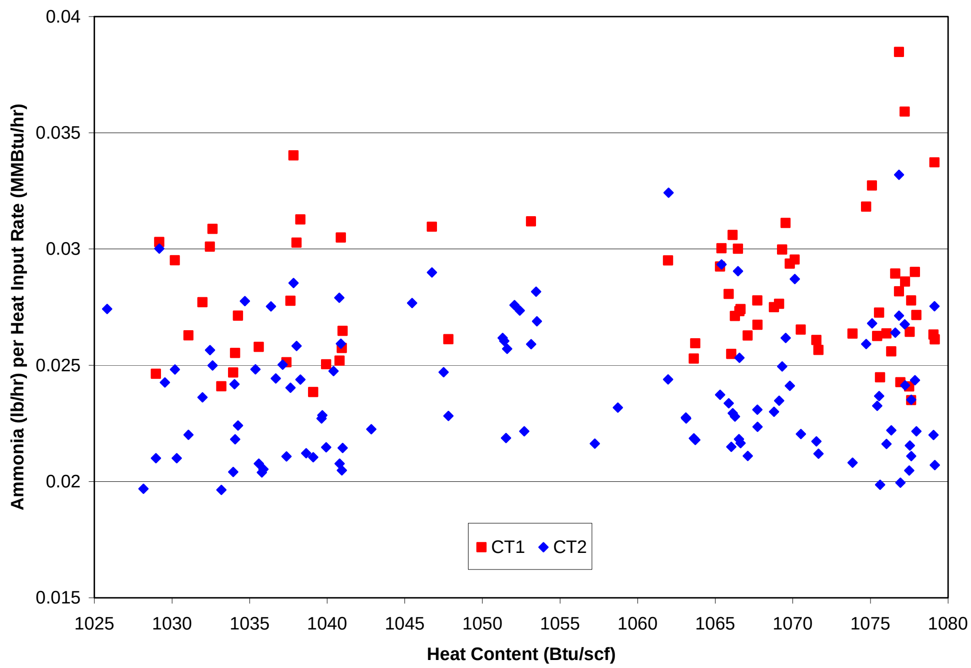


Figure 4-12 shows that there may be a small increase in the ammonia injection rate as the heat content of the natural gas increases. However, due to the operational variability, specific statistical relationships cannot be reliably determined.

In general, as shown in Figure 4-13 below, the ammonia injection rate increases with increased heat input rates. However, this relationship is much stronger for turbine heat input rates above 1700 MMBtu/hr.

Figure 4-13: LMEC Gas Turbines Ammonia Injection Rates versus Heat Input

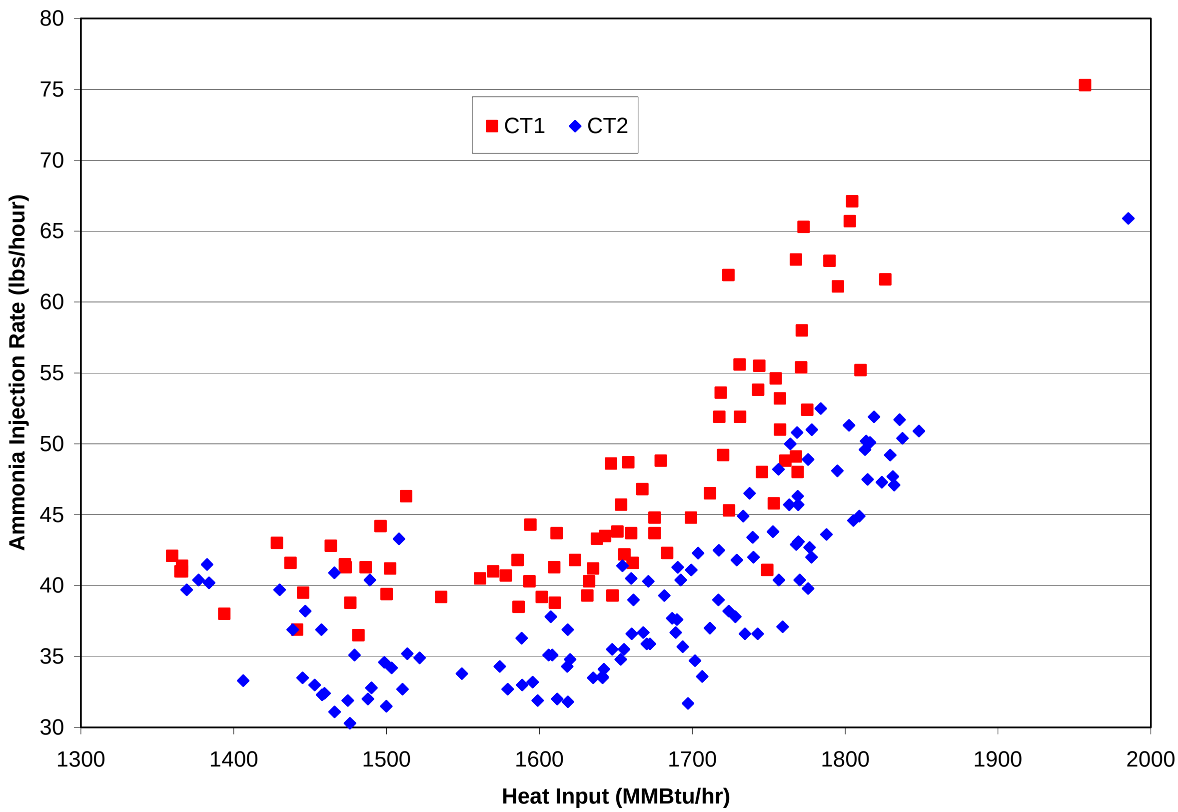
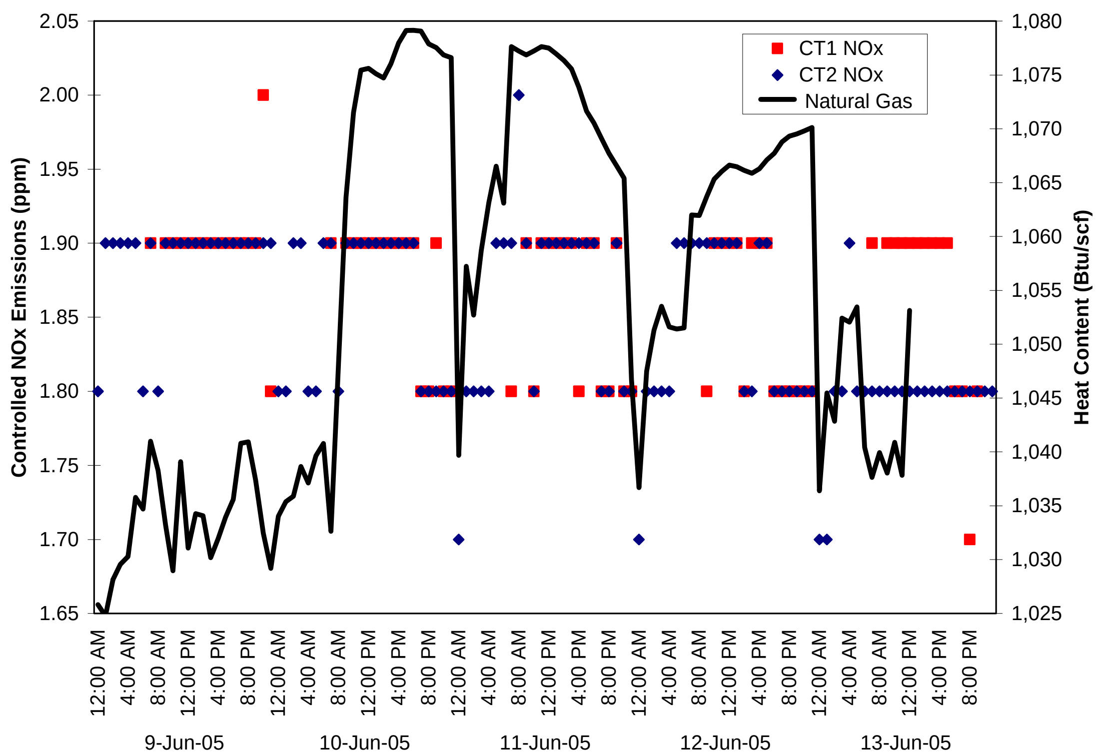


Figure 4-14, below (NOx shown @15% O_2), shows that the NOx control system was able to compensate for probable increases in pre-SCR NOx due to the higher natural gas heat content. However, it also shows that the Turbine 2 system was slow in compensating for the three rapid decreases in heat content when Delta blended gas was fired and this caused unusually low NOx concentrations coincident with the rapid drop in natural gas heat content.

In summary, the increased heat content caused a small increase in the ammonia injection rate for the LMEC gas turbine NOx control systems, and this increase allowed controlled NOx levels to be maintained.

Figure 4-14: LMEC Turbines Controlled NOx Emissions and Natural Gas Heat Content

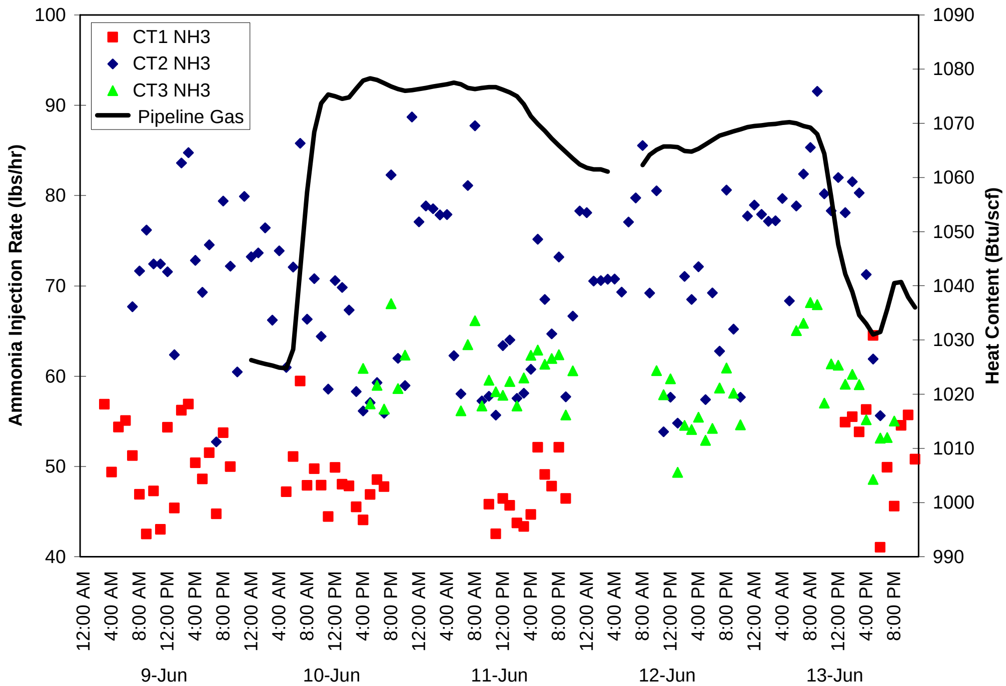


Delta

Due to an equipment problem, the data obtained for Delta did not include as-fired natural gas heat content data. Delta uses a blended natural gas fuel, so the heat content cannot be readily predicted and therefore, the effects of the heat content excursion cannot be readily determined. Additionally, similar to LMEC, any effects on the Delta gas turbines would have been difficult to determine due to the extreme load fluctuations that occurred during the period of the excursion event, and the fact that pre-SCR NOx concentrations are not available. However, it can be reasonably assumed that the effects on the Delta gas turbines would have been minimized by the blended fuel source.

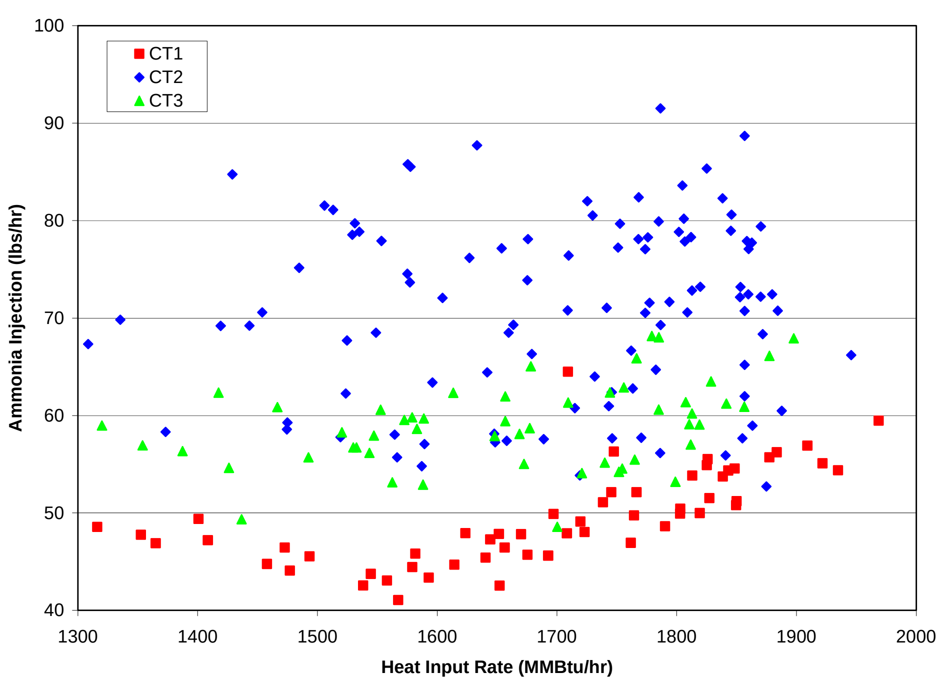
For information purposes, the ammonia injection rate over the period of the excursion event, the ammonia injection rate versus input heat rate data, and the NOx emission concentrations during the period for all three turbines are provided in Figures 4-15 through 4-17, respectively. The corresponding PG&E pipeline natural gas Wobbe index data are also shown on Figures 4-15 and 4-17 to provide an indicator when the blended fuel source would likely have experienced increases in heat content/Wobbe index. The turbine operating data shown are for normal operations excluding startup hours.

Figure 4-15: Delta Gas Turbines Ammonia Consumption



No significant pattern of increased ammonia injection rates can be reliably determined for the Delta turbines with the exception of ammonia injection versus heat input rate as shown in Figure 4-16. Figure 4-16 shows that, as expected, ammonia inject rates increase with increased turbine heat input load.

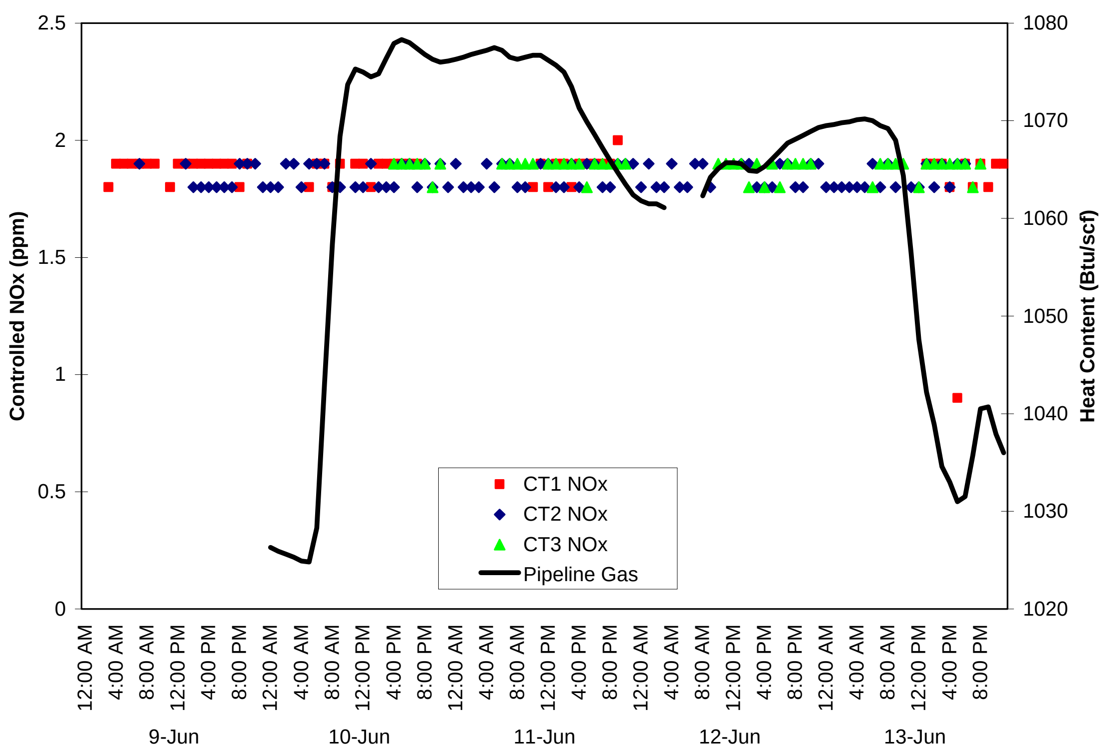
Figure 4-16: Delta Gas Turbines Ammonia Injection Rates versus Heat Input Rate



Figures 4-15 and 4-16 both show that the three Delta turbines have extremely different ammonia injection rates with Turbine 2 having rates that are on average more than 50 percent higher than Turbine 1, while Turbine 3 level ammonia injection rates fall between these two other turbines.

As can be seen in Figure 4-17, the NOx emissions (@15% O_2) are very consistent during the excursion period and it appears that the NOx control system adjusted as necessary to compensate for any effects of the increased heat content/Wobbe index of the natural gas fuel.

Figure 4-17: Delta Gas Turbines NOx Emissions



In summary, no pattern of any discernable effect of the natural gas excursion on the Delta gas turbines was discovered; however, that may be due to the amount and type of data that were available for the excursion event period.

CHAPTER 5: OTHER VARIABLE HEAT CONTENT EFFECTS DATA

The Midway Sunset facility has provided data (not related to the above excursion event) showing the effects of a decrease in natural gas heat content on carbon monoxide emissions from GE 7001E Frame turbines.[9] The local fuel source for the Midway Sunset facility, the Elk Hills Naval Reserve, is normally a relatively high heat content natural gas (~1100 Btu/scf). The collected data are provided in Appendix A. Figures 5-1 and 5-2 show the carbon monoxide (CO) emissions for the Midway Sunset turbine as a function of natural gas heat content and Wobbe index, respectively, before and after an expensive burner modification to allow greater fuel input flexibility. These figures also provide data for a second gas turbine that underwent additional modifications after the initial burner modification to correct the CO response issue. These turbines do not have oxidation catalysts to control the exhaust CO emissions.

For this cogeneration facility, the CO emissions concentration limit was permitted at 25 ppm. It should be noted that current permitted carbon monoxide emission limits for natural gas fired 7E turbines in the Central Valley would be expected to be around 2 to 6 ppm, and that at this regulatory level CO catalysts are generally not needed to ensure compliance during normal operations.

Figure 5-1: Midway Sunset CO Emissions versus Fuel Heat Content

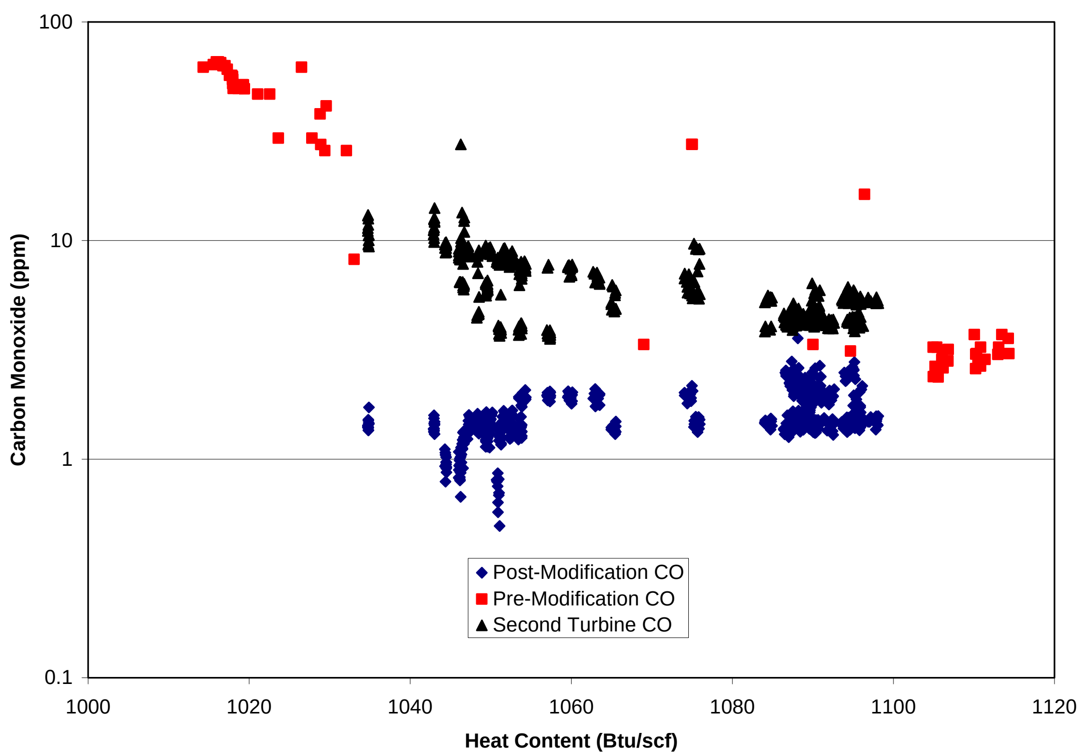
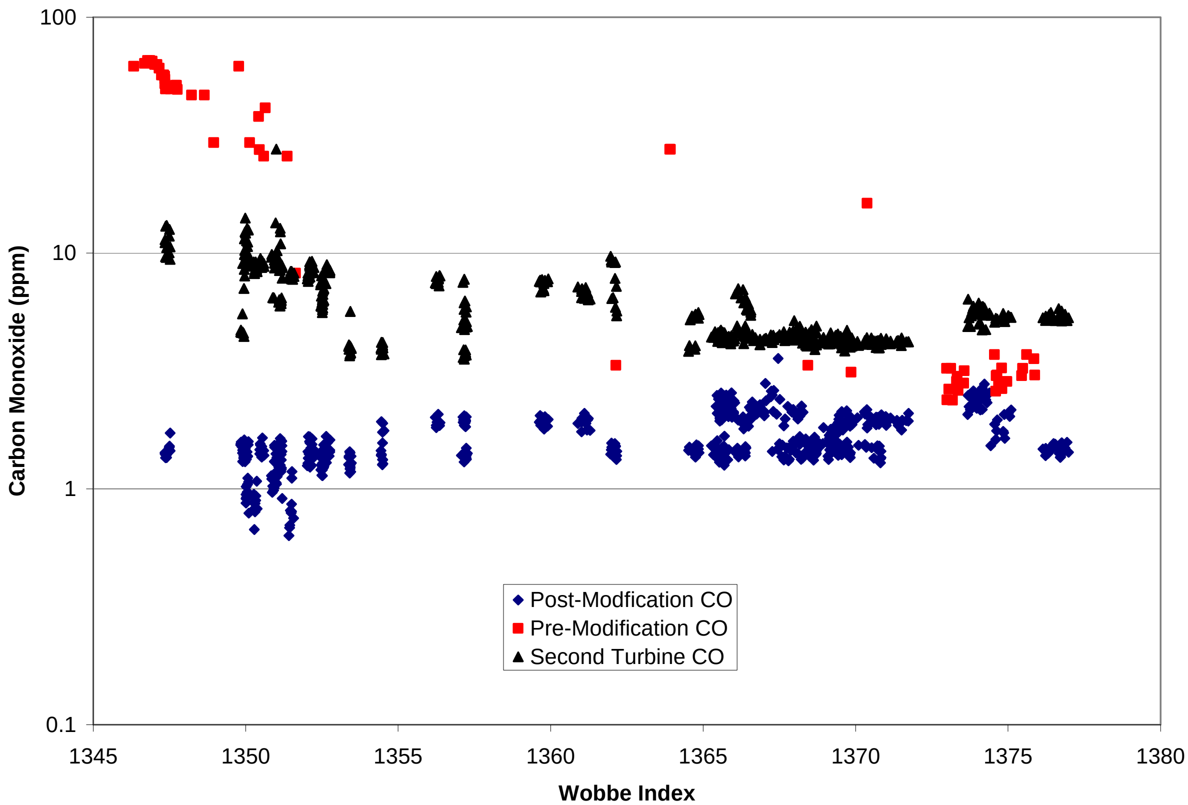


Figure 5-1: Midway Sunset CO Emissions versus Wobbe Index



The pre-modification emissions/heat content data are from May 24, 2001, and the post-modification and second turbine emissions/heat content data are from May 9, 2005.

The carbon monoxide emissions prior to the burner modification dramatically increased as fuel heat content decreased, and the second turbine shows a similar though less dramatic response with reduced fuel heat content. The dramatic response is attributed to the specific Dry Lo-NOx (DLN) burner. The Unit A turbine originally had 15 ppm NOx combustor liners, and the unit operated at 10 to 12 ppm NOx and 0 to 1.5 ppm CO with little effect with fuel Btu changes. The Midway-Sunset operator suggests, based on his experience, that combustor liners with lower NOx guarantees (that is, 9 ppm liners) have a higher sensitivity to fuel variation. The problems with significant CO emission response with Btu changes occurred after replacing the 15 ppm NOx combustor liner with a 9 ppm NOx model. It was the 9 ppm NOx combustor liner that required the additional combustor modifications to reduce CO levels to levels that complied with their permit conditions. After Midway Sunset completed the costly additional combustor modifications, the 9 ppm NOx combustor liner is now able to adjust more effectively and maintain proper combustion when the fuel heat content decreases from the normally high levels.

While the CO emissions were significantly affected due to the reduction in fuel heat content, there was a negligible effect on the Midway Sunset controlled NOx emissions. However, the Midway Sunset operator noted that, while counterintuitive due to the complexities in burner design and operation, it is possible that the NOx emissions could actually increase in certain cases when fuel heat content is reduced.

Figures 5-1 and 5-2 show that burners designed to allow a greater range in fuel composition can ensure low emissions over a wide range of natural gas fuel compositions. In fact, the post-modification burner, excepting for a few outlier data points, now results in lower carbon monoxide emissions than the pre-modified burner under all fuel heat content conditions within the range of the natural gas data provided. However, additional hot gas path component modifications, as experienced by the second turbine, can cause the CO emission reductions gained by these burner emissions modifications to be partially negated.

CHAPTER 6: OTHER STUDY FINDINGS/OTHER CONSIDERATIONS

Other Study Findings

Other studies performed by Southern California Gas Company (SoCalGas) and the South Coast Air Quality Management District (SCAQMD), among others, have looked at the effects of increasing natural gas heat content. The principal focus of all of these studies was to determine the effect of increased heat content on NOx emissions. A short summary of the findings of these other studies is provided in Table 6-1.

Table 6-1: Other Natural Gas Heat Content Study Finding Summary

Study Source	Equipment	Summary of Findings
SCAQMD	Microturbine	NOx increases with heat content increase (20 percent increase when Btu increases from 1020 to 1140 Btu/scf)
SCAQMD	Commercial Boiler	NOx increases with heat content increase (Max increase 17 percent)
SRI	Lean Burn Engine	Significant NOx increase with heat content increase (more than doubled for engine without air-to-fuel ratio controller, and 35 percent increase with controller)
SoCalGas	Residential furnaces	Little or no increase in NOx concentration with increased heat content
SoCalGas	Residential water heaters	Little or no increase in NOx concentration with increased heat content
SoCalGas	Natural Draft Burners	Little or no increase in NOx concentration with increased heat content
SoCalGas	Charbroiler	NOx increases with heat content increase (Max increase 41 percent)
SoCalGas	Deep Fat Fryer	NOx increases with heat content increase (Max increase 38 percent)
SoCalGas	Instant Water Heater	NOx increases with heat content increase (Max increase 15 percent)
SoCalGas	Pool Heater	NOx increases with heat content increase (Max increase 61 percent)
SoCalGas	Condensing Hot Water Boiler	NOx increases with heat content increase (Max increase 143 percent)
SoCalGas	Lo-NOx Hot Water Boiler	NOx increases with heat content increase (Max increase 169 percent)
SoCalGas	Lo-NOx Steam Boiler	NOx increases with heat content increase (Max increase 134 percent)
SoCalGas	Ultra Lo-NOx Steam Boiler	NOx increases with heat content increase (Max increase 50 percent)

Source: SCAQMD[10]
SCAQMD – South Coast Air Quality Management District
SRI – Southern Research Institute

The increased NOx values observed in many of these other tests were higher than observed at the large gas turbines in this study; however, the range of natural gas heat content in the other studies was also greater. A general conclusion that can be made from these other studies is that smaller external combustion burners that do not have high flame or combustion zone temperatures are less affected by heat content or Wobbe index than those burners that do have higher flame or combustion zone temperatures. Also, it can be generally concluded, using the former tests and the information from this report, that turbine type internal combustion engines are less affected by heat content/Wobbe index than piston type internal combustion engines. Considering the time and temperature requirements for the formation of thermal NOx, this finding is not surprising, but it is interesting that significant increases in NOx formation were found for some small external fired sources (pool heaters, charbroilers, and deep fat fryers, see Table 6-1).

It is important to note that these other studies are based on controlled tests. It is unlikely that there would be a cost effective way to perform such controlled tests with actual real-world operating power turbines and other large gas-fired power production facilities, since the amount of fuel necessary to perform such an experiment would be problematic to handle and transport, and it would be difficult for power plant operators to control operations to meet the objectives of such a controlled test.

CHAPTER 7: DATA LIMITATIONS

The analyses and conclusions presented in this report are limited by the available data and the context under which the data were gathered. This study is not purported to be a controlled experiment, nor is it meant to provide conclusive findings on the impacts of natural gas heat content on all large gas turbines for natural gas quality policy or regulatory determinations. Rather, this study is meant to provide initial data and findings regarding the effects of a single natural gas Btu content excursion event.

Since this was not a controlled experiment, both the gas Btu content and turbine operations were variable during the June 10 through June 13 excursion period. Additionally, not all desired data were available from all of the facilities included in this study. In the case of the Delta Energy Center, the heat content of the fuel used was not available so the operational/emissions data could not be meaningfully processed. In other cases, such as Sutter and Los Medanos, only short periods representing a few hours over the three-day period were considered to be useful or comparable for the determination of the effects of the heat content excursion. Therefore, the quality of the data are somewhat compromised based on the short-term nature of the event and the operational variability encountered at the facilities providing data.

No direct emission comparison can be made between separate facility gas turbines, both within the same facility or in another facility. The turbine and emission control technologies designs, including the combustor liner designs, are not all consistent between the facilities included in this study, the operations of each facility are variable from one another, and each gas turbine unit in each facility undergoes physically separate tuning events at different intervals. Therefore, the specific effects of the heat content excursion are analyzed separately for each turbine. However, observations of the general trends between comparable turbines have been provided.

CHAPTER 8: CONCLUSIONS

The gas turbine data collected indicate that the 2 percent to 5 percent increase in natural gas heat content observed at the facilities studied during the excursion event caused a minor increase in pre-SCONOx/SCR NOx emissions and ammonia consumption rates for facilities with SCR NOx controls. However, the controlled NOx emissions did not show such a trend, so it appears that the NOx controls (both SCR and SCONOx) were able to compensate under the range of natural gas compositions encountered during the excursion event.

The amount of data, number of facilities, types of facilities, and emission controls covered by this study were extremely limited and only represent a small fraction of the total natural gas power production facilities within California. Currently, the majority of natural gas-fired power plant emissions in California come from cogeneration and boiler facilities. Therefore, it is recommended that data from additional facilities (boilers, simple cycle turbines, cogeneration facilities, etc.) be gathered to determine if the effects observed during this study are representative of the facility types included in the study, if similar effects would occur for other technologies and emission controls, and if these effects could cause cumulatively significant impacts in exhaust emission levels.

It is recommended that natural gas data collected have sufficient information (specific gravity or full composition data) to enable the calculation of the Wobbe index. It is desirable to establish relationships between fuel Wobbe index and emissions and other operation variables in order to help guide future natural gas policy decisions.

It is also recommended that effects on fuel efficiency and greenhouse gas emissions from higher heat content natural gases also be included as future study objectives.

BIBLIOGRAPHY

[1] Pacific Gas and Electric Company, Pipe Ranger, http://www.pge.com/pipeline/news/20050608_620_news.shtml, News Article, June 8, 2005.

[2] City of Redding, Redding Power, Natural Gas Heat Content (6/8 to 6/13) Unit #5 Performance Data (June 9 to June 15). Provided by Russ Bennett. June 2005.

[3] Calpine Corporation. Natural Gas Composition Data and Sutter Facility Gas Turbine Performance Data (June 9 to June 14). Provided by Diane Tullos. June and August 2005.

[4] Calpine Corporation. Natural Gas Composition Data and LMEC Facility Gas Turbine Performance Data (various dates from June 6 to June 13). Provided by David Zeiger. June 2005.

[5] Calpine Corporation. Natural Gas Composition Data and Delta Facility Gas Turbine Performance Data (various dates from June 6 to June 13). Provided by David Zeiger. June 2005.

[6] Pacific Gas & Electric Company. Rule No. 21 – Transportation of Natural Gas, last revised April 2005.

[7] Southern California Gas Company. Rule No. 30 – Transportation of Customer-Owned Gas. Last revised March 30, 2003.

[8] United States Environmental Protection Agency. Standards of Performance for Stationary Gas Turbines. 40 CFR Part 60 Subpart GG Section 60.331(u). Amended July 8, 2004.

[9] Midway Sunset Cogeneration Company. Natural Gas Heat Content, Gas Turbine Carbon Monoxide Emissions Data and Additional Facility Description Information. Provided by Greg Jans. June, August, and September 2005.

[10] South Coast Air Quality Management District. Natural Gas Quality and Air Quality. Presented by Chung S. Liu, Deputy Executive Director, at the California Public Utilities Commission/California Energy Commission Workshop on Natural Gas Quality. February 2005.

APPENDIX A
DATA SUMMARY

Appendix A - Data Notes

General Notes
1. The raw data shown are as provided to the Energy Commission. The only manipulation was conversion into spreadsheet format and hourly averages when other time frames were provided.
2. Calculated values, such as fuel Wobbe index, are shown in red.
3. Data not provided or missing are left blank, while data provided as "NA" or in other similar formats, were left in those formats.

Sutter Turbine Data Notes
1. Sutter has two turbines
2. Sutter steam augmentation data was provided; however, no steam augmentation were performed for either turbine during the data period so those data are not presented.
3. Sutter duct firing data is only provided for CT1. CT2 had no duct firing during the period.

Sutter Fuel Data Notes
1. Sutter uses a mixed fuel source: the PG&E pipeline gas and Calpine-owned gas that has low Btu content.

Redding Data Notes
1. Redding uses fuel directly from the PG&E pipeline.
2. The data provided for Redding starts on June 8th for the natural gas data, and June 9th for the turbine operation data.
3. The Redding fuel heat content data were converted into an hourly average value.

Los Medanos Data Notes
1. Los Medanos has two turbines
2. Los Medanos can use a mixed fuel source: the PG&E pipeline gas and Calpine-owned gas that is mixed at the Delta facility.
3. The data provided for Los Medanos start half way through June 6th for the natural gas data, and June 9th for the turbine operation data.
4. The Los Medanos turbine MW, turbine exhaust temperature, and turbine heat rate data were converted into an hourly average values.

Delta Data Notes
1. Delta has three turbines
2. Delta uses a mixed fuel source; however, the data for the as-used fuel were not available during the surge event.
3. The Delta CT2 turbine MW, turbine exhaust temperature, and turbine heat rate data were converted into an hourly average values. Similar data for CT1 and CT3 were not provided.

Delta PG&E Natural Gas Data Notes
1. These data are for the pipeline natural gas and do not correspond to the Delta turbine fuel.

Midway Sunset Data Notes
1. The data presented are for two different time periods, and the second time period has data from two turbines. These data are not for the PG&E pipeline event covered by the other data.
2. The Wobbe index values are calculated
3. Unit A combustor was modified between the first and second period, as was the Unit X combustor; however, the Unit X combustor had additional modifications performed as well.

Table A-1 Sutter Fuel Data

Day	Hour	Turbine Fuel Data							Wobbe
		Heat Content Btu/scf	Specific Gravity	Composition Data (%)					
				Methane	Ethane	Butane	Propane	Nitrogen	
9-Jun-05	0:00:00	987	0.570	96.8	0.22	0	0.01	2.82	1307
	1:00:00	985	0.569	96.8	0.14	0.00	0.01	2.92	1307
	2:00:00	985	0.569	96.8	0.18	0.00	0.01	2.96	1306
	3:00:00	985	0.569	96.8	0.15	0.00	0.01	2.98	1306
	4:00:00	983	0.569	96.6	0.15	0.00	0.01	3.13	1303
	5:00:00	979	0.571	96.2	0.18	0.00	0.01	3.54	1296
	6:00:00	983	0.569	96.6	0.16	0.00	0.01	3.12	1303
	7:00:00	986	0.569	96.8	0.20	0.00	0.01	2.86	1308
	8:00:00	980	0.571	96.3	0.16	0.00	0.01	3.48	1297
	9:00:00	985	0.568	96.9	0.13	0.00	0.00	2.89	1307
	10:00:00	987	0.568	97.0	0.16	0.00	0.00	2.71	1310
	11:00:00	987	0.568	97.0	0.18	0.00	0.00	2.77	1309
	12:00:00	986	0.568	96.9	0.15	0.00	0.01	2.84	1308
	13:00:00	986	0.568	96.9	0.16	0.00	0.00	2.82	1308
	14:00:00	986	0.568	96.9	0.18	0.00	0.01	2.82	1309
	15:00:00	987	0.568	97.0	0.16	0.00	0.01	2.74	1310
	16:00:00	992	0.566	97.5	0.15	0.00	0.01	2.28	1318
	17:00:00	989	0.567	97.2	0.15	0.00	0.01	2.60	1313
	18:00:00	990	0.567	97.3	0.17	0.00	0.01	2.47	1315
	19:00:00	993	0.566	97.5	0.20	0.00	0.00	2.19	1320
	20:00:00	992	0.566	97.5	0.17	0.00	0.01	2.24	1319
	21:00:00		0.567	97.3	0.16	0.00	0.01	2.42	
	22:00:00	989	0.568	97.0	0.24	0.00	0.02	2.66	1312
	23:00:00	995	0.572	96.5	0.66	0.02	0.12	2.52	1316
10-Jun-05	0:00:00	995	0.570	96.5	0.67	0.02	0.12	2.49	1318
	1:00:00	995	0.572	96.5	0.67	0.02	0.12	2.49	1316
	2:00:00	996	0.572	96.5	0.67	0.02	0.12	2.49	1316
	3:00:00	996	0.572	96.5	0.68	0.02	0.12	2.49	1316
	4:00:00	996	0.572	96.5	0.68	0.02	0.12	2.49	1316
	5:00:00	998	0.573	96.4	0.77	0.02	0.14	2.38	1318
	6:00:00	998	0.573	96.4	0.81	0.02	0.14	2.41	1318
	7:00:00	997	0.573	96.4	0.76	0.02		2.46	1317
	8:00:00	992	0.571	96.6	0.51	0.01	0.07	2.60	1313
	9:00:00	995	0.572	96.5	0.64	0.02	0.10	2.52	1315
	10:00:00	997	0.573	96.4	0.74	0.02	0.13	2.44	1317
	11:00:00	994	0.572	96.5	0.62	0.01	0.10	2.59	1314
	12:00:00	981	0.570	96.4	0.14	0.00	0.01	3.32	1299
	13:00:00	981	0.570	96.5	0.13	0.00	0.00	3.29	1300
	14:00:00	985	0.568	96.9	0.14	0.00	0.00	2.90	1307
	15:00:00	987	0.568	96.9	0.19	0.00	0.01	2.83	1309
	16:00:00	990	0.567	97.3	0.17	0.00	0.01	2.47	1315
	17:00:00	988	0.567	97.1	0.16	0.00	0.00	2.62	1312
	18:00:00	989	0.567	97.1	0.17	0.00	0.00	2.61	1312
	19:00:00	989	0.567	97.2	0.15	0.00	0.01	2.54	1314
	20:00:00	988	0.568	97.1	0.17	0.00	0.01	2.67	1311
	21:00:00	988	0.568	96.9	0.21	0.00	0.01	2.75	1310
	22:00:00	993	0.569	97.0	0.39	0.01	0.04	2.42	1317
	23:00:00	1017	0.583	95.1	1.89	0.06	0.50	2.03	1332

Table A-1 Sutter Fuel Data

		Turbine Fuel Data								
		Heat Content	Specific	Composition Data (%)						
Day	Hour	Btu/scf	Gravity	Methane	Ethane	Butane	Propane	Nitrogen	Wobbe
11-Jun-05	0:00:00	1019	0.580	94.9	2.02	0.06	0.54	2.00	1338
	1:00:00	1019	0.584	94.9	2.02	0.06	0.54	2.00	1333
	2:00:00	1019	0.584	94.9	2.03	0.06	0.54	2.00	1333
	3:00:00	1019	0.585	94.9	2.06	0.06	0.54	2.00	1333
	4:00:00	1020	0.585	94.9	2.06	0.06	0.55	1.99	1333
	5:00:00	1023	0.587	94.6	2.28	0.07	0.61	1.94	1335
	6:00:00	1033	0.593	93.7	2.90	0.09	0.80	1.84	1341
	7:00:00	1030	0.591	94.0	2.70	0.09	0.75	1.92	1339
	8:00:00	1026	0.590	94.1	2.54	0.08	0.70	2.04	1336
	9:00:00	1020	0.586	94.6	2.12	0.07	0.58	2.14	1332
	10:00:00	1018	0.585	94.8	2.01	0.06	0.55	2.18	1330
	11:00:00	1002	0.577	95.8	1.11	0.03	0.28	2.55	1319
	12:00:00	986	0.568	97.0	0.12	0.00	0.00	2.83	1308
	13:00:00	989	0.567	97.2	0.15	0.00	0.00	2.57	1313
	14:00:00	988	0.568	97.1	0.14	0.00	0.00	2.69	1311
	15:00:00	986	0.568	96.9	0.15	0.00	0.01	2.86	1308
	16:00:00	987	0.568	97.0	0.15	0.00	0.00	2.75	1310
	17:00:00	987	0.568	97.0	0.17	0.00	0.01	2.75	1310
	18:00:00	1010	0.580	95.3	1.54	0.05	0.41	2.22	1326
	19:00:00	1045	0.601	92.7	3.68	0.12	1.01	1.67	1348
	20:00:00	1040	0.597	93.3	3.29	0.11	0.89	1.66	1345
	21:00:00	1036	0.595	93.6	3.09	0.11	0.83	1.63	1343
	22:00:00	1045			3.62	0.13	0.98		
	23:00:00								
12-Jun-05	0:00:00	1017	0.590	94.3	2.13	0.07	0.57	2.43	1324
	1:00:00	994	0.582	94.7	1.21	0.04	0.31	3.48	1303
	2:00:00	997	0.583	94.5	1.36	0.04	0.36	3.36	1306
	3:00:00	996	0.583	94.6	1.31	0.04	0.34	3.42	1304
	4:00:00	995	0.583	94.6	1.25	0.04	0.33	3.47	1303
	5:00:00	994	0.582	94.6	1.22	0.04	0.32	3.50	1303
	6:00:00	994	0.582	94.6	1.21	0.04	0.32	3.51	1302
	7:00:00	994	0.582	94.6	1.20	0.04	0.31	3.51	1302
	8:00:00	994	0.582	94.6	1.22	0.04	0.32	3.50	1303
	9:00:00	994	0.582	94.6	1.21	0.04	0.32	3.51	1302
	10:00:00	994	0.582	94.6	1.20	0.04	0.32	3.52	1302
	11:00:00	994	0.582	94.6	1.20	0.04	0.32	3.52	1302
	12:00:00	994	0.582	94.6	1.19	0.04	0.31	3.51	1302
	13:00:00	994	0.582	94.6	1.20	0.04	0.31	3.51	1302
	14:00:00	994	0.582	94.6	1.20	0.04	0.31	3.51	1302
	15:00:00	994	0.582	94.6	1.21	0.04	0.31	3.51	1302
	16:00:00	994	0.582	94.6	1.20	0.04	0.31	3.51	1302
	17:00:00	994	0.582	94.7	1.19	0.04	0.31	3.51	1302
	18:00:00	994	0.582	94.7	1.19	0.04	0.31	3.51	1302
	19:00:00	994	0.582	94.7	1.19	0.04	0.31	3.51	1302
	20:00:00	994	0.582	94.7	1.19	0.04	0.31	3.51	1302
	21:00:00	994	0.582	94.6	1.19	0.04	0.31	3.51	1302
	22:00:00	994	0.582	94.6	1.20	0.04	0.31	3.51	1302
	23:00:00	994	0.582	94.6	1.20	0.04	0.31	3.51	1302

Table A-1 Sutter Fuel Data

Day	Hour	Turbine Fuel Data: Heat Content Btu/scf	Specific Gravity	Composition Data (%): Methane	Ethane	Butane	Propane	Nitrogen	Wobbe
13-Jun-05	0:00:00	994	0.580	94.6	1.21	0.06	0.32	3.50	1305
	1:00:00	994	0.582	94.6	1.21	0.06	0.32	3.49	1303
	2:00:00	994	0.582	94.6	1.23	0.06	0.32	3.48	1303
	3:00:00	994	0.583	94.6	1.25	0.06	0.32	3.48	1303
	4:00:00	995	0.583	95.0	1.10	0.05	0.28	3.26	1303
	5:00:00	1000	0.580	96.0	0.97	0.04	0.24	2.49	1313
	6:00:00	1011	0.576	95.0	1.67	0.08	0.44	2.40	1332
	7:00:00	999	0.583	95.7	1.02	0.04	0.26	2.73	1308
	8:00:00	983	0.577	96.4	0.22	0.01	0.03	3.21	1294
	9:00:00	984	0.571	96.7	0.13	0.00	0.00	3.05	1302
	10:00:00	985	0.569	96.8	0.14	0.00	0.00	2.93	1306
	11:00:00	985	0.569	96.8	0.17	0.00	0.00	2.92	1307
	12:00:00	985	0.569	96.8	0.13	0.00	0.00	2.93	1306
	13:00:00	1015	0.569	95.6	1.63	0.08	0.36	1.84	1346
	14:00:00	1018	0.580	95.6	1.79	0.09	0.39	1.67	1337
	15:00:00	1020	0.581	95.4	1.85	0.10	0.43	1.70	1338
	16:00:00	1024	0.582	95.1	2.15	0.11	0.51	1.61	1343
	17:00:00	1032	0.585	94.6	2.57	0.13	0.62	1.40	1349
	18:00:00	1029	0.588	94.9	2.39	0.12	0.55	1.38	1342
	19:00:00	1022	0.586	95.4	1.99	0.10	0.44	1.55	1335
	20:00:00	1018	0.583	95.6	1.78	0.09	0.37	1.65	1334
	21:00:00	1022	0.581	95.8	1.84	0.10	0.38	1.39	1341
	22:00:00	1022	0.581	95.8	1.84	0.10	0.38	1.33	1341
	23:00:00	1022	0.580	95.9	1.83	0.10	0.37	1.33	1342
14-Jun-05	0:00:00	1022	0.580	95.9	1.83	0.10	0.38	1.31	1342
	1:00:00	1022	0.580	95.9	1.84	0.10	0.38	1.31	1342
	2:00:00	1022	0.580	95.9	1.84	0.10	0.38	1.31	1342
	3:00:00	1022	0.580	95.9	1.84	0.10	0.38	1.31	1342
	4:00:00	1022	0.580	95.9	1.83	0.10	0.38	1.32	1342
	5:00:00	1021	0.580	95.9	1.79	0.10	0.37	1.35	1341
	6:00:00	1015	0.580	96.0	1.53	0.08	0.31	1.63	1333
	7:00:00	1008	0.578	96.1	1.26	0.07	0.26	2.00	1326
	8:00:00	993	0.577	96.5	0.58	0.03	0.10	2.65	1308
	9:00:00	986	0.572	97.0	0.13	0.00	0.00	2.81	1304
	10:00:00	988	0.568	97.1	0.13	0.00	0.00	2.65	1311
	11:00:00	990	0.567	96.9	0.30	0.01	0.03	2.63	1314
	12:00:00	1017	0.569	96.0	1.61	0.08	0.32	1.48	1349
	13:00:00	1018	0.578	95.6	1.83	0.08	0.34	1.54	1338
	14:00:00	1016	0.581	95.7	1.74	0.08	0.33	1.61	1333
	15:00:00	1016	0.581	95.6	1.76	0.08	0.35	1.64	1334
	16:00:00	1017	0.581	95.6	1.80	0.09	0.35	1.64	1334
	17:00:00	1017	0.581	95.4	1.91	0.08	0.35	1.64	1334
	18:00:00	1018	0.582	95.3	1.98	0.08	0.35	1.61	1334
	19:00:00	1018	0.583	95.3	2.01	0.08	0.35	1.57	1334
	20:00:00	1017	0.583	95.4	1.97	0.08	0.34	1.58	1333
	21:00:00	1017	0.582	95.5	1.92	0.08	0.33	1.57	1333
	22:00:00	1015	0.582	95.6	1.77	0.07	0.31	1.62	1331
	23:00:00	1015	0.581	95.7	1.75	0.07	0.31	1.62	1332

Table A-2 Sutter Turbine Data

Day	Hour	CT01 GT Gas Flow klbs	CT01 GT Gas On-Time	CT01 GT Heat Input MMBtu/hr	CT01 Duct Burner Flow klbs	CT01 Duct Burner On-Time	CT01 DB Heat Input mmBtu	CT01 NH3 Flow lbs	CT01 NH3 Flow On-Time	CT01 SCR Cat Temp °F	CT01 GT Megawatts	CT01 Process Status	CT01 O2%	CT01 NOx ppm	CT01 NOx ppm @15% O2	CT01 NOx lb/mmBtu	CT01 NOx lbs	CT01 CO ppm	CT01 CO ppm @15% O2	CT01 CO lb/mmBtu	CT01 CO lbs	CT01 3-Hr Rolling CO lbs	CT01 SCR NOx ppm	CT01 SCR NOx ppm @15%O2	CT01 Process Status	CT01 Exhaust Temp °F
9-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	168.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	88
	1:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	173.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	89
	2:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	177.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	90
	3:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	177.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	91
	4:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	179.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	92
	5:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	210.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	92
	6:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	217.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	91
	7:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	224.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	91
	8:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	232.1	Down	Normal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	Down	Down	DCal	Normal	93
	9:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	236.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	93
	10:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	238.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	94
	11:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	241.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	97
	12:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	245.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	103
	13:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	247.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	117
	14:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	248.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	117
	15:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	250.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	120
	16:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	249.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	125
	17:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	250.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	123
	18:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	250.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	115
	19:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	250.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	121
	20:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	250.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	123
	21:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	244.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	118
	22:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	232.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	120
	23:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	221.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	121
10-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	213.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	105
	1:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	206.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	95
	2:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	199.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	94
	3:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	199.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	93
	4:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	215.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	94
	5:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	219.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	99
	6:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	221.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	96
	7:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	224.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	92
	8:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	231.0	Down	Normal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	Down	Down	DCal	Normal	97
	9:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	235.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	105
	10:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	239.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	110
	11:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	242.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	111
	12:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	244.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	113
	13:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	245.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	114
	14:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	244.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	117
	15:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	238.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	119
	16:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	232.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	122
	17:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	226.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	123
	18:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	220.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	119
	19:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	214.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	114
	20:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	208.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	109
	21:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	203.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	103
	22:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	198.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	100
	23:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	194.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	99
11-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	191.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	96
	1:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	188.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	93
	2:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	186.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	93
	3:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	184.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	96
	4:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	182.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	90
	5:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	179.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	90
	6:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	177.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	91
	7:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	176.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	93
	8:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	177.9	Down	Normal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	Down	Down	DCal	Normal	99
	9:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	178.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	105
	10:00:00	22.0	0.87	484	Down	0.00	Down	Down	0.00	277.5	10.1	Startup	18.2	13.6	29.7	0.1092	52.8	389.4	850.9	1.904	920.4	Inval	21.7	47.4	Startup	115
	11:00:00	34.5	1.00	760	Down	0.00	Down	0.0	0.20	495.4	40.0	Startup	16.9	21.3	31.4	0.1155	87.8	33.6	49.6	0.111	84.4	Inval	35.2	51.9	Startup	161
	12:00:00	53.9	1.00	1185	Down	0.00	Down	51.7	1.00	549.6	103.2	Startup	14.4	4.7	4.3	0.0157	18.6	0.5	0.5	0.001	1.2	335.3	24.3	22.1	Startup	267
	13:00:00	69.5	1.00	1526	Down	0.00	Down	59.8	1.00	586.3	144.8	Normal	14.0	2.6	2.2	0.0082	12.5	0.0	0.0	0.000	0.0	28.5	22.7	19.4	Normal	217
	14:00:00	77.6	1.00	1706	Down	0.00	Down	72.6	1.00	608.7	164.8	Normal	13.9	2.6	2.2	0.0081	13.8	0.0	0.0	0.000	0.0	0.4	23.6	19.9	Normal	217
	15:00:00	68.9	1.00	1516	Down	0.00	Down	59.5	1.00	598.3	144.2	Normal	14.0	2.6	2.2	0.0082	12.4	0.0	0.0	0.000	0.0	0.0	21.2	18.1	Normal	222
	16:00:00	76.6	1.00	1731	Down	0.00	Down	73.4	1.00	610.9	166.5	Normal	13.9	2.6	2.2	0.0081	14.0	0.0	0.0	0.000	0.0	0.0	23.7	20.0	Normal	218
	17:00:00	69.0	1.00	1606	Down	0.00	Down	61.9	1.00	603.3	151.2	Normal	13.9	2.6	2.2	0.0081	13.0	0.0	0.0	0.000	0.0	0.0	22.3	18.8	Normal	223
	18:00:00	68.1	1.00	1576	Down	0.00	Down	62.6	1.00	602.0	147.4	Normal	14.0	2.6	2.2	0.0082	12.9	0.0	0.0	0.000	0.0	0.0	22.6	19.3	Normal	219
	19:00:00	58.5	1.00	1351	Down	0.00	Down	46.5	1.00	586.5	121.4	Normal	14.1	2.5	2.2	0.0080	10.8	0.0	0.0	0.000	0.0	0.0	19.4	16.8	Normal	215
	20:00:00	49.7	1.00	1160	Down	0.00	Down	47.1	0.85	578.0	94.8	Shutdown	14.9	2.5	2.5	0.0090	10.4	6.7	6.6	0.015	17.4	5.8	21.5	21.1	Shutdown	211
	21:00:00	6.3	0.27	146	Down	0.00	Down	Down	0.00	505.3	3.4	Shutdown	18.5	7.9	19.4	0.0714	10.4	30.5	75.0	0.168	24.5	14.0	20.3	49.9	Shutdown	209
	22:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	427.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	199
	23:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	396.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	124

Table A-2 Sutter Turbine Data

Day	Hour	CT01 GT Gas Flow klbs	CT01 GT Gas On-Time	CT01 GT Heat Input MMBtu/hr	CT01 Duct Burner Flow klbs	CT01 Duct Burner On-Time	CT01 DB Heat Input mmBtu	CT01 NH3 Flow lbs	CT01 NH3 Flow On-Time	CT01 SCR Cat Temp °F	CT01 GT Megawatts	CT01 Process Status	CT01 O2%	CT01 NOx ppm	CT01 NOx ppm @15% O2	CT01 NOx lb/mmBtu	CT01 NOx lbs	CT01 CO ppm	CT01 CO ppm @15% O2	CT01 CO lb/mmBtu	CT01 CO lbs	CT01 3-Hr Rolling CO lbs	CT01 SCR NOx ppm	CT01 SCR NOx ppm @15%O2	CT01 Process Status	CT01 Exhaust Temp °F
12-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	382.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	114
	1:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	374.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	114
	2:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	363.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	118
	3:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	353.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	124
	4:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	346.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	120
	5:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	339.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	117
	6:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	338.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	116
	7:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	332.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	119
	8:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	327.9	Down	Normal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	Down	Down	DCal	Normal	126
	9:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	322.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	132
	10:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	310.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	136
	11:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	303.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	136
	12:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	297.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	137
	13:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	291.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	140
	14:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	286.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	143
	15:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	281.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	143
	16:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	277.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	142
	17:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	272.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	140
	18:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	268.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	137
	19:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	263.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	135
	20:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	259.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	133
	21:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	255.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	132
	22:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	250.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	125
	23:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	245.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	116
13-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	240.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	121
	1:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	235.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	115
	2:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	231.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	110
	3:00:00	10.0	0.43	221	Down	0.00	Down	Down	0.00	248.5	7.6	Startup	18.3	14.1	32.0	0.1176	26.0	627.7	1424.4	3.187	704.6	Inval	17.4	39.5	Startup	114
	4:00:00	33.2	1.00	741	Down	0.00	Down	Down	0.00	462.0	35.0	Startup	17.1	24.8	38.5	0.1415	104.8	38.8	60.2	0.135	100.0	Inval	34.8	54.0	Startup	145
	5:00:00	36.5	1.00	822	Down	0.00	Down	Down	0.00	527.9	50.1	Startup	16.5	26.2	35.1	0.1291	106.1	30.8	41.3	0.092	75.6	293.4	37.0	49.6	Startup	263
	6:00:00	37.0	1.00	822	Down	0.00	Down	Down	0.00	519.4	50.1	Startup	16.5	26.3	35.3	0.1296	106.6	33.0	44.3	0.099	81.4	85.7	35.3	47.3	Startup	270
	7:00:00	45.1	1.00	987	Down	0.00	Down	23.9	0.80	530.9	76.1	Startup	15.6	17.1	19.0	0.0700	69.1	16.1	17.9	0.040	39.5	65.5	31.8	35.4	Startup	224
	8:00:00	62.9	1.00	1379	Down	0.00	Down	50.0	1.00	564.9	128.0	Normal	14.1	2.2	1.9	0.0070	9.7	0.1	0.1	0.000	0.0	40.3	20.8	18.0	Normal	215
	9:00:00	78.7	1.00	1727	Down	0.00	Down	82.9	1.00	605.7	167.1	Normal	13.9	2.4	2.0	0.0074	12.8	0.4	0.3	0.001	1.7	13.7	23.9	20.1	Normal	206
	10:00:00	80.2	1.00	1760	Down	0.00	Down	73.7	1.00	617.3	170.7	Normal	13.9	2.6	2.2	0.0081	14.3	0.2	0.2	0.000	0.0	0.6	22.8	19.2	Normal	223
	11:00:00	80.4	1.00	1764	Down	0.00	Down	73.8	1.00	619.7	171.3	Normal	13.8	2.5	2.1	0.0076	13.4	0.2	0.2	0.000	0.0	0.6	22.2	18.4	Normal	225
	12:00:00	79.1	1.00	1793	Down	0.00	Down	73.2	1.00	619.3	173.2	Normal	13.8	2.7	2.2	0.0082	14.7	0.2	0.2	0.000	0.0	0.0	22.4	18.6	Normal	225
	13:00:00	79.0	1.00	1792	Down	0.00	Down	74.3	1.00	619.4	172.8	Normal	13.8	2.7	2.2	0.0082	14.7	0.2	0.2	0.000	0.0	0.0	22.8	18.9	Normal	226
	14:00:00	78.8	1.00	1790	Down	0.00	Down	73.9	1.00	620.2	172.3	Normal	13.8	2.7	2.2	0.0082	14.7	0.2	0.2	0.000	0.0	0.0	22.8	18.9	Normal	227
	15:00:00	78.5	1.00	1792	Down	0.00	Down	75.5	1.00	620.7	172.2	Normal	13.8	2.7	2.2	0.0082	14.7	0.2	0.2	0.000	0.0	0.0	23.4	19.4	Normal	227
	16:00:00	78.2	1.00	1798	Down	0.00	Down	76.3	1.00	621.2	172.2	Normal	13.8	2.7	2.2	0.0082	14.7	0.2	0.2	0.000	0.0	0.0	23.9	19.9	Normal	228
	17:00:00	78.6	1.00	1802	Down	0.00	Down	71.6	1.00	621.3	173.0	Normal	13.8	2.6	2.2	0.0079	14.2	0.2	0.2	0.000	0.0	0.0	23.0	19.1	Normal	227
	18:00:00	78.6	1.00	1788	Down	0.00	Down	63.2	1.00	620.7	172.1	Normal	13.8	2.7	2.2	0.0082	14.7	0.2	0.2	0.000	0.0	0.0	21.2	17.6	Normal	226
	19:00:00	76.7	1.00	1740	Down	0.00	Down	62.3	1.00	618.3	167.0	Normal	13.8	2.7	2.2	0.0082	14.3	0.2	0.2	0.000	0.0	0.0	21.1	17.5	Normal	224
	20:00:00	63.6	1.00	1448	Down	0.00	Down	55.0	1.00	594.1	134.3	Normal	14.1	2.6	2.3	0.0083	12.0	0.2	0.2	0.000	0.0	0.0	20.2	17.5	Normal	223
	21:00:00	72.0	1.00	1639	Down	0.00	Down	76.3	1.00	580.9	155.7	Normal	13.9	2.5	2.1	0.0077	12.6	0.2	0.2	0.000	0.0	0.0	23.2	19.6	Normal	212
	22:00:00	52.7	1.00	1200	Down	0.00	Down	38.4	0.85	559.3	101.3	Shutdown	14.7	2.8	2.7	0.0098	11.8	7.1	6.8	0.015	18.0	6.0	20.0	19.0	Shutdown	207
	23:00:00	1.6	0.07	37	Down	0.00	Down	Down	0.00	453.6	0.5	Shutdown	18.7	5.3	14.2	0.0522	1.9	29.7	79.7	0.178	6.6	8.2	17.5	46.9	Shutdown	194
14-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	386.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	162
	1:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	371.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	110
	2:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	363.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	112
	3:00:00	Down	0.00	Down	Down	0.00	Down	Down	0.00	356.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	116
	4:00:00	12.1	0.47	276	Down	0.00	Down	Down	0.00	374.6	18.4	Startup	17.8	8.7	16.6	0.0609	16.8	31.9	60.7	0.136	37.5	Inval	20.2	38.4	Startup	117
	5:00:00	40.8	1.00	922	Down	0.00	Down	0.2	0.78	510.9	67.8	Startup	15.8	20.9	24.2	0.0889	82.0	22.2	25.7	0.057	52.6	Inval	32.1	37.1	Startup	172
	6:00:00	45.3	1.00	1017	Down	0.00	Down	10.6	1.00	538.6	80.9	Startup	15.3	17.1	18.0	0.0662	67.3	12.3	13.0	0.029	29.5	39.9	28.5	30.0	Startup	253
	7:00:00	55.4	1.00	1224	Down	0.00	Down	66.9	1.00	563.6	107.6	Normal	14.3	2.1	1.9	0.0069	8.4	0.4	0.4	0.001	1.2	27.8	22.0	19.7	Normal	217
	8:00:00	72.4	1.00	1591	Down	0.00	Down	49.3	1.00	594.2	153.3	Normal	13.8	2.6	2.2	0.0079	12.6	0.2	0.2	0.000	0.0	10.2	21.0	17.5	Normal	215
	9:00:00	80.0	1.00	1759	Down	0.00	Down	70.2	1.00	615.1	170.7	Normal	13.7	2.7	2.2	0.0081	14.3	0.3	0.2	0.001	1.8	1.0	22.5	18.4	Normal	219
	10:00:00	79.6	1.00	1759	Down	0.00	Down	69.8	1.00	619.2	170.4	Normal	13.7	2.7	2.2	0.0081	14.2	0.1	0.1	0.000	0.0	0.6	22.5	18.4	Normal	226
	11:00:00	78.2	1.00	1774	Down	0.00	Down	70.5	1.00	620.1	170.6	Normal	13.7	2.7	2.2	0.0081	14.4	0.1	0.1	0.000	0.0	0.6	22.5	18.4	Normal	227
	12:00:00	78.3	1.00	1774	Down	0.00	Down	71.1	1.00	619.1	170.1	Normal	13.7	2.7	2.2	0.0081	14.4	0.1	0.1	0.000	0.0	0.0	22.5	18.4	Normal	226
	13:00:00	78.5	1.00	1777	0.5	0.35	11.1	70.1	1.00	620.3	170.7	Normal	13.7	2.7	2.2	0.0081	14.5	0.1	0.1	0.000	0.0	0.0	22.3	18.3	Normal	226
	14:00:00	78.3	1.00	1772	1.2	1.00	26.0	72.2	1.00	623.6	170.1	Normal	13.6	2.7	2.2	0.0080	14.4	0.2	0.2	0.000	0.0	0.0	22.8	18.4	Normal	225
	15:00:00	78.0	1.00	1766	1.8	1.00	41.4	71.3	1.00	625.3	169.3	Normal	13.5	2.8	2.2	0.0082	14.8	0.2	0.2	0.000	0.0	0.0	22.9	18.3	Normal	224
	16:00:00	77.9	1.00	1765	2.0	1.00	44.3	69.2	1.00	626.7	169.0	Normal	13.5	2.8	2.2	0.0082	14.9	0.2	0.2	0.000	0.0	0.0	22.7	18.1	Normal	222
	17:00:00	76.5	1.00	1734	1.5	0.77	34.1	66.2	1.00	625.3	166.1	Normal	13.6	2.7	2.2	0.0080	14.2	0.2	0.2	0.000	0.0	0.0	22.1	17.9	Normal	221
	18:00:00	63.2	1.00	1433	Down	0.00	Down	59.1	1.00	595.8	132.7	Normal	14.0	2.3	2.0	0.0072	10.3	0.1	0.1	0.000	0.0	0.0	19.1	16.3	Normal	219
	19:00:00	75.9	1.00	1720	Down	0.00	Down	70.6	1.00	613.1	164.3	Normal	13.8	2.6	2.2	0.0079	13.6	0.1	0.1	0.000	0.0	0.0	23.7	19.7	Normal	211
	20:00:00	59.4	1.00	1345	Down	0.00	Down	44.6	1.00	589.4	122.3	Normal	14.1	2.6	2.3	0.0083	11.2	0.1	0.1	0.000	0.0	0.0	18.4	16.0	Normal	220
	21:00:00	72.4	1.00	1637	Down	0.00	Down	66.4	1.00	572.8	156.3	Normal	13.9	2.6	2.2	0.0081	13.3	0.1	0.1	0.000	0.0	0.0	22.0	18.5	Normal	208
	22:00:00	53.6	1.00	1212	Down	0.00	Down	40.5	0.87	553.7	103.5	Shutdown	14.6	3.1	2.9	0.0107	13.0	6.7	6.3	0.014	17.0	5.7	20.8	19.5	Shutdown	202
	23:00:00	4.3	0.18	96	Down	0.00	Down	Down	0.00	454.2	2.7	Shutdown	18.5	8.8	21.6	0.0795	7.7	31.0	76.2	0.171	16.5	11.2	17.8	43.8	Shutdown	195

Table A-2 Sutter Turbine Data

Day	Hour	CT02 GT Gas Flow klbs	CT02 GT Gas On-Time	CT02 GT Heat Input MMBtu/hr	CT02 NH3 Flow lbs	CT02 NH3 Flow On-Time	CT02 SCR Cat Temp °F	CT02 GT Megawatts	CT02 Process Status	CT02 O2%	CT02 NOx ppm	CT02 NOx ppm @15% O2	CT02 NOx lb/mmBtu	CT02 NOx lbs	CT02 CO ppm	CT02 CO ppm @15% O2	CT02 CO lb/mmBtu	CT02 CO lbs	CT02 3-Hr Rolling CO lbs	CT02 SCR NOx ppm	CT02 SCR NOx ppm @15%O2	CT02 Process Status	CT02 Exhaust Temp °F
9-Jun-05	0:00:00	37.7	1.00	827	Down	0.00	540.2	50.0	Startup	16.5	23.0	30.8	0.1134	93.8	30.9	41.4	0.093	76.9	434.1	30.4	40.8	Startup	180
	1:00:00	38.2	1.00	838	0.0	0.18	535.8	52.1	Startup	16.4	23.3	30.5	0.1123	94.1	31.9	41.8	0.094	78.7	84.7	29.7	38.9	Startup	239
	2:00:00	44.9	1.00	983	6.4	1.00	507.2	76.2	Startup	15.5	18.2	19.9	0.0731	71.8	11.6	12.7	0.028	27.5	61.0	28.7	31.4	Startup	224
	3:00:00	51.2	1.00	1117	178.1	1.00	526.1	93.7	Startup	14.4	3.8	3.4	0.0127	14.2	0.2	0.2	0.000	0.0	35.4	24.9	22.6	Startup	232
	4:00:00	57.0	1.00	1248	200.0	1.00	545.9	111.5	Normal	14.1	2.1	1.8	0.0067	8.4	0.0	0.0	0.000	0.0	9.2	23.9	20.7	Normal	212
	5:00:00	64.7	1.00	1422	113.3	1.00	567.3	134.4	Normal	13.9	2.2	1.9	0.0068	9.7	0.3	0.3	0.001	1.4	0.5	21.4	18.0	Normal	205
	6:00:00	79.9	1.00	1742	101.8	1.00	598.8	171.0	Normal	14.0	2.3	2.0	0.0072	12.5	0.2	0.2	0.000	0.0	0.5	20.7	17.7	Normal	207
	7:00:00	79.0	1.00	1735	72.6	1.00	602.9	171.0	Normal	14.0	2.6	2.2	0.0082	14.2	0.0	0.0	0.000	0.0	0.5	21.0	18.0	Normal	212
	8:00:00	78.0	1.00	1715	78.0	1.00	604.1	168.4	Normal	14.0	2.6	2.2	0.0082	14.1	0.0	0.0	0.000	0.0	0.0	21.1	18.0	Normal	211
	9:00:00	60.2	1.00	1323	102.6	1.00	582.8	120.9	Normal	14.1	2.5	2.2	0.0080	10.6	0.0	0.0	0.000	0.0	0.0	21.8	18.9	Normal	210
	10:00:00	66.2	1.00	1454	66.2	1.00	586.0	137.7	Normal	14.0	2.4	2.1	0.0075	10.9	0.0	0.0	0.000	0.0	0.0	20.8	17.8	Normal	201
	11:00:00	78.5	1.00	1724	70.7	1.00	603.8	169.0	Normal	14.0	2.6	2.2	0.0082	14.1	0.0	0.0	0.000	0.0	0.0	21.9	18.7	Normal	206
	12:00:00	72.8	1.00	1599	69.3	1.00	599.5	155.4	Normal	14.0	2.6	2.2	0.0082	13.1	0.0	0.0	0.000	0.0	0.0	20.5	17.5	Normal	212
	13:00:00	72.3	1.00	1590	69.3	1.00	599.7	154.6	Normal	14.0	2.6	2.2	0.0082	13.0	0.0	0.0	0.000	0.0	0.0	21.1	18.0	Normal	210
	14:00:00	72.7	1.00	1606	73.0	1.00	600.7	156.5	Normal	14.0	2.6	2.2	0.0082	13.2	0.0	0.0	0.000	0.0	0.0	21.9	18.7	Normal	209
	15:00:00	73.2	1.00	1611	72.7	1.00	601.3	156.7	Normal	14.0	2.6	2.2	0.0082	13.2	0.0	0.0	0.000	0.0	0.0	21.9	18.7	Normal	209
	16:00:00	71.6	1.00	1579	70.2	1.00	600.8	152.9	Normal	14.0	2.6	2.2	0.0082	12.9	0.0	0.0	0.000	0.0	0.0	21.8	18.6	Normal	208
	17:00:00	59.6	1.00	1318	71.6	1.00	583.7	120.8	Normal	14.1	2.4	2.1	0.0077	10.1	0.0	0.0	0.000	0.0	0.0	20.9	18.1	Normal	208
	18:00:00	60.2	1.00	1330	56.9	1.00	580.9	122.5	Normal	14.1	2.5	2.2	0.0080	10.6	0.0	0.0	0.000	0.0	0.0	20.8	18.0	Normal	202
	19:00:00	60.5	1.00	1334	55.7	1.00	580.5	122.9	Normal	14.1	2.6	2.3	0.0083	11.1	0.0	0.0	0.000	0.0	0.0	20.8	18.0	Normal	203
	20:00:00	54.8	1.00	1207	43.6	0.87	579.5	103.7	Shutdown	14.7	2.8	2.7	0.0098	11.8	5.6	5.3	0.012	14.5	4.8	21.6	20.6	Shutdown	205
	21:00:00	3.6	0.15	80	Down	0.00	470.7	1.9	Shutdown	18.6	5.5	14.1	0.0519	4.2	24.2	62.1	0.139	11.2	8.6	17.2	44.1	Shutdown	206
	22:00:00	Down	0.00	Down	Down	0.00	388.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	190
	23:00:00	Down	0.00	Down	Down	0.00	358.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	122
10-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	346.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	105
	1:00:00	Down	0.00	Down	Down	0.00	335.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	100
	2:00:00	Down	0.00	Down	Down	0.00	325.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	100
	3:00:00	24.8	0.90	552	Down	0.00	426.5	18.6	Startup	17.8	12.7	24.2	0.0889	49.1	29.2	55.6	0.124	68.5	Inval	21.0	40.0	Startup	100
	4:00:00	35.5	1.00	789	Down	0.00	534.6	42.6	Startup	16.8	22.6	32.5	0.1195	94.2	33.8	48.6	0.109	86.0	Inval	29.4	42.3	Startup	236
	5:00:00	40.7	1.00	903	5.4	0.78	514.1	63.3	Startup	16.0	22.4	27.0	0.0991	89.5	27.0	32.5	0.073	65.9	73.5	30.3	36.5	Startup	292
	6:00:00	48.0	1.00	1060	80.7	1.00	549.9	86.9	Startup	14.8	2.9	2.8	0.0103	10.9	3.0	2.9	0.006	6.4	52.8	27.3	26.4	Startup	263
	7:00:00	59.5	1.00	1318	112.3	1.00	568.7	120.4	Normal	14.0	2.6	2.2	0.0082	10.8	0.0	0.0	0.000	0.0	24.1	22.7	19.4	Normal	221
	8:00:00	59.4	1.00	1318	89.9	1.00	576.1	120.2	Normal	14.1	2.5	2.2	0.0080	10.5	0.0	0.0	0.000	0.0	2.1	23.1	20.0	Normal	222
	9:00:00	66.1	1.00	1461	68.0	1.00	586.2	138.2	Normal	13.9	2.4	2.0	0.0074	10.8	0.0	0.0	0.000	0.0	0.0	21.8	18.4	Normal	209
	10:00:00	79.5	1.00	1736	80.6	1.00	605.6	169.3	Normal	13.9	2.7	2.3	0.0084	14.6	0.0	0.0	0.000	0.0	0.0	23.8	20.1	Normal	207
	11:00:00	79.7	1.00	1742	91.6	1.00	610.7	169.4	Normal	13.9	2.6	2.2	0.0081	14.1	0.0	0.0	0.000	0.0	0.0	24.6	20.7	Normal	213
	12:00:00	79.5	1.00	1745	97.7	1.00	612.8	169.4	Normal	13.9	2.6	2.2	0.0081	14.1	0.0	0.0	0.000	0.0	0.0	25.9	21.8	Normal	213
	13:00:00	79.4	1.00	1745	91.9	1.00	612.3	170.2	Normal	13.8	2.6	2.2	0.0079	13.8	0.0	0.0	0.000	0.0	0.0	25.2	20.9	Normal	212
	14:00:00	79.1	1.00	1744	91.9	1.00	612.5	170.5	Normal	13.9	2.6	2.2	0.0081	14.1	0.0	0.0	0.000	0.0	0.0	25.0	21.1	Normal	212
	15:00:00	79.5	1.00	1749	93.7	1.00	613.1	170.5	Normal	13.9	2.7	2.3	0.0084	14.7	0.0	0.0	0.000	0.0	0.0	25.6	21.6	Normal	211
	16:00:00	78.7	1.00	1732	94.6	1.00	612.9	168.8	Normal	13.8	2.6	2.2	0.0079	13.7	0.0	0.0	0.000	0.0	0.0	26.1	21.7	Normal	210
	17:00:00	71.4	1.00	1572	75.4	1.00	603.1	152.1	Normal	13.8	2.6	2.2	0.0079	12.4	0.0	0.0	0.000	0.0	0.0	23.3	19.4	Normal	209
	18:00:00	59.1	1.00	1300	69.6	1.00	582.9	118.6	Normal	14.1	2.6	2.3	0.0083	10.8	0.0	0.0	0.000	0.0	0.0	21.9	19.0	Normal	208
	19:00:00	58.9	1.00	1296	59.1	1.00	576.9	118.0	Normal	14.1	2.5	2.2	0.0080	10.4	0.0	0.0	0.000	0.0	0.0	21.3	18.5	Normal	200
	20:00:00	53.3	1.00	1180	49.9	0.87	574.9	100.9	Shutdown	14.6	2.5	2.3	0.0086	10.1	5.2	4.9	0.011	13.0	4.3	22.1	20.7	Shutdown	199
	21:00:00	1.9	0.08	42	Down	0.00	459.8	0.0	Shutdown	18.6	3.2	8.2	0.0302	1.3	25.3	64.9	0.145	6.1	6.4	16.1	41.3	Shutdown	198
	22:00:00	Down	0.00	Down	Down	0.00	378.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	185
	23:00:00	Down	0.00	Down	Down	0.00	342.7	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	108
11-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	324.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	100
	1:00:00	Down	0.00	Down	Down	0.00	310.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	96
	2:00:00	Down	0.00	Down	Down	0.00	303.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	95
	3:00:00	11.0	0.45	252	Down	0.00	328.2	14.6	Startup	17.9	6.7	13.2	0.0484	12.2	29.3	57.6	0.129	32.4	Inval	17.6	34.6	Startup	98
	4:00:00	41.6	1.00	957	0.0	0.87	524.2	71.4	Startup	15.7	18.0	20.4	0.0751	71.8	13.3	15.1	0.034	32.5	Inval	31.2	35.4	Startup	142
	5:00:00	47.1	1.00	1080	13.0	1.00	552.5	88.0	Startup	15.0	12.3	12.3	0.0452	48.8	1.8	1.8	0.004	4.3	23.1	28.1	28.1	Startup	268
	6:00:00	56.6	1.00	1293	111.1	1.00	562.1	115.4	Normal	14.1	2.8	2.4	0.0089	11.5	0.4	0.3	0.001	1.3	12.7	25.4	22.0	Normal	234
	7:00:00	57.8	1.00	1312	96.0	1.00	569.6	118.2	Normal	14.1	2.4	2.1	0.0077	10.1	0.1	0.1	0.000	0.0	1.9	24.3	21.1	Normal	206
	8:00:00	58.6	1.00	1328	75.9	1.00	577.5	120.3	Normal	14.1	2.5	2.2	0.0080	10.6	0.1	0.1	0.000	0.0	0.4	23.6	20.5	Normal	203
	9:00:00	66.8	1.00	1487	65.3	1.00	590.0	140.6	Normal	13.9	2.5	2.1	0.0077	11.4	0.1	0.1	0.000	0.0	0.0	22.3	18.8	Normal	205
	10:00:00	76.9	1.00	1688	87.6	1.00	608.8	164.2	Normal	13.9	2.7	2.3	0.0084	14.2	0.0	0.0	0.000	0.0	0.0	25.6	21.6	Normal	207
	11:00:00	62.9	1.00	1385	65.4	1.00	600.8	129.1	Normal	14.1	2.5	2.2	0.0080	11.1	0.0	0.0	0.000	0.0	0.0	21.4	18.6	Normal	214
	12:00:00	58.9	1.00	1295	55.6	1.00	607.6	117.7	Normal	14.2	2.5	2.2	0.0081	10.5	0.0	0.0	0.000	0.0	0.0	21.9	19.3	Normal	211
	13:00:00	69.0	1.00	1515	64.0	1.00	629.5	144.8	Normal	14.0	2.6	2.2	0.0082	12.4	0.0	0.0	0.000	0.0	0.0	23.0	19.7	Normal	235
	14:00:00	77.5	1.00	1703	82.5	1.00	647.6	166.4	Normal	13.9	2.6	2.2	0.0081	13.8	0.0	0.0	0.000	0.0	0.0	25.4	21.4	Normal	226
	15:00:00	68.5	1.00	1506	75.8	1.00	635.7	144.1	Normal	13.9	2.4	2.0	0.0074	11.1	0.0	0.0	0.000	0.0	0.0	23.6	19.9	Normal	231
	16:00:00	76.3	1.00	1724	84.8	1.00	647.8	167.5	Normal	13.9	2.7	2.3	0.0084	14.5	0.1	0.1	0.000	0.0	0.0	26.3	22.2	Normal	226
	17:00:00	68.7	1.00	1599	78.9	1.00	639.5	151.0	Normal	13.8	2.6	2.2	0.0079	12.6	0.1	0.1	0.000	0.0	0.0	25.8	21.4	Normal	232
	18:00:00	67.7	1.00	1566	78.5	1.00	638.0	147.3	Normal	13.9	2.6	2.2	0.0081	12.7	0.1	0.1	0.000	0.0	0.0	26.0	21.9	Normal	226
	19:00:00	58.3	1.00	1346	61.2	1.00	621.4	121.3	Normal	14.1	2.6	2.3	0.0083	11.2	0.1	0.1	0.000	0.0	0.0	22.8	19.8	Normal	223
	20:00:00	60.0	1.00	1399	68.1	1.00	616.0	127.1	Normal	14.0	2.6	2.2	0.0082	11.5	0.1	0.1	0.000	0.0	0.0	24.6	21.0	Normal	219
	21:00:00	71.8	1.00	1675	85.9	1.00	611.4	157.5	Normal	13.9	2.6	2.2	0.0081	13.6	0.1	0.1	0.000	0.0	0.0	26.3	22.2	Normal	218
	22:00:00	53.6	1.00	1209	53.3	0.87	581.8	102.4	Shutdown	14.5	2.6	2.4	0.0088	10.6	5.4	5.0	0.011	13.3	4.4	22.9	21.1	Shutdown	214
	23:00:00	1.9	0.08	42	Down	0.00	464.0	0.0	Shutdown	18.7	3.7	9.9	0.0365	1.5	25.7	68.9	0.154	6.4	6.6	16.2	43.4	Shutdown	200

Table A-2 Sutter Turbine Data

Day	Hour	CT02 GT Gas Flow klbs	CT02 GT Gas On-Time	CT02 GT Heat Input MMBtu/hr	CT02 NH3 Flow lbs	CT02 NH3 Flow On-Time	CT02 SCR Cat Temp °F	CT02 GT Megawatts	CT02 Process Status	CT02 O2%	CT02 NOx ppm	CT02 NOx ppm @15% O2	CT02 NOx lb/mmBtu	CT02 NOx lbs	CT02 CO ppm	CT02 CO ppm @15% O2	CT02 CO lb/mmBtu	CT02 CO lbs	CT02 3-Hr Rolling CO lbs	CT02 SCR NOx ppm	CT02 SCR NOx ppm @15%O2	CT02 Process Status	CT02 Exhaust Temp °F
12-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	387.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	172
	1:00:00	Down	0.00	Down	Down	0.00	361.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	105
	2:00:00	Down	0.00	Down	Down	0.00	346.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	100
	3:00:00	Down	0.00	Down	Down	0.00	332.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	103
	4:00:00	Down	0.00	Down	Down	0.00	336.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	102
	5:00:00	Down	0.00	Down	Down	0.00	352.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	98
	6:00:00	Down	0.00	Down	Down	0.00	347.7	Down	Normal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	DCal	Down	Down	DCal	Normal	97
	7:00:00	Down	0.00	Down	Down	0.00	343.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	98
	8:00:00	Down	0.00	Down	Down	0.00	340.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	107
	9:00:00	Down	0.00	Down	Down	0.00	334.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	116
	10:00:00	Down	0.00	Down	Down	0.00	329.4	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	118
	11:00:00	Down	0.00	Down	Down	0.00	321.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	120
	12:00:00	Down	0.00	Down	Down	0.00	313.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	123
	13:00:00	Down	0.00	Down	Down	0.00	304.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	127
	14:00:00	Down	0.00	Down	Down	0.00	289.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	129
	15:00:00	Down	0.00	Down	Down	0.00	283.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	128
	16:00:00	Down	0.00	Down	Down	0.00	272.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	127
	17:00:00	Down	0.00	Down	Down	0.00	263.5	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	126
	18:00:00	Down	0.00	Down	Down	0.00	258.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	124
	19:00:00	Down	0.00	Down	Down	0.00	252.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	122
	20:00:00	Down	0.00	Down	Down	0.00	247.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	119
	21:00:00	Down	0.00	Down	Down	0.00	243.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	116
	22:00:00	Down	0.00	Down	Down	0.00	236.6	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	112
	23:00:00	Down	0.00	Down	Down	0.00	231.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	105
13-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	228.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	107
	1:00:00	Down	0.00	Down	Down	0.00	224.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	101
	2:00:00	Down	0.00	Down	Down	0.00	221.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	99
	3:00:00	10.5	0.45	232	Down	0.00	254.4	7.5	Startup	18.2	9.5	20.8	0.0763	17.7	44.9	98.1	0.220	51.1	Inval	16.1	35.2	Startup	107
	4:00:00	33.0	1.00	736	Down	0.00	486.2	35.0	Startup	17.1	20.9	32.5	0.1193	87.8	34.1	52.9	0.118	86.8	Inval	31.1	48.3	Startup	160
	5:00:00	36.7	1.00	826	0.0	0.07	550.5	50.6	Startup	16.5	23.0	30.8	0.1134	93.7	28.6	38.4	0.086	71.0	69.6	33.8	45.3	Startup	274
	6:00:00	45.9	1.00	1020	9.7	1.00	539.6	80.9	Startup	15.1	14.1	14.3	0.0527	53.7	4.1	4.2	0.009	9.2	55.7	29.8	30.3	Startup	284
	7:00:00	62.8	1.00	1374	88.4	1.00	577.5	127.6	Normal	14.1	2.6	2.3	0.0083	11.4	0.0	0.0	0.000	0.0	26.7	21.0	18.2	Normal	240
	8:00:00	62.7	1.00	1374	57.7	1.00	601.9	127.8	Normal	14.1	2.5	2.2	0.0080	11.0	0.0	0.0	0.000	0.0	3.1	22.1	19.2	Normal	233
	9:00:00	78.1	1.00	1713	82.2	1.00	640.7	167.6	Normal	13.9	2.6	2.2	0.0081	13.9	0.0	0.0	0.000	0.0	0.0	25.0	21.1	Normal	233
	10:00:00	79.5	1.00	1745	84.2	1.00	649.5	170.8	Normal	13.9	2.6	2.2	0.0081	14.1	0.0	0.0	0.000	0.0	0.0	24.4	20.6	Normal	232
	11:00:00	81.0	1.00	1777	91.0	1.00	652.4	174.0	Normal	13.9	2.7	2.3	0.0084	14.9	0.0	0.0	0.000	0.0	0.0	25.7	21.7	Normal	236
	12:00:00	78.8	1.00	1786	97.3	1.00	652.6	173.1	Normal	13.9	2.6	2.2	0.0081	14.5	0.0	0.0	0.000	0.0	0.0	26.9	22.7	Normal	237
	13:00:00	78.8	1.00	1787	100.5	1.00	653.4	172.8	Normal	13.9	2.7	2.3	0.0084	15.0	0.0	0.0	0.000	0.0	0.0	27.7	23.3	Normal	238
	14:00:00	78.8	1.00	1790	104.1	1.00	654.3	172.4	Normal	13.9	2.6	2.2	0.0081	14.5	0.0	0.0	0.000	0.0	0.0	28.4	23.9	Normal	239
	15:00:00	78.4	1.00	1789	107.2	1.00	654.9	172.3	Normal	13.9	2.7	2.3	0.0084	15.0	0.0	0.0	0.000	0.0	0.0	29.3	24.7	Normal	238
	16:00:00	78.2	1.00	1797	101.5	1.00	654.7	172.7	Normal	13.9	2.6	2.2	0.0081	14.6	0.0	0.0	0.000	0.0	0.0	28.5	24.0	Normal	238
	17:00:00	78.2	1.00	1792	95.4	1.00	653.8	172.9	Normal	13.9	2.6	2.2	0.0081	14.5	0.0	0.0	0.000	0.0	0.0	27.4	23.1	Normal	237
	18:00:00	78.2	1.00	1779	85.3	1.00	652.8	172.1	Normal	13.9	2.6	2.2	0.0081	14.4	0.0	0.0	0.000	0.0	0.0	25.6	21.6	Normal	236
	19:00:00	76.2	1.00	1728	80.7	1.00	650.3	166.9	Normal	13.9	2.7	2.3	0.0084	14.5	0.0	0.0	0.000	0.0	0.0	25.2	21.2	Normal	236
	20:00:00	52.7	1.00	1199	65.8	0.93	621.6	102.6	Shutdown	14.5	2.4	2.2	0.0081	9.7	3.2	3.0	0.007	8.4	2.8	24.9	23.0	Shutdown	235
	21:00:00	7.0	0.30	158	Down	0.00	527.8	3.3	Shutdown	18.4	7.4	17.5	0.0642	10.2	23.0	54.3	0.121	19.2	9.2	20.8	49.1	Shutdown	219
	22:00:00	Down	0.00	Down	Down	0.00	433.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	222
	23:00:00	Down	0.00	Down	Down	0.00	397.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	135
14-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	373.9	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	117
	1:00:00	Down	0.00	Down	Down	0.00	360.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	110
	2:00:00	Down	0.00	Down	Down	0.00	349.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	104
	3:00:00	10.7	0.47	244	Down	0.00	373.9	9.6	Startup	18.2	11.8	25.8	0.0948	23.1	24.4	53.3	0.119	29.0	Inval	16.4	35.8	Startup	107
	4:00:00	35.3	1.00	802	0.0	0.17	528.7	46.6	Startup	16.6	23.6	32.4	0.1190	95.5	31.6	43.4	0.097	77.8	Inval	31.1	42.7	Startup	177
	5:00:00	40.9	1.00	924	0.0	1.00	559.6	67.8	Startup	15.8	19.7	22.8	0.0838	77.5	17.6	20.4	0.046	42.5	49.8	31.3	36.2	Startup	285
	6:00:00	45.3	1.00	1016	14.0	1.00	566.2	80.5	Startup	15.0	13.6	13.6	0.0500	50.8	4.3	4.3	0.010	10.2	43.5	28.4	28.4	Startup	278
	7:00:00	55.7	1.00	1230	87.4	1.00	596.8	108.4	Normal	14.2	2.2	1.9	0.0071	8.7	0.1	0.1	0.000	0.0	17.6	24.9	21.9	Normal	261
	8:00:00	71.9	1.00	1580	60.4	1.00	631.7	153.3	Normal	13.9	2.6	2.2	0.0081	12.8	0.0	0.0	0.000	0.0	3.4	22.5	19.0	Normal	233
	9:00:00	81.5	1.00	1792	95.9	1.00	652.1	174.8	Normal	13.8	2.7	2.2	0.0082	14.7	0.0	0.0	0.000	0.0	0.0	27.6	22.9	Normal	229
	10:00:00	81.0	1.00	1789	98.8	1.00	655.4	174.3	Normal	13.8	2.7	2.2	0.0082	14.7	0.0	0.0	0.000	0.0	0.0	27.9	23.2	Normal	235
	11:00:00	79.0	1.00	1792	104.5	1.00	655.1	173.0	Normal	13.8	2.7	2.2	0.0082	14.7	0.0	0.0	0.000	0.0	0.0	29.0	24.1	Normal	238
	12:00:00	78.4	1.00	1776	101.0	1.00	653.9	170.8	Normal	13.8	2.7	2.2	0.0082	14.6	0.0	0.0	0.000	0.0	0.0	28.2	23.4	Normal	237
	13:00:00	79.3	1.00	1795	102.5	1.00	655.1	173.0	Normal	13.8	2.6	2.2	0.0079	14.2	0.0	0.0	0.000	0.0	0.0	28.5	23.7	Normal	237
	14:00:00	79.2	1.00	1793	104.4	1.00	656.5	172.8	Normal	13.8	2.7	2.2	0.0082	14.7	0.0	0.0	0.000	0.0	0.0	28.9	24.0	Normal	237
	15:00:00	78.9	1.00	1786	102.7	1.00	657.1	172.0	Normal	13.8	2.6	2.2	0.0079	14.1	0.0	0.0	0.000	0.0	0.0	28.7	23.8	Normal	236
	16:00:00	79.0	1.00	1790	100.4	1.00	657.2	172.0	Normal	13.8	2.7	2.2	0.0082	14.7	0.0	0.0	0.000	0.0	0.0	28.6	23.8	Normal	236
	17:00:00	77.2	1.00	1750	96.8	1.00	655.4	168.0	Normal	13.8	2.6	2.2	0.0079	13.8	0.0	0.0	0.000	0.0	0.0	28.0	23.3	Normal	236
	18:00:00	63.0	1.00	1428	70.4	1.00	627.6	132.5	Normal	14.0	2.6	2.2	0.0082	11.7	0.0	0.0	0.000	0.0	0.0	23.7	20.3	Normal	235
	19:00:00	77.0	1.00	1744	96.8	1.00	648.3	167.3	Normal	13.8	2.6	2.2	0.0079	13.8	0.0	0.0	0.000	0.0	0.0	28.7	23.8	Normal	220
	20:00:00	53.8	1.00	1218	45.3	0.88	620.9	104.4	Shutdown	14.6	3.6	3.4	0.0124	15.1	5.0	4.7	0.010	12.2	4.1	23.0	21.5	Shutdown	229
	21:00:00	5.9	0.25	134	Down	0.00	514.4	3.0	Shutdown	18.5	10.7	26.3	0.0967	13.0	23.5	57.8	0.129	17.3	9.8	18.9	46.5	Shutdown	217
	22:00:00	Down	0.00	Down	Down	0.00	424.1	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	212
	23:00:00	Down	0.00	Down	Down	0.00	391.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Inval	Down	Down	Normal	113

Table A-3 Redding Data

		Heat Content Btu/scf	O2%	NOx ppm	NOx ppm @15% O2	NOx lb/mmBtu	NOx lbs	SCONOx inlet NOx ppm	Gas Flow kscf	Process Status	Turbine On-Time	Heat Input mmBtu/hr
8-Jun-05	0:00:00	1021										
	1:00:00	1020										
	2:00:00	1021										
	3:00:00	1021										
	4:00:00	1022										
	5:00:00	1022										
	6:00:00	1022										
	7:00:00	1023										
	8:00:00	1024										
	9:00:00	1025										
	10:00:00	1025										
	11:00:00	1025										
	12:00:00	1026										
	13:00:00	1026										
	14:00:00	1025										
	15:00:00	1024										
	16:00:00	1024										
	17:00:00	1024										
	18:00:00	1024										
	19:00:00	1024										
	20:00:00	1025										
	21:00:00	1026										
	22:00:00	1027										
	23:00:00	1027										
9-Jun-05	0:00:00	1028	14.3	0.41	0.4	0.001	0.3	25.6	297.4	Normal	1.00	308.7
	1:00:00	1028	14.3	0.41	0.4	0.001	0.3	25.6	297.2	Normal	1.00	308.5
	2:00:00	1028	14.3	0.40	0.4	0.001	0.3	25.6	296.9	Normal	1.00	308.2
	3:00:00	1029	14.3	0.40	0.4	0.001	0.3	25.6	296.4	Normal	1.00	307.7
	4:00:00	1031	14.3	0.41	0.4	0.001	0.3	25.6	296.2	Normal	1.00	307.5
	5:00:00	1032	14.3	0.40	0.4	0.001	0.3	25.6	296.1	Normal	1.00	307.4
	6:00:00	1032	14.3	0.38	0.3	0.001	0.3	25.9	296.2	Normal	1.00	307.5
	7:00:00	1032	14.4	0.37	0.3	0.001	0.3	26.4	296.4	Normal	1.00	307.7
	8:00:00	1030	14.4	0.37	0.3	0.001	0.3	26.3	297.4	Normal	1.00	308.7
	9:00:00	1028	14.4	0.43	0.4	0.001	0.4	27.8	338.5	Normal	1.00	351.4
	10:00:00	1026	14.5	0.55	0.5	0.002	0.8	29.5	380.1	Normal	1.00	394.5
	11:00:00	1025	14.5	0.57	0.5	0.002	0.8	29.8	394.2	Normal	1.00	409.2
	12:00:00	1023	14.5	0.60	0.6	0.002	0.9	28.0	411.8	Normal	1.00	427.4
	13:00:00	1022	14.4	0.48	0.4	0.002	0.8	27.7	366.0	Normal	1.00	379.9
	14:00:00	1021	14.3	0.39	0.3	0.001	0.3	26.3	312.3	Normal	1.00	324.2
	15:00:00	1021	14.3	0.39	0.3	0.001	0.3	26.6	327.0	Normal	1.00	339.4
	16:00:00	1021	14.3	0.38	0.3	0.001	0.3	27.0	320.6	Normal	1.00	332.8
	17:00:00	1020	14.4	0.35	0.3	0.001	0.3	26.1	297.6	Normal	1.00	308.9
	18:00:00	1020	14.3	0.35	0.3	0.001	0.3	26.0	297.5	Normal	1.00	308.8
	19:00:00	1021	14.3	0.38	0.3	0.001	0.3	26.2	328.6	Normal	1.00	341.1
	20:00:00	1021	14.3	0.35	0.3	0.001	0.3	26.0	299.5	Normal	1.00	310.9
	21:00:00	1023	14.3	0.36	0.3	0.001	0.3	26.1	295.2	Normal	1.00	306.4
	22:00:00	1030	14.3	0.35	0.3	0.001	0.3	26.2	293.3	Normal	1.00	304.4
	23:00:00	1039	14.3	0.36	0.3	0.001	0.3	26.6	291.9	Normal	1.00	303.0
10-Jun-05	0:00:00	1047	14.3	0.36	0.3	0.001	0.3	26.9	291.1	Normal	1.00	302.2
	1:00:00	1052	14.3	0.38	0.3	0.001	0.3	27.2	290.9	Normal	1.00	302.0
	2:00:00	1055	14.3	0.37	0.3	0.001	0.3	27.3	290.9	Normal	1.00	302.0
	3:00:00	1056	14.3	0.37	0.3	0.001	0.3	27.3	291.0	Normal	1.00	302.1
	4:00:00	1056	14.3	0.37	0.3	0.001	0.3	27.3	291.1	Normal	1.00	302.2
	5:00:00	1056	14.3	0.35	0.3	0.001	0.3	27.1	291.0	Normal	1.00	302.1
	6:00:00	1055	14.4	0.36	0.3	0.001	0.3	26.6	290.7	Normal	1.00	301.7
	7:00:00	1055	14.4	0.36	0.3	0.001	0.3	25.4	290.2	Normal	1.00	301.2
	8:00:00	1055	14.4	0.37	0.3	0.001	0.3	25.7	289.5	Normal	1.00	300.5
	9:00:00	1057	14.4	0.35	0.3	0.001	0.3	26.1	289.5	Normal	1.00	300.5
	10:00:00	1058	14.4	0.35	0.3	0.001	0.3	25.7	289.4	Normal	1.00	300.4
	11:00:00	1058	14.4	0.34	0.3	0.001	0.3	25.5	289.4	Normal	1.00	300.4
	12:00:00	1058	14.4	0.35	0.3	0.001	0.3	25.3	289.4	Normal	1.00	300.4
	13:00:00	1057	14.4	0.39	0.4	0.001	0.3	25.7	323.7	Normal	1.00	336.0
	14:00:00	1056	14.5	0.44	0.4	0.001	0.4	27.3	352.2	Normal	1.00	365.6
	15:00:00	1056	14.4	0.45	0.4	0.002	0.7	27.8	353.2	Normal	1.00	365.6
	16:00:00	1056	14.4	0.45	0.4	0.002	0.7	28.0	352.9	Normal	1.00	366.3
	17:00:00	1056	14.4	0.46	0.4	0.002	0.7	27.8	346.1	Normal	1.00	359.3
	18:00:00	1057	14.3	0.38	0.3	0.001	0.3	26.3	306.6	Normal	1.00	318.3
	19:00:00	1057	14.3	0.36	0.3	0.001	0.3	26.2	290.4	Normal	1.00	301.4
	20:00:00	1057	14.3	0.36	0.3	0.001	0.3	26.1	290.8	Normal	1.00	301.9
	21:00:00	1057	14.3	0.36	0.3	0.001	0.3	26.0	291.0	Normal	1.00	302.1
	22:00:00	1057	14.3	0.36	0.3	0.001	0.3	26.2	291.2	Normal	1.00	302.3
	23:00:00	1057	14.3	0.35	0.3	0.001	0.3	26.1	291.2	Normal	1.00	302.3

Table A-3 Redding Data

		Heat Content Btu/scf	O2%	NOx ppm	NOx ppm @15% O2	NOx lb/mmBtu	NOx lbs	SCONOx inlet NOx ppm	Gas Flow kscf	Process Status	Turbine On-Time	Heat Input mmBtu/hr
11-Jun-05	0:00:00	1057	14.3	0.36	0.3	0.001	0.3	26.1	291.2	Normal	1.00	302.3
	1:00:00	1057	14.3	0.36	0.3	0.001	0.3	26.4	291.2	Normal	1.00	302.3
	2:00:00	1057	14.3	0.37	0.3	0.001	0.3	26.6	291.2	Normal	1.00	302.3
	3:00:00	1057	14.3	0.37	0.3	0.001	0.3	26.6	291.5	Normal	1.00	302.6
	4:00:00	1056	14.3	0.37	0.3	0.001	0.3	26.7	291.5	Normal	1.00	302.6
	5:00:00	1056	14.3	0.40	0.4	0.001	0.3	26.8	291.8	Normal	1.00	302.9
	6:00:00	1056	14.3	0.41	0.4	0.001	0.3	26.9	292.1	Normal	1.00	303.2
	7:00:00	1054	14.4	0.39	0.4	0.001	0.3	26.9	292.6	Normal	1.00	303.7
	8:00:00	1052	14.4	0.40	0.4	0.001	0.3	26.8	292.9	Normal	1.00	304.0
	9:00:00	1050	14.4	0.40	0.4	0.001	0.3	26.6	293.0	Normal	1.00	304.1
	10:00:00	1048	14.4	0.40	0.4	0.001	0.3	26.7	293.0	Normal	1.00	304.1
	11:00:00	1048	14.4	0.39	0.4	0.001	0.3	26.6	292.7	Normal	1.00	303.8
	12:00:00	1048	14.4	0.39	0.4	0.001	0.3	26.8	292.3	Normal	1.00	303.4
	13:00:00	1049	14.4	0.39	0.4	0.001	0.3	26.6	291.9	Normal	1.00	303.0
	14:00:00	1051	14.4	0.39	0.4	0.001	0.3	26.7	296.8	Normal	1.00	308.1
	15:00:00	1051	14.4	0.42	0.4	0.001	0.3	26.9	325.6	Normal	1.00	338.0
	16:00:00	1050	14.4	0.44	0.4	0.001	0.3	27.1	325.4	Normal	1.00	337.8
	17:00:00	1050	14.3	0.42	0.4	0.001	0.3	27.3	316.1	Normal	1.00	328.1
	18:00:00	1050	14.3	0.42	0.4	0.001	0.3	27.3	310.1	Normal	1.00	321.9
	19:00:00	1051	14.3	0.38	0.3	0.001	0.3	27.1	291.4	Normal	1.00	302.5
	20:00:00	1052	14.3	0.39	0.3	0.001	0.3	27.1	291.6	Normal	1.00	302.7
	21:00:00	1053	14.3	0.40	0.4	0.001	0.3	27.2	291.8	Normal	1.00	302.9
	22:00:00	1053	14.3	0.40	0.4	0.001	0.3	27.3	292.0	Normal	1.00	303.1
	23:00:00	1054	14.3	0.41	0.4	0.001	0.3	27.4	292.1	Normal	1.00	303.2
12-Jun-05	0:00:00	1054	14.3	0.40	0.4	0.001	0.3	27.6	292.2	Normal	1.00	303.3
	1:00:00	1054	14.3	0.40	0.4	0.001	0.3	27.7	292.2	Normal	1.00	303.3
	2:00:00	1054	14.3	0.41	0.4	0.001	0.3	27.7	292.4	Normal	1.00	303.5
	3:00:00	1055	14.3	0.41	0.4	0.001	0.3	27.8	292.5	Nonnal	1.00	303.6
	4:00:00	1055	14.3	0.41	0.4	0.001	0.3	27.9	292.7	Normal	1.00	303.8
	5:00:00	1055	14.3	0.42	0.4	0.001	0.3	28.0	292.8	Normal	1.00	303.9
	6:00:00	1055	14.4	0.43	0.4	0.001	0.3	27.9	293.0	Normal	1.00	304.1
	7:00:00	1055	14.4	0.42	0.4	0.001	0.3	27.7	292.9	Normal	1.00	304.0
	8:00:00	1055	14.4	0.43	0.4	0.001	0.3	27.4	292.8	Normal	1.00	303.9
	9:00:00	1054	14.4	0.42	0.4	0.001	0.3	27.6	292.8	Normal	1.00	303.9
	10:00:00	1054	14.4	0.41	0.4	0.001	0.3	27.0	292.9	Normal	1.00	304.0
	11:00:00	1054	14.4	0.42	0.4	0.001	0.3	27.1	294.0	Normal	1.00	305.2
	12:00:00	1050	14.4	0.41	0.4	0.001	0.3	26.8	295.1	Normal	1.00	306.3
	13:00:00	1045	14.4	0.41	0.4	0.001	0.3	26.6	295.9	Normal	1.00	307.1
	14:00:00	1038	14.4	0.41	0.4	0.001	0.3	26.5	296.0	Normal	1.00	307.2
	15:00:00	1034	14.4	0.40	0.4	0.001	0.3	26.6	295.7	Normal	1.00	306.9
	16:00:00	1033	14.4	0.40	0.4	0.001	0.3	26.7	295.4	Normal	1.00	306.6
	17:00:00	1033	14.4	0.44	0.4	0.001	0.7	26.8	328.7	Normal	1.00	341.2
	18:00:00	1033	14.4	0.45	0.4	0.002	0.3	26.9	329.3	Normal	1.00	341.8
	19:00:00	1032	14.3	0.44	0.4	0.001	0.3	26.5	329.6	Normal	1.00	342.1
	20:00:00	1031	14.3	0.40	0.4	0.001	0.3	26.2	302.6	Normal	1.00	314.1
	21:00:00	1029	14.3	0.39	0.3	0.001	0.3	26.3	297.2	Normal	1.00	308.5
	22:00:00	1029	14.3	0.40	0.4	0.001	0.3	26.2	297.5	Normal	1.00	308.8
	23:00:00	1029	14.3	0.41	0.4	0.001	0.3	26.4	297.4	Normal	1.00	308.7
13-Jun-05	0:00:00	1028	14.3	0.41	0.4	0.001	0.3	26.6	297.6	Normal	1.00	308.9
	1:00:00	1027	14.3	0.41	0.4	0.001	0.3	26.7	297.8	Normal	1.00	309.1
	2:00:00	1026	14.3	0.41	0.4	0.001	0.3	26.7	297.8	Normal	1.00	309.1
	3:00:00	1026	14.3	0.41	0.4	0.001	0.3	26.8	297.7	Normal	1.00	309.0
	4:00:00	1026	14.3	0.41	0.4	0.001	0.3	26.9	297.7	Normal	1.00	309.0
	5:00:00	1027	14.3	0.40	0.4	0.001	0.3	26.9	297.1	Normal	1.00	308.4
	6:00:00	1029	14.4	0.42	0.4	0.001	0.3	26.8	296.1	Normal	1.00	307.4
	7:00:00	1033	14.4	0.41	0.4	0.001	0.3	26.6	296.3	Normal	1.00	307.6
	8:00:00	1036	14.4	0.42	0.4	0.001	0.3	26.9	311.7	Normal	1.00	323.5
	9:00:00	1033	14.4	0.44	0.4	0.001	0.3	26.8	326.6	Normal	1.00	339.0
	10:00:00	1029	14.4	0.44	0.4	0.001	0.3	26.9	327.3	Normal	1.00	339.7
	11:00:00	1026	14.4	0.44	0.4	0.001	0.3	26.5	327.3	Normal	1.00	339.7
	12:00:00	1024	14.5	0.48	0.4	0.002	0.7	27.5	355.7	Normal	1.00	369.2
	13:00:00	1023	14.5	0.48	0.4	0.002	0.7	27.5	359.1	Normal	1.00	372.7
	14:00:00	1022	14.4	0.40	0.4	0.001	0.3	25.6	297.3	Normal	1.00	308.6
	15:00:00	1022	14.4	0.41	0.4	0.001	0.3	25.7	316.8	Normal	1.00	328.8
	16:00:00	1022	14.4	0.42	0.4	0.001	0.3	26.1	327.1	Normal	1.00	339.5
	17:00:00	1022	14.4	0.44	0.4	0.001	0.3	26.1	331.8	Normal	1.00	344.4
	18:00:00	1022	14.5	0.54	0.5	0.002	0.8	28.4	377.7	Normal	1.00	392.1
	19:00:00	1023	14.3	0.43	0.4	0.001	0.3	25.8	325.7	Normal	1.00	338.1
	20:00:00	1024	14.3	0.41	0.4	0.001	0.3	25.6	325.4	Normal	1.00	337.8
	21:00:00	1025	14.3	0.41	0.4	0.001	0.3	25.7	325.7	Normal	1.00	338.1
	22:00:00	1025	14.3	0.41	0.4	0.001	0.3	25.9	325.7	Normal	1.00	338.1
	23:00:00	1026	14.3	0.39	0.3	0.001	0.3	25.8	296.9	Normal	1.00	330.3

Table A-4 Los Medanos Data

		Heat Content Btu/scf	CT1 Heat Input MMBTU	CT1 NOx ppm	CT1 CO ppm	CT1 O2 %	CT1 NH3 lb/hr	CT1 MW	CT1 Temp	CT1 Btu/KWh	CT2 Heat Input MMBTU	CT2 NOx ppm	CT2 CO ppm	CT2 O2 %	CT2 NH3 lb/hr	CT2 MW	CT2 Temp	CT2 Btu/KWh
6-Jun-05	12:00 PM	1,026.97																
	1:00 PM	1,028.50																
	2:00 PM	1,028.44																
	3:00 PM	1,028.22																
	4:00 PM	1,028.26																
	5:00 PM	1,028.88																
	6:00 PM	1,029.68																
	7:00 PM	1,021.03																
	8:00 PM	1,021.05																
	9:00 PM	1,020.58																
	10:00 PM	1,026.36																
	11:00 PM	1,027.15																
7-Jun-05	12:00 AM	1,028.05																
	1:00 AM	1,029.03																
	2:00 AM	1,030.03																
	3:00 AM	1,030.86																
	4:00 AM	1,030.75																
	5:00 AM	1,028.40																
	6:00 AM	1,031.03																
	7:00 AM	1,025.60																
	8:00 AM	1,025.83																
	9:00 AM	1,024.53																
	10:00 AM	1,023.27																
	11:00 AM	1,023.36																
	12:00 PM	1,024.08																
	1:00 PM	1,026.47																
	2:00 PM	1,027.56																
	3:00 PM	1,026.79																
	4:00 PM	1,030.97																
	5:00 PM	1,031.03																
	6:00 PM	1,030.69																
	7:00 PM	1,026.25																
	8:00 PM	1,025.69																
	9:00 PM	1,026.57																
	10:00 PM	1,023.07																
	11:00 PM	1,022.95																
8-Jun-05	12:00 AM	1,024.12																
	1:00 AM	1,024.57																
	2:00 AM	1,027.37																
	3:00 AM	1,026.78																
	4:00 AM	1,029.28																
	5:00 AM	1,029.38																
	6:00 AM	1,035.17																
	7:00 AM	1,039.38																
	8:00 AM	1,030.88																
	9:00 AM	1,029.24																
	10:00 AM	1,019.38																
	11:00 AM	1,023.73																
	12:00 PM	1,029.63																
	1:00 PM	1,028.24																
	2:00 PM	1,028.42																
	3:00 PM	1,029.17																
	4:00 PM	1,028.19																
	5:00 PM	1,027.97																
	6:00 PM	1,028.13																
	7:00 PM	1,023.52																
	8:00 PM	1,023.34																
	9:00 PM	1,024.63																
	10:00 PM	1,022.75																
	11:00 PM	1,023.06																

Table A-4 Los Medanos Data

		Heat Content	CT1 Heat Input	CT1 NOx	CT1 CO	CT1 O2	CT1 NH3	CT1	CT1	CT1	CT2 Heat Input	CT2 NOx	CT2 CO	CT2 O2	CT2 NH3	CT2	CT2	CT2
		Btu/scf	MMBTU	ppm	ppm	%	lb/hr	MW	Temp	Btu/KWh	MMBTU	ppm	ppm	%	lb/hr	MW	Temp	Btu/KWh
9-Jun-05	12:00 AM	1,025.81	N/A	N/A	N/A	N/A	N/A				1837.4	1.8	0.2	13.1	50.4			
	1:00 AM	1,024.78	N/A	N/A	N/A	N/A	N/A				1697.1	1.9	0.1	13.5	31.7			
	2:00 AM	1,028.16	N/A	N/A	N/A	N/A	N/A				1706.5	1.9	0.1	13.5	33.6			
	3:00 AM	1,029.55	N/A	N/A	N/A	N/A	N/A				1768.0	1.9	0.2	13.3	42.9			
	4:00 AM	1,030.30	N/A	N/A	N/A	N/A	N/A				1742.8	1.9	0.1	13.5	36.6			
	5:00 AM	1,035.78	N/A	N/A	N/A	N/A	N/A				1701.8	1.9	0.1	13.5	34.7			
	6:00 AM	1,034.69	1377.9	6.1	0.2	13.8	44.3				1430.0	1.8	0.1	13.5	39.7			
	7:00 AM	1,041.00	1643.0	1.9	0.0	13.7	43.5				1655.3	1.9	0.1	13.5	35.5			
	8:00 AM	1,038.28	1771.3	N/A	N/A	N/A	55.4				1787.7	1.8	0.2	13.4	43.6			
	9:00 AM	1,033.19	1610.1	1.9	0.0	13.7	38.8				1618.6	1.9	0.1	13.5	31.8			
	10:00 AM	1,028.97	1481.6	1.9	0.0	13.7	36.5				1499.8	1.9	0.1	13.5	31.5			
	11:00 AM	1,039.09	1647.9	1.9	0.0	13.7	39.3				1653.2	1.9	0.1	13.5	34.8			
	12:00 PM	1,031.06	1476.3	1.9	0.0	13.8	38.8				1490.0	1.9	0.1	13.5	32.8			
	1:00 PM	1,034.26	1769.0	1.9	0.1	13.6	48.0	163.0	1119.8	10403.9	1775.7	1.9	0.2	13.5	39.8	163.6	1125.1	10402.1
	2:00 PM	1,034.07	1535.7	1.9	0.0	13.8	39.2	138.8	1136.9	10828.3	1549.3	1.9	0.1	13.5	33.8	139.5	1154.3	10858.7
	3:00 PM	1,030.19	1775.3	1.9	0.1	13.5	52.4	163.8	1122.5	10455.6	1809.3	1.9	0.3	13.2	44.9	164.5	1125.8	10498.3
	4:00 PM	1,031.96	1761.0	1.9	0.1	13.6	48.8	163.2	1118.3	10442.1	1778.0	1.9	0.2	13.4	42.0	164.0	1123.2	10435.5
	5:00 PM	1,033.94	1632.5	1.9	0.0	13.8	40.3	150.1	1123.7	10610.3	1641.2	1.9	0.1	13.5	33.5	150.5	1141.1	10631.3
	6:00 PM	1,035.59	1578.0	1.9	0.0	13.8	40.7	144.8	1131.0	10631.2	1588.7	1.9	0.1	13.6	33.0	145.4	1147.8	10646.9
	7:00 PM	1,040.80	1635.1	1.9	0.0	13.8	41.2	151.1	1122.5	10511.3	1642.1	1.9	0.1	13.6	34.1	151.6	1139.4	10507.8
	8:00 PM	1,040.94	1623.4	1.9	0.0	13.8	41.8	150.6	1122.3	10510.9	1635.1	1.9	0.1	13.6	33.5	151.0	1139.3	10548.8
	9:00 PM	1,037.38	1683.6	1.9	0.0	13.8	42.3	156.8	1113.5	10482.7	1693.7	1.9	0.1	13.5	35.7	157.2	1129.6	10513.9
	10:00 PM	1,032.45	1428.3	2.0	0.0	13.8	43.0	123.2	1149.6	11461.6	1438.6	1.9	0.1	13.5	36.9	123.7	1168.4	11494.5
	11:00 PM	1,029.19	1366.2	1.8	0.0	13.8	41.4	116.4	1159.0	11510.5	1382.5	1.9	0.1	13.5	41.5	118.4	1176.3	11456.6
10-Jun-05	12:00 AM	1,034.03	N/A	N/A	N/A	N/A	N/A	5.3	678.5	2767.0	1699.3	1.8	0.1	13.4	41.1	154.6	1138.8	10521.5
	1:00 AM	1,035.38	N/A	N/A	N/A	N/A	N/A	0.0	581.8	0.0	1703.7	1.8	0.1	13.3	42.3	152.7	1140.7	10545.1
	2:00 AM	1,035.89	N/A	N/A	N/A	N/A	N/A	0.0	507.4	0.0	1476.0	1.9	0.1	13.5	30.3	129.8	1161.3	10967.7
	3:00 AM	1,038.64	N/A	N/A	N/A	N/A	N/A	0.0	451.1	0.0	1466.0	1.9	0.1	13.5	31.1	129.5	1162.3	10962.9
	4:00 AM	1,037.12	N/A	N/A	N/A	N/A	N/A	0.0	412.1	0.0	1654.3	1.8	0.1	13.4	41.4	150.1	1143.7	10596.9
	5:00 AM	1,039.64	N/A	N/A	N/A	N/A	N/A	13.1	606.9	5845.1	1717.1	1.8	0.2	13.4	39.0	158.0	1131.8	10445.1
	6:00 AM	1,040.78	1451.2	3.5	0.0	13.7	47.4	129.0	1145.5	11069.4	1465.8	1.9	0.1	13.5	40.9	129.5	1161.0	11115.2
	7:00 AM	1,032.62	1743.1	1.9	0.0	13.6	53.8	161.9	1123.1	10387.3	1752.8	1.9	0.2	13.4	43.8	162.3	1132.3	10405.6
	8:00 AM	1,047.81	1753.4	N/A	N/A	N/A	45.8	162.2	1114.7	10445.0	1770.3	1.8	0.2	13.5	40.4	163.0	1125.3	10470.0
	9:00 AM	1,063.63	1593.5	1.9	0.0	13.7	40.3	144.1	1129.9	10827.7	1606.0	1.9	0.1	13.5	35.1	144.5	1145.8	10862.3
	10:00 AM	1,071.52	1675.3	1.9	0.0	13.7	43.7	151.8	1124.0	10720.8	1689.1	1.9	0.1	13.5	36.7	152.4	1139.2	10746.5
	11:00 AM	1,075.44	1500.1	1.9	0.0	13.7	39.4	131.1	1144.7	11215.3	1513.6	1.9	0.1	13.6	35.2	131.8	1163.9	11261.0
	12:00 PM	1,075.63	1601.5	1.9	0.0	13.8	39.2	143.8	1132.3	10852.4	1611.6	1.9	0.1	13.6	32.0	144.3	1150.4	10879.4
	1:00 PM	1,075.10	1771.7	1.9	0.0	13.2	58.0	153.3	1133.9	10759.0	1794.9	1.9	0.1	13.0	48.1	153.9	1142.9	10801.6
	2:00 PM	1,074.72	1743.9	1.9	0.0	13.5	55.5	158.4	1132.8	10649.3	1763.3	1.9	0.2	13.3	45.7	159.2	1138.0	10651.8
	3:00 PM	1,076.03	1699.1	1.9	0.0	13.7	44.8	154.0	1124.4	10719.3	1711.5	1.9	0.1	13.5	37.0	154.5	1137.5	10736.1
	4:00 PM	1,077.96	1711.6	1.9	0.0	13.6	46.5	155.0	1123.6	10708.5	1723.8	1.9	0.1	13.4	38.2	155.5	1134.5	10729.2
	5:00 PM	1,079.13	1826.3	1.9	0.0	13.3	61.6	163.0	1130.1	10634.1	1848.2	1.9	0.2	13.1	50.9	163.5	1132.2	10633.5
	6:00 PM	1,079.14	1569.8	1.9	0.0	13.7	41.0	139.4	1135.4	10980.0	1579.2	1.9	0.1	13.5	32.7	139.9	1153.3	10996.7
	7:00 PM	1,079.07	1660.0	1.8	0.0	13.7	43.7	151.7	1120.7	10728.4	1667.9	1.8	0.1	13.5	36.7	152.3	1136.2	10720.7
	8:00 PM	1,077.87	1757.5	1.8	0.0	13.6	51.0	160.1	1117.6	10626.7	1769.4	1.8	0.1	13.4	43.1	160.4	1127.5	10639.4
	9:00 PM	1,077.53	1637.7	1.9	0.0	13.7	43.3	147.6	1123.0	10840.0	1647.6	1.8	0.1	13.5	35.5	148.1	1139.6	10850.9
	10:00 PM	1,076.84	1472.7	1.8	0.0	13.7	41.5	126.9	1146.5	11347.1	1489.0	1.8	0.1	13.5	40.4	127.5	1164.4	11419.5
	11:00 PM	1,076.60	1437.2	1.8	0.0	13.7	41.6	123.2	1152.6	11411.7	1446.8	1.8	0.1	13.5	38.2	123.8	1170.9	11430.9
11-Jun-05	12:00 AM	1,039.69	N/A	N/A	N/A	N/A	N/A	7.9	692.8	2919.3	1588.4	1.7	0.1	13.5	36.3	143.3	1146.3	10848.1
	1:00 AM	1,057.24	N/A	N/A	N/A	N/A	N/A	0.0	581.8	0.0	1474.5	1.8	0.1	13.5	31.9	128.2	1163.6	11199.7
	2:00 AM	1,052.70	N/A	N/A	N/A	N/A	N/A	0.0	509.2	0.0	1457.8	1.8	0.1	13.5	32.3	126.5	1165.2	11230.2
	3:00 AM	1,058.72	N/A	N/A	N/A	N/A	N/A	0.0	454.3	0.0	1445.0	1.8	0.1	13.5	33.5	125.6	1165.9	11212.8
	4:00 AM	1,063.13	N/A	N/A	N/A	N/A	N/A	0.0	413.2	0.0	1452.9	1.8	0.1	13.5	33.0	125.8	1165.7	11262.4
	5:00 AM	1,066.53	N/A	N/A	N/A	N/A	N/A	7.9	624.2	7248.1	1608.3	1.9	0.1	13.5	35.1	144.9	1144.8	10878.6
	6:00 AM	1,063.10	1468.1	6.3	0.1	13.7	44.4	129.5	1144.5	11182.9	1503.2	1.9	0.1	13.5	34.2	130.9	1159.7	11217.2
	7:00 AM	1,077.63	1594.1	1.8	0.0	13.7	44.3	142.7	1132.9	10926.8	1607.4	1.9	0.1	13.5	37.8	143.3	1148.3	10960.6
	8:00 AM	1,077.21	1723.7	N/A	N/A	N/A	61.9	152.1	1130.7	10734.7	1737.4	2.0	0.1	13.1	46.5	152.7	1141.6	10739.8
	9:00 AM	1,076.84	1957.0	1.9	0.0	12.7	75.3	165.8	1128.3	10565.5	1985.3	1.9	0.1	12.5	65.9	166.6	1130.3	10574.5
	10:00 AM	1,077.23	1720.2	1.8	0.0	13.5	49.2	155.7	1125.7	10675.6	1740.0	1.8	0.2	13.4	42.0	156.1	1134.7	10699.3
	11:00 AM	1,077.63	1749.0	1.9	0.0	13.6	41.1	159.9	1113.8	10625.7	1759.0	1.9	0.1	13.5	37.1	160.4	1124.9	10619.4
	12:00 PM	1,077.50	1631.4	1.9	0.0	13.7	39.3	147.2	1126.5	10793.4	1641.1	1.9	0.1	13.6	33.6	147.5	1144.9	10831.6

Table A-4 Los Medanos Data

		Heat Content Btu/scf	CT1 Heat Input MMBTU	CT1 NOx ppm	CT1 CO ppm	CT1 O2 %	CT1 NH3 lb/hr	CT1 MW	CT1 Temp	CT1 Btu/KWh	CT2 Heat Input MMBTU	CT2 NOx ppm	CT2 CO ppm	CT2 O2 %	CT2 NH3 lb/hr	CT2 MW	CT2 Temp	CT2 Btu/KWh
9-Jun-05	12:00 AM	1,025.81	N/A	N/A	N/A	N/A	N/A				1837.4	1.8	0.2	13.1	50.4			
	1:00 AM	1,024.78	N/A	N/A	N/A	N/A	N/A				1697.1	1.9	0.1	13.5	31.7			
	2:00 AM	1,028.16	N/A	N/A	N/A	N/A	N/A				1706.5	1.9	0.1	13.5	33.6			
	3:00 AM	1,029.55	N/A	N/A	N/A	N/A	N/A				1768.0	1.9	0.2	13.3	42.9			
	4:00 AM	1,030.30	N/A	N/A	N/A	N/A	N/A				1742.8	1.9	0.1	13.5	36.6			
	5:00 AM	1,035.78	N/A	N/A	N/A	N/A	N/A				1701.8	1.9	0.1	13.5	34.7			
	6:00 AM	1,034.69	1377.9	6.1	0.2	13.8	44.3				1430.0	1.8	0.1	13.5	39.7			
	7:00 AM	1,041.00	1643.0	1.9	0.0	13.7	43.5				1655.3	1.9	0.1	13.5	35.5			
	8:00 AM	1,038.28	1771.3	N/A	N/A	N/A	55.4				1787.7	1.8	0.2	13.4	43.6			
	9:00 AM	1,033.19	1610.1	1.9	0.0	13.7	38.8				1618.6	1.9	0.1	13.5	31.8			
	10:00 AM	1,028.97	1481.6	1.9	0.0	13.7	36.5				1499.8	1.9	0.1	13.5	31.5			
	11:00 AM	1,039.09	1647.9	1.9	0.0	13.7	39.3				1653.2	1.9	0.1	13.5	34.8			
	12:00 PM	1,031.06	1476.3	1.9	0.0	13.8	38.8				1490.0	1.9	0.1	13.5	32.8			
	1:00 PM	1,034.26	1769.0	1.9	0.1	13.6	48.0	163.0	1119.8	10403.9	1775.7	1.9	0.2	13.5	39.8	163.6	1125.1	10402.1
	2:00 PM	1,034.07	1535.7	1.9	0.0	13.8	39.2	138.8	1136.9	10828.3	1549.3	1.9	0.1	13.5	33.8	139.5	1154.3	10858.7
	3:00 PM	1,030.19	1775.3	1.9	0.1	13.5	52.4	163.8	1122.5	10455.6	1809.3	1.9	0.3	13.2	44.9	164.5	1125.8	10498.3
	4:00 PM	1,031.96	1761.0	1.9	0.1	13.6	48.8	163.2	1118.3	10442.1	1778.0	1.9	0.2	13.4	42.0	164.0	1123.2	10435.5
	5:00 PM	1,033.94	1632.5	1.9	0.0	13.8	40.3	150.1	1123.7	10610.3	1641.2	1.9	0.1	13.5	33.5	150.5	1141.1	10631.3
	6:00 PM	1,035.59	1578.0	1.9	0.0	13.8	40.7	144.8	1131.0	10631.2	1588.7	1.9	0.1	13.6	33.0	145.4	1147.8	10646.9
	7:00 PM	1,040.80	1635.1	1.9	0.0	13.8	41.2	151.1	1122.5	10511.3	1642.1	1.9	0.1	13.6	34.1	151.6	1139.4	10507.8
	8:00 PM	1,040.94	1623.4	1.9	0.0	13.8	41.8	150.6	1122.3	10510.9	1635.1	1.9	0.1	13.6	33.5	151.0	1139.3	10548.8
	9:00 PM	1,037.38	1683.6	1.9	0.0	13.8	42.3	156.8	1113.5	10482.7	1693.7	1.9	0.1	13.5	35.7	157.2	1129.6	10513.9
	10:00 PM	1,032.45	1428.3	2.0	0.0	13.8	43.0	123.2	1149.6	11461.6	1438.6	1.9	0.1	13.5	36.9	123.7	1168.4	11494.5
	11:00 PM	1,029.19	1366.2	1.8	0.0	13.8	41.4	116.4	1159.0	11510.5	1382.5	1.9	0.1	13.5	41.5	118.4	1176.3	11456.6
10-Jun-05	12:00 AM	1,034.03	N/A	N/A	N/A	N/A	N/A	5.3	678.5	2767.0	1699.3	1.8	0.1	13.4	41.1	154.6	1138.8	10521.5
	1:00 AM	1,035.38	N/A	N/A	N/A	N/A	N/A	0.0	581.8	0.0	1703.7	1.8	0.1	13.3	42.3	152.7	1140.7	10545.1
	2:00 AM	1,035.89	N/A	N/A	N/A	N/A	N/A	0.0	507.4	0.0	1476.0	1.9	0.1	13.5	30.3	129.8	1161.3	10967.7
	3:00 AM	1,038.64	N/A	N/A	N/A	N/A	N/A	0.0	451.1	0.0	1466.0	1.9	0.1	13.5	31.1	129.5	1162.3	10962.9
	4:00 AM	1,037.12	N/A	N/A	N/A	N/A	N/A	0.0	412.1	0.0	1654.3	1.8	0.1	13.4	41.4	150.1	1143.7	10596.9
	5:00 AM	1,039.64	N/A	N/A	N/A	N/A	N/A	13.1	606.9	5845.1	1717.1	1.8	0.2	13.4	39.0	158.0	1131.8	10445.1
	6:00 AM	1,040.78	1451.2	3.5	0.0	13.7	47.4	129.0	1145.5	11069.4	1465.8	1.9	0.1	13.5	40.9	129.5	1161.0	11115.2
	7:00 AM	1,032.62	1743.1	1.9	0.0	13.6	53.8	161.9	1123.1	10387.3	1752.8	1.9	0.2	13.4	43.8	162.3	1132.3	10405.6
	8:00 AM	1,047.81	1753.4	N/A	N/A	N/A	45.8	162.2	1114.7	10445.0	1770.3	1.8	0.2	13.5	40.4	163.0	1125.3	10470.0
	9:00 AM	1,063.63	1593.5	1.9	0.0	13.7	40.3	144.1	1129.9	10827.7	1606.0	1.9	0.1	13.5	35.1	144.5	1145.8	10862.3
	10:00 AM	1,071.52	1675.3	1.9	0.0	13.7	43.7	151.8	1124.0	10720.8	1689.1	1.9	0.1	13.5	36.7	152.4	1139.2	10746.5
	11:00 AM	1,075.44	1500.1	1.9	0.0	13.7	39.4	131.1	1144.7	11215.3	1513.6	1.9	0.1	13.6	35.2	131.8	1163.9	11261.0
	12:00 PM	1,075.63	1601.5	1.9	0.0	13.8	39.2	143.8	1132.3	10852.4	1611.6	1.9	0.1	13.6	32.0	144.3	1150.4	10879.4
	1:00 PM	1,075.10	1771.7	1.9	0.0	13.2	58.0	153.3	1133.9	10759.0	1794.9	1.9	0.1	13.0	48.1	153.9	1142.9	10801.6
	2:00 PM	1,074.72	1743.9	1.9	0.0	13.5	55.5	158.4	1132.8	10649.3	1763.3	1.9	0.2	13.3	45.7	159.2	1138.0	10651.8
	3:00 PM	1,076.03	1699.1	1.9	0.0	13.7	44.8	154.0	1124.4	10719.3	1711.5	1.9	0.1	13.5	37.0	154.5	1137.5	10736.1
	4:00 PM	1,077.96	1711.6	1.9	0.0	13.6	46.5	155.0	1123.6	10708.5	1723.8	1.9	0.1	13.4	38.2	155.5	1134.5	10729.2
	5:00 PM	1,079.13	1826.3	1.9	0.0	13.3	61.6	163.0	1130.1	10634.1	1848.2	1.9	0.2	13.1	50.9	163.5	1132.2	10633.5
	6:00 PM	1,079.14	1569.8	1.9	0.0	13.7	41.0	139.4	1135.4	10980.0	1579.2	1.9	0.1	13.5	32.7	139.9	1153.3	10996.7
	7:00 PM	1,079.07	1660.0	1.8	0.0	13.7	43.7	151.7	1120.7	10728.4	1667.9	1.8	0.1	13.5	36.7	152.3	1136.2	10720.7
	8:00 PM	1,077.87	1757.5	1.8	0.0	13.6	51.0	160.1	1117.6	10626.7	1769.4	1.8	0.1	13.4	43.1	160.4	1127.5	10639.4
	9:00 PM	1,077.53	1637.7	1.9	0.0	13.7	43.3	147.6	1123.0	10840.0	1647.6	1.8	0.1	13.5	35.5	148.1	1139.6	10850.9
	10:00 PM	1,076.84	1472.7	1.8	0.0	13.7	41.5	126.9	1146.5	11347.1	1489.0	1.8	0.1	13.5	40.4	127.5	1164.4	11419.5
	11:00 PM	1,076.60	1437.2	1.8	0.0	13.7	41.6	123.2	1152.6	11411.7	1446.8	1.8	0.1	13.5	38.2	123.8	1170.9	11430.9
11-Jun-05	12:00 AM	1,039.69	N/A	N/A	N/A	N/A	N/A	7.9	692.8	2919.3	1588.4	1.7	0.1	13.5	36.3	143.3	1146.3	10848.1
	1:00 AM	1,057.24	N/A	N/A	N/A	N/A	N/A	0.0	581.8	0.0	1474.5	1.8	0.1	13.5	31.9	128.2	1163.6	11199.7
	2:00 AM	1,052.70	N/A	N/A	N/A	N/A	N/A	0.0	509.2	0.0	1457.8	1.8	0.1	13.5	32.3	126.5	1165.2	11230.2
	3:00 AM	1,058.72	N/A	N/A	N/A	N/A	N/A	0.0	454.3	0.0	1445.0	1.8	0.1	13.5	33.5	125.6	1165.9	11212.8
	4:00 AM	1,063.13	N/A	N/A	N/A	N/A	N/A	0.0	413.2	0.0	1452.9	1.8	0.1	13.5	33.0	125.8	1165.7	11262.4
	5:00 AM	1,066.53	N/A	N/A	N/A	N/A	N/A	7.9	624.2	7248.1	1608.3	1.9	0.1	13.5	35.1	144.9	1144.8	10878.6
	6:00 AM	1,063.10	1468.1	6.3	0.1	13.7	44.4	129.5	1144.5	11182.9	1503.2	1.9	0.1	13.5	34.2	130.9	1159.7	11217.2
	7:00 AM	1,077.63	1594.1	1.8	0.0	13.7	44.3	142.7	1132.9	10926.8	1607.4	1.9	0.1	13.5	37.8	143.3	1148.3	10960.6
	8:00 AM	1,077.21	1723.7	N/A	N/A	N/A	61.9	152.1	1130.7	10734.7	1737.4	2.0	0.1	13.1	46.5	152.7	1141.6	10739.8
	9:00 AM	1,076.84	1957.0	1.9	0.0	12.7	75.3	165.8	1128.3	10565.5	1985.3	1.9	0.1	12.5	65.9	166.6	1130.3	10574.5
	10:00 AM	1,077.23	1720.2	1.8	0.0	13.5	49.2	155.7	1125.7	10675.6	1740.0	1.8	0.2	13.4	42.0	156.1	1134.7	10699.3
	11:00 AM	1,077.63	1749.0	1.9	0.0	13.6	41.1	159.9	1113.8	10625.7	1759.0	1.9	0.1	13.5	37.1	160.4	1124.9	10619.4
	12:00 PM	1,077.50	1631.4	1.9	0.0	13.7	39.3	147.2	1126.5	10793.4	1641.1	1.9	0.1	13.6	33.6	147.5	1144.9	10831.6

Table A-5 Delta Turbine Data

		CT1 Heat Input MMBTU	CT1 NOx ppm	CT1 CO ppm	CT1 O2 %	CT1 NH3 lb/hr	CT2 Heat Input MMBTU	CT2 NOx ppm	CT2 CO ppm	CT2 O2 %	CT2 NH3 lb/hr	CT2 MW	CT2 Temp	CT2 Btu/KWh	CT3 Heat Input MMBTU	CT3 NOx ppm	CT3 CO ppm	CT3 O2 %	CT3 NH3 lb/hr
10-Jun-2005	12:00 AM	N/A	N/A	N/A	N/A	N/A	1870.2	1.8	0.34	13.969	73.22	178.0	1013.9	11061.0	0.2	N/A	N/A	N/A	N/A
	1:00 AM	N/A	N/A	N/A	N/A	N/A	1870.1	1.8	0.34	13.962	73.66	176.6	1017.6	11129.2	N/A	N/A	N/A	N/A	N/A
	2:00 AM	N/A	N/A	N/A	N/A	N/A	1887.7	1.9	0.34	13.938	76.42	176.3	1033.5	11087.9	0.2	N/A	N/A	N/A	N/A
	3:00 AM	N/A	N/A	N/A	N/A	N/A	1784.9	1.9	0.34	13.867	66.20	177.6	1042.0	11130.1	0.2	N/A	N/A	N/A	N/A
	4:00 AM	N/A	N/A	N/A	N/A	N/A	1819.7	1.8	0.35	13.874	73.88	168.6	1037.0	11214.2	0.2	N/A	N/A	N/A	N/A
	5:00 AM	1408.6	1.8	1.43	13.913	47.20	1577.2	1.9	0.57	13.948	60.96	172.2	1006.7	11175.0	0.2	N/A	N/A	N/A	N/A
	6:00 AM	1738.6	1.9	0.24	13.756	51.09	1709.7	1.9	0.37	13.870	72.07	146.2	990.0	11235.0	N/A	N/A	N/A	N/A	N/A
	7:00 AM	1968.6	1.9	0.39	13.332	59.45	1945.6	1.9	0.63	13.484	85.78	162.1	1036.0	11127.9	0.2	N/A	N/A	N/A	N/A
	8:00 AM	1708.3	1.8	0.24	13.768	47.90	1675.3	1.8	0.36	13.866	66.30	177.8	1053.5	10853.3	0.2	N/A	N/A	N/A	N/A
	9:00 AM	1764.3	1.9	0.18	13.812	49.74	1743.4	1.8	0.34	13.903	70.79	160.1	1058.7	11063.6	0.2	N/A	N/A	N/A	N/A
	10:00 AM	1623.6	N/A	N/A	N/A	47.92	1604.4	N/A	N/A	N/A	64.41	167.4	1045.3	10925.1	N/A	N/A	N/A	N/A	N/A
	11:00 AM	1579.2	1.9	0.30	13.720	44.44	1575.4	1.8	0.76	13.819	58.56	152.0	1036.7	11081.4	N/A	N/A	N/A	N/A	N/A
	12:00 PM	1697.3	1.9	0.25	13.718	49.89	1679.1	1.8	0.50	13.828	70.59	148.6	1069.8	11119.6	N/A	N/A	N/A	N/A	N/A
	1:00 PM	1723.1	1.8	0.23	13.760	48.04	1709.0	1.9	0.42	13.851	69.82	160.3	1047.9	10980.0	N/A	N/A	N/A	N/A	N/A
	2:00 PM	1651.6	1.9	0.21	13.693	47.84	1641.8	1.8	0.42	13.802	67.32	163.7	1063.4	10914.1	747.8	32.6	841.13	15.932	0.23
	3:00 PM	1493.4	1.9	0.25	13.781	45.53	1474.5	1.8	0.48	13.910	58.30	158.1	1079.4	10916.7	1170.9	11.2	4.12	14.331	50.05
	4:00 PM	1477.1	1.9	0.25	13.736	44.07	1454.0	1.8	0.38	13.844	56.15	138.6	1094.7	11278.4	1466.6	1.9	0.20	13.938	60.86
	5:00 PM	1365.0	1.9	0.34	13.909	46.89	1335.5	1.9	0.69	14.051	57.07	135.7	1093.1	11242.7	1354.1	1.9	0.47	14.025	56.94
	6:00 PM	1316.2	1.9	0.43	13.965	48.55	1308.6	1.9	0.92	14.105	59.28	122.0	1052.7	11623.7	1320.1	1.9	0.73	14.069	58.97
	7:00 PM	1352.7	1.9	0.39	13.882	47.76	1373.3	1.8	0.63	13.997	55.90	117.3	1061.3	11715.4	1387.4	1.9	0.46	13.977	56.35
	8:00 PM	N/A	N/A	N/A	N/A	N/A	1786.2	1.9	0.33	13.786	82.29	124.4	1077.4	11538.6	1785.1	1.9	0.00	13.801	68.03
	9:00 PM	N/A	N/A	N/A	N/A	N/A	1589.4	1.8	0.39	13.857	61.97	171.7	1071.6	10869.9	1583.1	1.8	0.12	13.861	58.62
	10:00 PM	N/A	N/A	N/A	N/A	N/A	1474.9	1.9	0.36	13.858	58.95	149.9	1054.2	11175.7	1417.4	1.9	0.90	13.941	62.34
	11:00 PM	N/A	N/A	N/A	N/A	N/A	1840.8	1.8	0.32	13.791	88.69	137.3	1065.6	11233.7	N/A	N/A	N/A	N/A	N/A
11-Jun-2005	12:00 AM	N/A	N/A	N/A	N/A	N/A	1838.2	1.9	0.33	13.837	77.08	177.0	1082.9	10811.1	0.2	N/A	N/A	N/A	N/A
	1:00 AM	N/A	N/A	N/A	N/A	N/A	1856.7	1.8	0.33	13.844	78.85	174.9	1068.4	11021.1	N/A	N/A	N/A	N/A	N/A
	2:00 AM	N/A	N/A	N/A	N/A	N/A	1863.2	1.8	0.33	13.845	78.54	176.4	1034.2	10961.1	0.2	N/A	N/A	N/A	N/A
	3:00 AM	N/A	N/A	N/A	N/A	N/A	1856.7	1.8	0.34	13.855	77.85	177.3	1023.7	11009.7	0.2	N/A	N/A	N/A	N/A
	4:00 AM	N/A	N/A	N/A	N/A	N/A	1860.0	1.9	0.34	13.856	77.90	177.3	1068.6	10942.4	304.3	N/A	N/A	N/A	N/A
	5:00 AM	N/A	N/A	N/A	N/A	N/A	1535.0	1.8	0.48	13.925	62.26	177.3	1068.7	10998.2	1301.6	2.8	1.17	14.018	57.42
	6:00 AM	N/A	N/A	N/A	N/A	N/A	1529.2	1.9	0.46	13.881	58.04	144.4	1093.1	11338.7	1543.5	1.9	0.19	13.854	56.17
	7:00 AM	N/A	N/A	N/A	N/A	N/A	1806.7	1.9	0.37	13.788	81.10	139.5	1093.3	11435.9	1828.6	1.9	0.01	13.758	63.50
	8:00 AM	N/A	N/A	N/A	N/A	N/A	1858.5	1.8	0.44	13.709	87.72	172.6	1039.7	10909.7	1877.5	1.9	0.06	13.667	66.13
	9:00 AM	1135.7	8.7	375.30	14.463	41.50	1523.6	1.8	0.37	13.861	57.26	176.6	1078.0	10869.6	1530.0	1.9	0.08	13.860	56.71
	10:00 AM	1581.7	1.8	0.26	13.680	45.81	1564.5	N/A	N/A	N/A	57.77	143.4	1103.8	11281.9	1572.6	1.9	0.02	13.796	59.55
	11:00 AM	1538.2	1.9	0.25	13.724	42.55	1513.1	1.9	0.78	13.831	55.69	145.9	1097.2	11144.4	1520.5	N/A	N/A	N/A	58.28
	12:00 PM	1656.4	1.8	0.23	13.676	46.45	1633.3	1.9	0.50	13.789	63.39	141.6	1092.3	11304.1	1648.0	1.9	0.01	13.772	57.88
	1:00 PM	1675.4	1.9	0.21	13.652	45.70	1648.4	1.8	0.42	13.752	64.00	154.6	1057.4	11042.4	1656.8	1.9	0.00	13.741	59.42
	2:00 PM	1544.6	1.9	0.23	13.707	43.74	1519.3	1.8	0.40	13.802	57.56	157.7	1093.5	11017.6	1532.6	1.9	0.05	13.812	56.71
	3:00 PM	1593.0	1.8	0.22	13.659	43.35	1566.6	1.9	0.34	13.763	58.12	142.2	1041.8	11254.4	1579.0	1.9	0.01	13.762	59.80
	4:00 PM	1614.4	1.9	0.22	13.644	44.68	1596.0	1.8	0.33	13.734	60.75	146.9	1055.7	11184.1	1613.5	1.9	0.00	13.739	62.32
	5:00 PM	1766.5	1.9	0.20	13.635	52.12	1731.5	1.9	0.35	13.732	75.16	151.7	1019.6	11064.7	1755.8	1.8	0.00	13.707	62.89
	6:00 PM	1719.6	1.9	0.19	13.649	49.10	1688.9	1.9	0.38	13.735	68.49	166.5	1057.1	10758.6	1709.4	1.9	0.00	13.751	61.32
	7:00 PM	1670.0	1.9	0.23	13.656	47.82	1647.7	1.8	0.36	13.738	64.69	163.8	1027.2	10916.2	1656.9	1.9	0.00	13.707	61.96
	8:00 PM	1745.4	1.9	0.23	13.642	52.13	1714.9	1.8	0.34	13.773	73.19	156.6	1100.5	11016.3	1744.3	1.9	0.01	13.704	62.37
	9:00 PM	1472.7	2.0	0.33	13.811	46.45	1484.7	1.9	0.38	13.867	57.72	166.3	1084.8	10853.9	1492.6	1.9	0.12	13.854	55.70
	10:00 PM	N/A	N/A	N/A	N/A	N/A	1548.8	1.9	0.38	13.864	66.66	138.4	1110.8	11310.6	1552.7	1.9	0.17	13.888	60.59
	11:00 PM	N/A	N/A	N/A	N/A	N/A	1782.6	1.9	0.34	13.841	78.29	148.5	1066.5	10977.7	N/A	N/A	N/A	N/A	N/A

Table A-5 Delta Turbine Data

		CT1 Heat Input MMBTU	CT1 NOx ppm	CT1 CO ppm	CT1 O2 %	CT1 NH3 lb/hr	CT2 Heat Input MMBTU	CT2 NOx ppm	CT2 CO ppm	CT2 O2 %	CT2 NH3 lb/hr	CT2 MW	CT2 Temp	CT2 Btu/KWh	CT3 Heat Input MMBTU	CT3 NOx ppm	CT3 CO ppm	CT3 O2 %	CT3 NH3 lb/hr
12-Jun-2005	12:00 AM	N/A	N/A	N/A	N/A	N/A	1853.3	1.8	0.33	13.851	78.10	170.1	1035.9	10885.8	N/A	N/A	N/A	N/A	N/A
	1:00 AM	N/A	N/A	N/A	N/A	N/A	1770.3	1.9	0.35	13.768	70.53	176.8	1019.1	10920.5	0.2	N/A	N/A	N/A	N/A
	2:00 AM	N/A	N/A	N/A	N/A	N/A	1761.9	1.8	0.33	13.774	70.59	168.6	1048.8	11027.4	0.2	N/A	N/A	N/A	N/A
	3:00 AM	N/A	N/A	N/A	N/A	N/A	1775.9	1.8	0.35	13.825	70.73	168.5	1014.7	11021.0	0.2	N/A	N/A	N/A	N/A
	4:00 AM	N/A	N/A	N/A	N/A	N/A	1768.0	1.9	0.34	13.864	70.75	168.2	1042.3	11005.9	N/A	N/A	N/A	N/A	N/A
	5:00 AM	N/A	N/A	N/A	N/A	N/A	1773.7	1.8	0.34	13.950	69.30	167.7	1037.2	11019.4	0.2	N/A	N/A	N/A	N/A
	6:00 AM	N/A	N/A	N/A	N/A	N/A	1808.8	1.8	0.34	13.956	77.06	167.7	1039.5	11057.7	N/A	N/A	N/A	N/A	N/A
	7:00 AM	N/A	N/A	N/A	N/A	N/A	1856.8	1.9	0.34	13.928	79.73	171.5	1035.6	11038.2	N/A	N/A	N/A	N/A	N/A
	8:00 AM	N/A	N/A	N/A	N/A	N/A	1884.4	1.9	0.35	13.883	85.53	175.6	1048.2	11083.1	300.0	N/A	N/A	N/A	N/A
	9:00 AM	N/A	N/A	N/A	N/A	N/A	1663.6	1.8	0.45	13.926	69.20	178.5	1055.8	11034.2	1311.7	3.9	2.12	14.189	53.62
	10:00 AM	N/A	N/A	N/A	N/A	N/A	1773.7	N/A	N/A	N/A	80.53	155.6	1066.8	11348.2	1784.9	1.9	0.04	13.883	60.61
	11:00 AM	N/A	N/A	N/A	N/A	N/A	1531.3	N/A	N/A	N/A	53.84	170.2	1051.4	10918.6	1547.2	1.9	0.08	13.877	57.94
	12:00 PM	N/A	N/A	N/A	N/A	N/A	1577.7	N/A	N/A	N/A	57.67	141.9	1042.7	11421.7	1588.8	1.9	0.01	13.820	59.70
	1:00 PM	N/A	N/A	N/A	N/A	N/A	1419.2	1.9	0.82	13.979	54.80	145.7	1029.6	11267.6	1436.7	1.9	0.72	13.971	49.35
	2:00 PM	N/A	N/A	N/A	N/A	N/A	1729.8	1.9	0.45	13.854	71.04	128.7	1017.2	11616.3	1754.5	1.8	0.08	13.957	54.56
	3:00 PM	N/A	N/A	N/A	N/A	N/A	1719.1	1.8	0.42	13.838	68.49	164.9	1011.2	10999.8	1720.8	1.9	0.07	13.934	54.09
	4:00 PM	N/A	N/A	N/A	N/A	N/A	1746.1	1.8	0.41	13.778	72.13	162.8	1045.6	10989.9	1765.0	1.8	0.04	13.830	55.47
	5:00 PM	N/A	N/A	N/A	N/A	N/A	1587.2	1.8	0.40	13.818	57.40	167.1	1022.2	10920.6	1588.2	1.9	0.13	13.843	52.90
	6:00 PM	N/A	N/A	N/A	N/A	N/A	1741.6	1.9	0.37	13.821	69.22	147.4	1071.1	11332.7	1751.7	1.8	0.01	13.874	54.21
	7:00 PM	N/A	N/A	N/A	N/A	N/A	1659.7	1.9	0.40	13.765	62.77	165.7	1066.4	10987.7	1677.3	1.9	0.00	13.747	58.69
	8:00 PM	N/A	N/A	N/A	N/A	N/A	1852.8	1.8	0.55	13.627	80.61	156.0	1080.6	11138.8	1856.4	1.9	0.07	13.657	60.90
	9:00 PM	N/A	N/A	N/A	N/A	N/A	1658.1	1.8	0.39	13.809	65.20	174.1	1058.6	10895.7	1668.7	1.9	0.04	13.832	58.11
	10:00 PM	N/A	N/A	N/A	N/A	N/A	1443.2	1.9	0.42	13.910	57.67	156.7	1090.2	11108.9	1426.2	1.9	0.21	13.975	54.62
	11:00 PM	N/A	N/A	N/A	N/A	N/A	1763.3	1.9	0.37	13.831	77.73	134.6	1089.9	11254.8	N/A	N/A	N/A	N/A	N/A
13-Jun-2005	12:00 AM	N/A	N/A	N/A	N/A	N/A	1845.8	1.8	0.36	13.873	78.96	169.8	1040.2	10921.3	N/A	N/A	N/A	N/A	N/A
	1:00 AM	N/A	N/A	N/A	N/A	N/A	1856.7	1.8	0.41	13.877	77.91	176.2	1053.5	10909.2	N/A	N/A	N/A	N/A	N/A
	2:00 AM	N/A	N/A	N/A	N/A	N/A	1854.7	1.8	0.36	13.882	77.16	176.5	1043.0	10962.1	0.2	N/A	N/A	N/A	N/A
	3:00 AM	N/A	N/A	N/A	N/A	N/A	1862.8	1.8	0.34	13.889	77.22	176.8	1002.4	10964.3	N/A	N/A	N/A	N/A	N/A
	4:00 AM	N/A	N/A	N/A	N/A	N/A	1845.1	1.8	0.35	13.896	79.67	176.6	1032.1	10928.3	N/A	N/A	N/A	N/A	N/A
	5:00 AM	N/A	N/A	N/A	N/A	N/A	1553.5	1.8	0.48	13.925	68.34	177.2	1044.8	10957.2	1200.3	3.8	310.23	14.493	56.28
	6:00 AM	N/A	N/A	N/A	N/A	N/A	1653.8	1.9	0.49	13.836	78.84	149.5	1035.5	10949.6	1678.1	1.8	0.07	13.850	65.04
	7:00 AM	N/A	N/A	N/A	N/A	N/A	1751.0	1.8	0.46	13.784	82.39	159.4	1050.6	10762.7	1766.4	1.9	0.01	13.811	65.86
	8:00 AM	N/A	N/A	N/A	N/A	N/A	1752.7	1.9	0.45	13.787	85.33	170.7	1006.7	10506.8	1779.2	1.9	0.00	13.765	68.15
	9:00 AM	N/A	N/A	N/A	N/A	N/A	1871.8	1.8	0.47	13.608	91.53	170.9	1011.5	10604.5	1897.7	1.9	0.06	13.539	67.92
	10:00 AM	N/A	N/A	N/A	N/A	N/A	1801.8	N/A	N/A	N/A	80.19	176.7	1061.5	10691.9	1811.6	1.9	0.07	13.889	57.02
	11:00 AM	N/A	N/A	N/A	N/A	N/A	1768.3	1.8	0.84	13.722	78.30	172.5	1009.2	10758.4	1807.5	N/A	N/A	N/A	61.36
	12:00 PM	1525.0	11.8	1.52	13.913	38.48	1825.0	1.8	0.61	13.717	81.99	169.4	1040.8	10911.3	1841.4	1.8	0.03	13.693	61.21
	1:00 PM	1825.2	1.9	0.29	13.632	54.91	1786.5	1.9	0.48	13.767	78.10	173.6	1053.8	10833.6	1810.5	1.9	0.04	13.745	59.11
	2:00 PM	1825.8	1.9	0.22	13.702	55.51	1806.0	1.8	0.42	13.781	81.54	171.5	1045.6	10859.6	1812.7	1.9	0.01	13.779	60.19
	3:00 PM	1813.0	1.9	0.16	13.675	53.82	1811.9	1.9	0.40	13.754	80.30	173.7	1027.2	10872.7	1819.0	1.9	0.00	13.749	59.06
	4:00 PM	1747.6	1.8	0.18	13.686	56.30	1725.3	1.8	0.38	13.755	71.26	174.2	1080.5	10933.4	1739.9	1.9	0.12	13.766	55.17
	5:00 PM	1709.2	0.9	0.19	13.773	64.50	1675.8	1.9	0.38	13.810	61.89	166.5	1033.3	11016.9	1700.2	1.9	0.41	13.894	48.57
	6:00 PM	1567.5	1.9	0.24	13.696	41.05	1505.9	1.9	0.64	13.818	55.62	157.9	1024.0	11106.7	1562.5	1.9	0.13	13.785	53.14
	7:00 PM	1802.8	1.8	0.17	13.742	49.92	N/A	N/A	N/A	N/A	N/A	141.8	1050.3	11389.6	1798.9	1.8	0.10	13.857	53.20
	8:00 PM	1692.8	1.9	0.24	13.698	45.61	N/A	N/A	N/A	N/A	N/A	9.5	541.3	4475.0	1672.4	1.9	0.15	13.772	55.03
	9:00 PM	1848.5	1.8	0.21	13.682	54.56	N/A	N/A	N/A	N/A	N/A	0.0	234.0	0.0	N/A	N/A	N/A	N/A	N/A
	10:00 PM	1877.4	1.9	0.22	13.653	55.70	N/A	N/A	N/A	N/A	N/A	0.0	356.3	0.0	N/A	N/A	N/A	N/A	N/A
	11:00 PM	1849.7	1.9	0.17	13.720	50.80	N/A	N/A	N/A	N/A	N/A	0.0	380.8	0.0	N/A	N/A	N/A	N/A	N/A

Table A-6 Delta PG&E Natural Gas Data

		Composition (%)												
		Methane	Ethane	Propane	nButane	iButane	nPentane	iPentane	C6Plus	N2	C02	Btu/scf	Sp. Gr.	Wobbe
10-Jun-2005	12:00 AM	95.16	2.35	0.420	0.110	0.070	0.020	0.030	0.010	1.21	0.62	1026.3	0.585	1342
	1:00 AM	95.19	2.33	0.410	0.110	0.070	0.020	0.030	0.010	1.20	0.62	1025.9	0.585	1341
	2:00 AM	95.21	2.32	0.400	0.100	0.070	0.020	0.030	0.010	1.21	0.62	1025.6	0.585	1341
	3:00 AM	95.23	2.31	0.390	0.100	0.060	0.020	0.030	0.010	1.21	0.62	1025.3	0.585	1341
	4:00 AM	95.26	2.30	0.390	0.100	0.060	0.020	0.030	0.010	1.21	0.62	1024.9	0.585	1340
	5:00 AM	95.28	2.30	0.380	0.100	0.060	0.020	0.030	0.010	1.20	0.62	1024.8	0.584	1341
	6:00 AM	94.96	2.54	0.450	0.110	0.070	0.020	0.030	0.010	1.17	0.64	1028.3	0.587	1342
	7:00 AM	93.54	3.54	0.770	0.150	0.100	0.020	0.040	0.020	1.11	0.71	1043.0	0.596	1351
	8:00 AM	92.17	4.48	1.080	0.200	0.130	0.030	0.050	0.020	1.07	0.77	1057.3	0.606	1358
	9:00 AM	91.13	5.17	1.330	0.240	0.160	0.040	0.050	0.020	1.04	0.81	1068.4	0.613	1365
	10:00 AM	90.65	5.46	1.470	0.260	0.170	0.040	0.060	0.030	1.03	0.83	1073.7	0.617	1367
	11:00 AM	90.51	5.52	1.520	0.270	0.180	0.040	0.060	0.030	1.03	0.83	1075.3	0.618	1368
	12:00 PM	90.54	5.49	1.520	0.270	0.180	0.040	0.060	0.030	1.05	0.83	1075.0	0.618	1367
	1:00 PM	90.57	5.46	1.510	0.270	0.180	0.040	0.060	0.030	1.06	0.83	1074.5	0.618	1367
	2:00 PM	90.50	5.50	1.520	0.270	0.180	0.040	0.060	0.030	1.07	0.83	1074.8	0.618	1367
	3:00 PM	90.30	5.63	1.560	0.270	0.180	0.040	0.060	0.030	1.09	0.83	1076.4	0.619	1368
	4:00 PM	90.14	5.74	1.600	0.280	0.190	0.040	0.060	0.030	1.09	0.84	1077.9	0.621	1368
	5:00 PM	90.11	5.76	1.610	0.280	0.190	0.040	0.060	0.030	1.08	0.84	1078.3	0.621	1368
	6:00 PM	90.15	5.74	1.600	0.270	0.190	0.040	0.060	0.030	1.08	0.84	1078.0	0.621	1368
	7:00 PM	90.22	5.70	1.580	0.270	0.180	0.040	0.060	0.030	1.08	0.84	1077.4	0.620	1368
	8:00 PM	90.28	5.66	1.570	0.270	0.180	0.040	0.060	0.030	1.08	0.83	1076.8	0.620	1368
	9:00 PM	90.30	5.64	1.560	0.270	0.180	0.040	0.060	0.030	1.09	0.83	1076.3	0.619	1368
	10:00 PM	90.33	5.62	1.550	0.270	0.180	0.040	0.060	0.030	1.10	0.83	1076.0	0.619	1368
	11:00 PM	90.31	5.63	1.560	0.270	0.180	0.040	0.060	0.030	1.10	0.83	1076.1	0.619	1368
11-Jun-2005	12:00 AM	90.29	5.64	1.560	0.270	0.180	0.040	0.060	0.030	1.10	0.83	1076.3	0.619	1368
	1:00 AM	90.27	5.65	1.570	0.270	0.180	0.040	0.060	0.030	1.10	0.83	1076.5	0.620	1367
	2:00 AM	90.25	5.67	1.570	0.270	0.180	0.040	0.060	0.030	1.09	0.83	1076.8	0.620	1368
	3:00 AM	90.24	5.68	1.580	0.270	0.180	0.040	0.060	0.030	1.09	0.83	1077.0	0.620	1368
	4:00 AM	90.22	5.69	1.590	0.270	0.190	0.040	0.060	0.030	1.09	0.83	1077.2	0.620	1368
	5:00 AM	90.21	5.69	1.590	0.270	0.190	0.040	0.060	0.030	1.08	0.84	1077.5	0.620	1368
	6:00 AM	90.25	5.67	1.590	0.270	0.190	0.040	0.060	0.030	1.07	0.83	1077.2	0.620	1368
	7:00 AM	90.34	5.61	1.570	0.270	0.180	0.040	0.060	0.030	1.07	0.83	1076.5	0.619	1368
	8:00 AM	90.39	5.58	1.570	0.270	0.180	0.040	0.060	0.030	1.06	0.83	1076.3	0.619	1368
	9:00 AM	90.37	5.59	1.570	0.270	0.180	0.040	0.060	0.030	1.06	0.82	1076.5	0.619	1368
	10:00 AM	90.34	5.62	1.580	0.270	0.180	0.040	0.060	0.030	1.06	0.82	1076.7	0.619	1369
	11:00 AM	90.32	5.63	1.580	0.270	0.180	0.040	0.060	0.030	1.07	0.83	1076.7	0.619	1369
	12:00 PM	90.34	5.62	1.570	0.270	0.180	0.040	0.060	0.030	1.07	0.83	1076.2	0.619	1368
	1:00 PM	90.37	5.61	1.550	0.260	0.180	0.040	0.060	0.030	1.08	0.83	1075.7	0.619	1367
	2:00 PM	90.42	5.57	1.540	0.260	0.180	0.040	0.050	0.030	1.09	0.83	1075.0	0.618	1367
	3:00 PM	90.58	5.47	1.500	0.260	0.170	0.040	0.050	0.030	1.09	0.82	1073.5	0.617	1367
	4:00 PM	90.82	5.31	1.450	0.250	0.170	0.040	0.050	0.030	1.08	0.80	1071.3	0.616	1365
	5:00 PM	90.98	5.20	1.420	0.240	0.170	0.040	0.050	0.030	1.08	0.79	1069.9	0.615	1364
	6:00 PM	91.13	5.09	1.390	0.240	0.160	0.040	0.050	0.030	1.08	0.79	1068.6	0.614	1364
	7:00 PM	91.30	4.98	1.350	0.240	0.160	0.040	0.050	0.030	1.08	0.78	1067.2	0.613	1363
	8:00 PM	91.47	4.86	1.320	0.230	0.160	0.040	0.050	0.030	1.07	0.77	1065.9	0.612	1363
	9:00 PM	91.62	4.77	1.290	0.230	0.160	0.040	0.050	0.030	1.05	0.76	1064.7	0.611	1362
	10:00 PM	91.78	4.66	1.260	0.230	0.160	0.040	0.050	0.030	1.05	0.75	1063.5	0.609	1363
	11:00 PM	91.92	4.58	1.230	0.220	0.160	0.040	0.050	0.030	1.04	0.75	1062.4	0.609	1361

Table A-6 Delta PG&E Natural Gas Data

		Composition (%)												
		Methane	Ethane	Propane	nButane	iButane	nPentane	iPentane	C6Plus	N2	C02	Btu/scf	Sp. Gr.	Wobbe
12-Jun-2005	12:00 AM	92.00	4.52	1.210	0.220	0.150	0.040	0.050	0.030	1.04	0.74	1061.8	0.608	1362
	1:00 AM	92.03	4.50	1.210	0.220	0.150	0.030	0.050	0.030	1.03	0.74	1061.5	0.608	1361
	2:00 AM	92.04	4.49	1.210	0.220	0.150	0.040	0.050	0.030	1.03	0.74	1061.5	0.608	1361
	3:00 AM	92.08	4.47	1.200	0.220	0.150	0.030	0.050	0.030	1.03	0.74	1061.1	0.608	1361
	4:00 AM													
	5:00 AM													
	6:00 AM													
	7:00 AM													
	8:00 AM	91.91	4.57	1.220	0.220	0.160	0.040	0.050	0.030	1.04	0.76	1062.3	0.609	1361
	9:00 AM	91.69	4.71	1.260	0.230	0.160	0.040	0.050	0.030	1.05	0.77	1064.2	0.610	1363
	10:00 AM	91.57	4.78	1.290	0.230	0.160	0.040	0.050	0.030	1.06	0.78	1065.1	0.611	1363
	11:00 AM	91.47	4.83	1.310	0.240	0.170	0.040	0.050	0.030	1.08	0.78	1065.7	0.612	1362
	12:00 PM	91.42	4.84	1.310	0.240	0.170	0.040	0.050	0.030	1.12	0.77	1065.7	0.612	1362
	1:00 PM	91.43	4.84	1.310	0.240	0.170	0.040	0.050	0.030	1.12	0.77	1065.6	0.612	1362
	2:00 PM	91.47	4.79	1.300	0.240	0.170	0.040	0.050	0.030	1.15	0.76	1064.9	0.612	1361
	3:00 PM	91.50	4.76	1.300	0.240	0.170	0.040	0.050	0.030	1.14	0.76	1064.8	0.612	1361
	4:00 PM	91.52	4.76	1.300	0.240	0.170	0.040	0.060	0.030	1.11	0.76	1065.3	0.612	1362
	5:00 PM	91.51	4.78	1.320	0.250	0.170	0.040	0.060	0.030	1.08	0.76	1066.1	0.612	1363
	6:00 PM	91.50	4.81	1.330	0.250	0.170	0.040	0.060	0.030	1.05	0.77	1066.9	0.612	1364
	7:00 PM	91.47	4.84	1.340	0.250	0.170	0.040	0.060	0.030	1.02	0.77	1067.7	0.612	1365
	8:00 PM	91.43	4.88	1.340	0.250	0.180	0.040	0.060	0.030	1.01	0.77	1068.1	0.613	1364
	9:00 PM	91.42	4.90	1.340	0.250	0.180	0.040	0.060	0.030	1.00	0.78	1068.5	0.613	1365
	10:00 PM	91.41	4.91	1.350	0.250	0.180	0.040	0.060	0.030	0.98	0.78	1068.9	0.613	1365
	11:00 PM	91.40	4.93	1.350	0.250	0.180	0.040	0.060	0.030	0.96	0.79	1069.3	0.613	1366
13-Jun-2005	12:00 AM	91.40	4.94	1.360	0.250	0.180	0.040	0.060	0.030	0.95	0.79	1069.5	0.613	1366
	1:00 AM	91.39	4.95	1.360	0.250	0.180	0.040	0.060	0.030	0.94	0.79	1069.6	0.613	1366
	2:00 AM	91.38	4.97	1.360	0.250	0.180	0.040	0.060	0.030	0.93	0.80	1069.8	0.613	1366
	3:00 AM	91.37	4.98	1.360	0.250	0.180	0.040	0.060	0.030	0.93	0.80	1069.9	0.613	1367
	4:00 AM	91.35	4.99	1.370	0.250	0.180	0.040	0.060	0.030	0.93	0.80	1070.1	0.613	1367
	5:00 AM	91.31	5.03	1.370	0.250	0.180	0.040	0.060	0.030	0.92	0.82	1070.2	0.613	1367
	6:00 AM	91.31	5.02	1.360	0.250	0.180	0.040	0.060	0.030	0.92	0.82	1070.0	0.613	1367
	7:00 AM	91.34	5.00	1.350	0.250	0.180	0.040	0.060	0.030	0.93	0.83	1069.5	0.613	1366
	8:00 AM	91.36	4.98	1.340	0.250	0.180	0.040	0.060	0.030	0.93	0.83	1069.2	0.613	1366
	9:00 AM	91.45	4.93	1.310	0.250	0.170	0.040	0.060	0.030	0.95	0.82	1068.0	0.612	1365
	10:00 AM	91.74	4.77	1.210	0.230	0.160	0.040	0.060	0.030	0.96	0.80	1064.4	0.610	1363
	11:00 AM	92.47	4.36	1.000	0.190	0.130	0.030	0.050	0.030	0.98	0.75	1056.4	0.604	1359
	12:00 PM	93.31	3.84	0.790	0.160	0.110	0.030	0.040	0.020	1.00	0.70	1047.6	0.598	1355
	1:00 PM	94.17	2.99	0.820	0.170	0.120	0.030	0.040	0.020	1.04	0.60	1042.2	0.594	1352
	2:00 PM	94.64	2.59	0.770	0.170	0.110	0.030	0.040	0.020	1.08	0.55	1038.9	0.591	1351
	3:00 PM	94.85	2.61	0.590	0.140	0.090	0.020	0.040	0.020	1.10	0.54	1034.6	0.588	1349
	4:00 PM	94.94	2.61	0.530	0.130	0.080	0.020	0.030	0.020	1.11	0.53	1033.0	0.587	1348
	5:00 PM	95.12	2.48	0.490	0.120	0.080	0.020	0.030	0.010	1.13	0.51	1031.0	0.586	1347
	6:00 PM	95.12	2.43	0.520	0.130	0.080	0.020	0.030	0.020	1.14	0.50	1031.5	0.586	1347
	7:00 PM	94.72	2.70	0.620	0.150	0.090	0.020	0.040	0.020	1.11	0.54	1035.7	0.589	1350
	8:00 PM	94.23	3.05	0.710	0.160	0.100	0.030	0.040	0.020	1.08	0.58	1040.5	0.592	1352
	9:00 PM	94.21	3.08	0.710	0.160	0.100	0.030	0.040	0.020	1.07	0.58	1040.7	0.592	1353
	10:00 PM	94.51	2.89	0.640	0.150	0.100	0.030	0.040	0.020	1.08	0.56	1037.9	0.590	1351
	11:00 PM	94.71	2.76	0.600	0.140	0.090	0.020	0.040	0.020	1.08	0.54	1036.0	0.589	1350

Table A-7 Midway Sunset Data

Date/Time	Unit A CO ppm	Btu/scf	Wobbe
5/24/01 16:30	2.66	1111	1375
5/24/01 16:35	2.59	1110	1375
5/24/01 16:40	2.82	1111	1375
5/24/01 16:45	3.04	1110	1375
5/24/01 16:50	3.02	1110	1375
5/24/01 16:55	2.65	1105	1373
5/24/01 17:00	2.39	1105	1373
5/24/01 17:05	2.38	1106	1373
5/24/01 17:10	2.61	1106	1373
5/24/01 17:15	2.81	1107	1374
5/24/01 17:20	2.81	1107	1374
5/24/01 17:25	3.00	1106	1373
5/24/01 17:30	3.25	1105	1373
5/24/01 17:35	3.25	1105	1373
5/24/01 17:40	16.27	1096	1370
5/24/01 17:45	27.55	1075	1364
5/24/01 17:50	27.53	1075	1364
5/24/01 17:55	41.31	1030	1351
5/24/01 18:00	46.72	1023	1349
5/24/01 18:05	46.74	1021	1348
5/24/01 18:10	49.41	1019	1348
5/24/01 18:15	51.49	1019	1348
5/24/01 18:20	51.49	1019	1348
5/24/01 18:25	50.60	1019	1348
5/24/01 18:30	49.59	1019	1348
5/24/01 18:35	49.59	1018	1347
5/24/01 18:40	52.21	1018	1347
5/24/01 18:45	54.62	1018	1347
5/24/01 18:50	54.62	1018	1347
5/24/01 18:55	56.23	1018	1347
5/24/01 19:00	56.93	1018	1347
5/24/01 19:05	56.92	1018	1347
5/24/01 19:10	60.76	1017	1347
5/24/01 19:15	63.01	1017	1347
5/24/01 19:20	63.01	1017	1347
5/24/01 19:25	65.06	1016	1347
5/24/01 19:30	65.57	1016	1347
5/24/01 19:35	65.56	1016	1347
5/24/01 19:40	63.78	1016	1347
5/24/01 19:45	62.01	1014	1346
5/24/01 19:50	62.01	1027	1350
5/24/01 19:55	37.94	1029	1350
5/24/01 20:00	29.42	1024	1349
5/24/01 20:05	29.42	1028	1350
5/24/01 20:10	27.49	1029	1350
5/24/01 20:15	25.76	1029	1351
5/24/01 20:20	25.76	1032	1351
5/24/01 20:25	8.21	1033	1352
5/24/01 20:30	3.34	1069	1362
5/24/01 20:35	3.34	1090	1368
5/24/01 20:40	3.12	1095	1370
5/24/01 20:45	3.02	1113	1375
5/24/01 20:50	3.04	1114	1376
5/24/01 20:55	3.57	1114	1376
5/24/01 21:00	3.71	1113	1376
5/24/01 21:05	3.71	1110	1375
5/24/01 21:10	3.17	1107	1374
5/24/01 21:15	2.86	1106	1373
5/24/01 21:20	2.86	1111	1375
5/24/01 21:25	3.25	1111	1375
5/24/01 21:30	3.25	1113	1375

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 9:00	1.39	4.11	1095	1370
5/9/05 9:01	1.36	3.99	1096	1370
5/9/05 9:02	1.53	4.06	1096	1370
5/9/05 9:03	1.49	3.84	1095	1370
5/9/05 9:04	1.50	3.97	1095	1370
5/9/05 9:05	1.48	4.02	1095	1370
5/9/05 9:06	1.42	4.14	1096	1370
5/9/05 9:07	1.41	4.47	1096	1370
5/9/05 9:08	1.51	4.29	1095	1370
5/9/05 9:09	1.47	4.40	1095	1369
5/9/05 9:10	1.47	4.45	1095	1369
5/9/05 9:11	1.58	4.71	1096	1370
5/9/05 9:12	1.50	4.36	1096	1370
5/9/05 9:13	1.40	4.32	1096	1370
5/9/05 9:14	1.45	4.41	1095	1369
5/9/05 9:15	1.46	4.33	1095	1369
5/9/05 9:16	1.55	4.25	1094	1369
5/9/05 9:17	1.53	4.45	1095	1369
5/9/05 9:18	1.39	4.46	1095	1369
5/9/05 9:19	1.60	4.48	1095	1369
5/9/05 9:20	1.41	4.22	1094	1369
5/9/05 9:21	1.46	4.35	1094	1369
5/9/05 9:22	1.41	4.14	1095	1369
5/9/05 9:23	1.48	4.23	1095	1369
5/9/05 9:24	1.55	4.30	1095	1369
5/9/05 9:25	1.50	4.35	1095	1370
5/9/05 9:26	1.54	4.19	1094	1369
5/9/05 9:27	1.33	4.27	1094	1369
5/9/05 9:28	1.44	4.13	1091	1366
5/9/05 9:29	1.49	4.35	1091	1366
5/9/05 9:30	1.42	4.42	1091	1366
5/9/05 9:31	1.43	4.46	1090	1366
5/9/05 9:32	1.49	4.74	1090	1366
5/9/05 9:33	1.45	4.91	1090	1366
5/9/05 9:34	1.45	4.77	1091	1366
5/9/05 9:35	1.38	4.91	1091	1366
5/9/05 9:36	1.51	4.59	1091	1366
5/9/05 9:37	1.41	4.61	1090	1366
5/9/05 9:38	1.37	4.58	1090	1366
5/9/05 9:39	1.42	4.57	1090	1366
5/9/05 9:40	1.53	4.63	1049	1350
5/9/05 9:41	1.55	4.71	1049	1350
5/9/05 9:42	1.51	4.59	1048	1350
5/9/05 9:43	1.35	4.56	1048	1350
5/9/05 9:44	1.38	4.43	1048	1350
5/9/05 9:45	1.58	4.60	1048	1350
5/9/05 9:46	1.46	4.63	1049	1350
5/9/05 9:47	1.42	5.52	1049	1350
5/9/05 9:48	1.39	7.08	1048	1350
5/9/05 9:49	1.51	7.99	1048	1350
5/9/05 9:50	1.61	8.52	1048	1350
5/9/05 9:51	1.31	9.02	1049	1350
5/9/05 9:52	1.46	9.16	1049	1350
5/9/05 9:53	1.53	9.48	1049	1350
5/9/05 9:54	1.40	8.99	1049	1351
5/9/05 9:55	1.51	9.08	1049	1351
5/9/05 9:56	1.55	8.92	1049	1350
5/9/05 9:57	1.41	8.97	1049	1350
5/9/05 9:58	1.38	8.69	1049	1351
5/9/05 9:59	1.64	8.97	1049	1351
5/9/05 10:00	1.45	9.04	1049	1351

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 13:00	1.35	7.97	1053	1352
5/9/05 13:01	1.28	7.96	1052	1352
5/9/05 13:02	0.03	7.90	1052	1352
5/9/05 13:03	0.04	8.18	1052	1352
5/9/05 13:04	-0.03	8.35	1051	1351
5/9/05 13:05	1.18	8.07	1051	1352
5/9/05 13:06	1.11	8.02	1051	1352
5/9/05 13:07	-0.01	7.85	1051	1352
5/9/05 13:08	-0.22	8.06	1051	1352
5/9/05 13:09	-0.27	7.74	1051	1352
5/9/05 13:10	10.15	7.96	1051	1352
5/9/05 13:11	40.41	8.09	1051	1351
5/9/05 13:12	40.54	7.86	1051	1351
5/9/05 13:13	40.44	8.13	1051	1352
5/9/05 13:14	40.29	7.75	1051	1352
5/9/05 13:15	2.48	7.96	1051	1352
5/9/05 13:16	-0.72	7.95	1051	1352
5/9/05 13:17	-0.93	8.10	1051	1352
5/9/05 13:18	0.49	8.19	1051	1352
5/9/05 13:19	0.57	8.22	1051	1352
5/9/05 13:20	0.75	8.02	1051	1352
5/9/05 13:21	0.86	8.35	1051	1352
5/9/05 13:22	0.68	8.08	1051	1351
5/9/05 13:23	0.70	8.13	1051	1351
5/9/05 13:24	0.81	7.98	1051	1351
5/9/05 13:25	0.79	8.18	1051	1351
5/9/05 13:26	0.80	7.99	1051	1352
5/9/05 13:27	0.63	7.88	1051	1351
5/9/05 13:28	0.67	8.19	1046	1350
5/9/05 13:29	0.87	8.51	1046	1350
5/9/05 13:30	0.80	8.43	1046	1350
5/9/05 13:31	1.08	8.54	1046	1350
5/9/05 13:32	0.82	8.34	1046	1350
5/9/05 13:33	0.81	8.19	1046	1350
5/9/05 13:34	0.83	8.34	1046	1350
5/9/05 13:35	0.95	8.84	1046	1350
5/9/05 13:36	0.93	8.57	1046	1350
5/9/05 13:37	0.82	8.89	1046	1350
5/9/05 13:38	0.89	9.16	1046	1350
5/9/05 13:39	0.87	9.17	1046	1350
5/9/05 13:40	0.87	9.57	1045	1350
5/9/05 13:41	0.92	8.85	1045	1350
5/9/05 13:42	0.97	8.88	1044	1350
5/9/05 13:43	0.79	8.80	1044	1350
5/9/05 13:44	1.07	9.76	1044	1350
5/9/05 13:45	0.97	9.22	1044	1350
5/9/05 13:46	0.95	9.82	1044	1350
5/9/05 13:47	0.91	9.68	1044	1350
5/9/05 13:48	1.04	9.27	1044	1350
5/9/05 13:49	0.93	9.25	1044	1350
5/9/05 13:50	1.11	9.60	1044	1350
5/9/05 13:51	1.02	9.51	1044	1350
5/9/05 13:52	1.14	9.60	1046	1351
5/9/05 13:53	0.97	9.71	1046	1351
5/9/05 13:54	1.03	6.46	1046	1351
5/9/05 13:55	1.01	6.44	1046	1351
5/9/05 13:56	0.99	6.46	1046	1351
5/9/05 13:57	1.10	9.88	1046	1351
5/9/05 13:58	1.11	9.38	1046	1351
5/9/05 13:59	1.12	9.10	1046	1351
5/9/05 14:00	1.05	9.28	1046	1351

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 17:00	1.46	3.83	1084	1365
5/9/05 17:01	1.50	4.05	1084	1365
5/9/05 17:02	1.40	3.91	1085	1365
5/9/05 17:03	1.49	4.05	1085	1365
5/9/05 17:04	1.42	3.90	1087	1369
5/9/05 17:05	1.50	4.12	1088	1369
5/9/05 17:06	1.44	4.03	1087	1368
5/9/05 17:07	1.46	4.10	1087	1368
5/9/05 17:08	1.59	4.08	1087	1368
5/9/05 17:09	1.44	4.03	1087	1369
5/9/05 17:10	1.45	4.08	1088	1369
5/9/05 17:11	1.66	4.09	1088	1369
5/9/05 17:12	1.59	4.33	1088	1369
5/9/05 17:13	1.45	4.16	1087	1368
5/9/05 17:14	1.35	4.14	1087	1368
5/9/05 17:15	1.41	4.28	1087	1368
5/9/05 17:16	1.52	3.96	1092	1371
5/9/05 17:17	1.52	3.98	1092	1371
5/9/05 17:18	1.45	4.25	1092	1371
5/9/05 17:19	1.36	4.28	1092	1371
5/9/05 17:20	1.49	4.10	1092	1371
5/9/05 17:21	1.54	4.26	1091	1370
5/9/05 17:22	1.48	4.20	1092	1371
5/9/05 17:23	1.34	4.19	1092	1371
5/9/05 17:24	1.44	4.34	1093	1371
5/9/05 17:25	1.29	4.25	1093	1371
5/9/05 17:26	1.35	4.25	1092	1371
5/9/05 17:27	1.50	4.17	1091	1370
5/9/05 17:28	1.55	4.16	1089	1369
5/9/05 17:29	1.59	4.11	1090	1369
5/9/05 17:30	1.38	4.31	1090	1369
5/9/05 17:31	1.64	4.17	1090	1369
5/9/05 17:32	1.69	4.41	1089	1369
5/9/05 17:33	1.54	4.15	1089	1369
5/9/05 17:34	1.56	4.32	1089	1369
5/9/05 17:35	1.68	4.12	1089	1369
5/9/05 17:36	1.73	4.35	1090	1369
5/9/05 17:37	1.67	4.52	1090	1369
5/9/05 17:38	1.79	4.58	1090	1369
5/9/05 17:39	1.82	4.39	1089	1369
5/9/05 17:40	1.80	4.31	1089	1369
5/9/05 17:41	1.83	4.33	1090	1369
5/9/05 17:42	1.87	4.12	1090	1370
5/9/05 17:43	1.77	4.26	1090	1370
5/9/05 17:44	1.85	4.29	1090	1370
5/9/05 17:45	1.73	4.53	1089	1369
5/9/05 17:46	1.85	4.30	1089	1369
5/9/05 17:47	1.95	4.19	1089	1369
5/9/05 17:48	1.99	4.13	1090	1370
5/9/05 17:49	1.87	4.03	1090	1370
5/9/05 17:50	1.90	4.20	1090	1370
5/9/05 17:51	1.90	4.18	1090	1370
5/9/05 17:52	2.17	4.37	1091	1370
5/9/05 17:53	2.12	4.12	1091	1370
5/9/05 17:54	1.97	4.25	1092	1371
5/9/05 17:55	1.94	4.09	1092	1371
5/9/05 17:56	1.87	3.97	1092	1371
5/9/05 17:57	1.93	4.14	1092	1371
5/9/05 17:58	1.88	4.15	1091	1370
5/9/05 17:59	1.81	4.26	1091	1370
5/9/05 18:00	2.08	4.11	1091	1370

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 10:01	1.39	8.78	1049	1351
5/9/05 10:02	1.47	9.21	1049	1351
5/9/05 10:03	1.36	8.90	1049	1351
5/9/05 10:04	1.31	9.33	1050	1351
5/9/05 10:05	1.50	9.05	1050	1351
5/9/05 10:06	1.41	9.22	1050	1351
5/9/05 10:07	1.47	8.82	1050	1351
5/9/05 10:08	1.13	9.07	1050	1351
5/9/05 10:09	1.53	8.65	1050	1351
5/9/05 10:10	1.63	8.72	1050	1351
5/9/05 10:11	1.43	8.49	1050	1351
5/9/05 10:12	1.60	8.91	1050	1351
5/9/05 10:13	1.52	8.85	1050	1351
5/9/05 10:14	1.59	8.71	1050	1351
5/9/05 10:15	1.41	8.73	1050	1351
5/9/05 10:16	1.42	9.19	1052	1352
5/9/05 10:17	1.66	8.79	1052	1352
5/9/05 10:18	1.49	8.67	1051	1352
5/9/05 10:19	1.26	8.50	1051	1352
5/9/05 10:20	1.56	8.58	1051	1352
5/9/05 10:21	1.59	8.93	1052	1352
5/9/05 10:22	1.63	9.22	1052	1352
5/9/05 10:23	1.54	8.48	1052	1352
5/9/05 10:24	1.36	8.25	1052	1352
5/9/05 10:25	1.46	8.69	1051	1352
5/9/05 10:26	1.39	8.95	1052	1352
5/9/05 10:27	1.43	8.82	1052	1352
5/9/05 10:28	1.44	8.93	1053	1353
5/9/05 10:29	1.67	8.68	1053	1353
5/9/05 10:30	1.48	8.66	1053	1353
5/9/05 10:31	1.57	8.70	1052	1353
5/9/05 10:32	1.45	8.40	1052	1353
5/9/05 10:33	1.29	8.44	1053	1353
5/9/05 10:34	1.38	8.52	1053	1353
5/9/05 10:35	1.38	8.38	1053	1353
5/9/05 10:36	1.61	8.44	1053	1353
5/9/05 10:37	1.43	8.26	1053	1353
5/9/05 10:38	1.46	8.33	1053	1353
5/9/05 10:39	1.59	8.41	1053	1353
5/9/05 10:40	1.56	8.44	1047	1351
5/9/05 10:41	1.50	8.66	1047	1351
5/9/05 10:42	1.59	8.68	1047	1351
5/9/05 10:43	1.44	8.75	1047	1351
5/9/05 10:44	1.40	8.71	1047	1351
5/9/05 10:45	1.41	8.56	1047	1351
5/9/05 10:46	1.50	9.04	1047	1351
5/9/05 10:47	1.36	9.43	1047	1351
5/9/05 10:48	1.30	9.17	1047	1351
5/9/05 10:49	1.34	9.16	1047	1351
5/9/05 10:50	1.24	9.33	1047	1351
5/9/05 10:51	1.34	9.16	1047	1351
5/9/05 10:52	1.36	9.63	1035	1347
5/9/05 10:53	1.39	9.58	1035	1347
5/9/05 10:54	1.46	10.03	1035	1347
5/9/05 10:55	1.45	9.40	1035	1348
5/9/05 10:56	1.72	10.61	1035	1348
5/9/05 10:57	1.36	10.55	1035	1347
5/9/05 10:58	1.43	11.06	1035	1347
5/9/05 10:59	1.41	11.40	1035	1347
5/9/05 11:00	1.50	11.79	1035	1347
5/9/05 11:01	1.52	12.59	1035	1348
5/9/05 11:02	1.40	13.09	1035	1347
5/9/05 11:03	1.40	13.01	1035	1347

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 14:01	1.06	27.56	1046	1351
5/9/05 14:02	1.13	10.24	1046	1351
5/9/05 14:03	1.17	13.42	1046	1351
5/9/05 14:04	1.21	12.72	1047	1351
5/9/05 14:05	1.22	10.94	1047	1351
5/9/05 14:06	1.26	12.29	1047	1351
5/9/05 14:07	0.91	7.82	1047	1351
5/9/05 14:08	1.33	8.94	1047	1351
5/9/05 14:09	1.34	5.97	1047	1351
5/9/05 14:10	1.26	6.19	1047	1351
5/9/05 14:11	1.18	6.34	1047	1351
5/9/05 14:12	1.21	6.29	1047	1351
5/9/05 14:13	1.21	6.10	1047	1351
5/9/05 14:14	1.18	6.23	1047	1351
5/9/05 14:15	1.23	6.45	1047	1351
5/9/05 14:16	1.25	6.32	1050	1353
5/9/05 14:17	1.38	6.57	1050	1352
5/9/05 14:18	1.14	6.15	1050	1352
5/9/05 14:19	1.24	6.24	1050	1353
5/9/05 14:20	1.22	6.32	1049	1353
5/9/05 14:21	1.14	6.43	1049	1353
5/9/05 14:22	1.29	6.06	1050	1353
5/9/05 14:23	1.20	5.98	1050	1352
5/9/05 14:24	1.26	5.94	1050	1352
5/9/05 14:25	1.25	5.85	1050	1353
5/9/05 14:26	1.20	5.75	1049	1353
5/9/05 14:27	1.27	5.59	1049	1353
5/9/05 14:28	1.23	5.65	1051	1353
5/9/05 14:29	1.17	3.91	1051	1353
5/9/05 14:30	1.18	3.78	1051	1353
5/9/05 14:31	1.44	3.66	1051	1353
5/9/05 14:32	1.21	3.74	1051	1353
5/9/05 14:33	1.29	3.94	1051	1353
5/9/05 14:34	1.38	3.91	1051	1353
5/9/05 14:35	1.27	4.02	1051	1353
5/9/05 14:36	1.37	3.98	1051	1353
5/9/05 14:37	1.26	3.99	1051	1353
5/9/05 14:38	1.42	4.03	1051	1353
5/9/05 14:39	1.36	4.08	1051	1353
5/9/05 14:40	1.40	4.18	1054	1354
5/9/05 14:41	1.33	4.17	1054	1354
5/9/05 14:42	1.28	3.96	1054	1355
5/9/05 14:43	1.27	4.00	1054	1354
5/9/05 14:44	1.33	4.05	1054	1354
5/9/05 14:45	1.39	3.91	1053	1354
5/9/05 14:46	1.45	3.97	1054	1354
5/9/05 14:47	1.56	4.07	1054	1354
5/9/05 14:48	1.74	4.07	1054	1354
5/9/05 14:49	1.76	3.74	1054	1355
5/9/05 14:50	1.93	3.70	1053	1354
5/9/05 14:51	1.90	3.97	1054	1354
5/9/05 14:52	1.91	3.79	1057	1357
5/9/05 14:53	1.91	3.61	1057	1357
5/9/05 14:54	1.94	3.78	1057	1357
5/9/05 14:55	1.84	3.89	1057	1357
5/9/05 14:56	1.86	3.66	1057	1357
5/9/05 14:57	1.96	3.89	1057	1357
5/9/05 14:58	1.93	3.75	1057	1357
5/9/05 14:59	2.02	3.70	1057	1357
5/9/05 15:00	1.96	3.79	1057	1357
5/9/05 15:01	2.04	3.55	1057	1357
5/9/05 15:02	1.94	7.75	1057	1357
5/9/05 15:03	2.01	7.51	1057	1357

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 18:01	2.01	4.23	1092	1371
5/9/05 18:02	1.88	3.96	1092	1371
5/9/05 18:03	2.01	4.26	1092	1371
5/9/05 18:04	1.86	4.33	1092	1371
5/9/05 18:05	1.88	4.12	1091	1371
5/9/05 18:06	1.93	4.22	1091	1371
5/9/05 18:07	2.02	4.23	1092	1371
5/9/05 18:08	2.03	4.22	1092	1371
5/9/05 18:09	1.97	4.16	1092	1371
5/9/05 18:10	1.97	4.22	1092	1371
5/9/05 18:11	1.94	4.22	1091	1371
5/9/05 18:12	1.93	4.36	1091	1371
5/9/05 18:13	2.01	4.20	1091	1370
5/9/05 18:14	1.95	4.31	1092	1371
5/9/05 18:15	2.06	4.10	1092	1371
5/9/05 18:16	2.09	4.20	1093	1372
5/9/05 18:17	1.78	4.37	1092	1372
5/9/05 18:18	1.91	4.25	1092	1371
5/9/05 18:19	1.95	4.16	1092	1371
5/9/05 18:20	1.95	4.20	1092	1372
5/9/05 18:21	1.94	4.21	1093	1372
5/9/05 18:22	1.95	4.27	1092	1372
5/9/05 18:23	1.86	4.25	1092	1371
5/9/05 18:24	2.00	4.23	1091	1371
5/9/05 18:25	1.99	4.12	1091	1371
5/9/05 18:26	1.93	4.22	1092	1371
5/9/05 18:27	1.92	4.05	1092	1371
5/9/05 18:28	2.05	4.23	1089	1366
5/9/05 18:29	2.01	4.40	1089	1366
5/9/05 18:30	1.96	4.46	1088	1366
5/9/05 18:31	1.94	4.56	1088	1366
5/9/05 18:32	2.24	4.50	1088	1365
5/9/05 18:33	2.04	4.26	1089	1366
5/9/05 18:34	2.14	4.42	1089	1366
5/9/05 18:35	2.30	4.41	1089	1366
5/9/05 18:36	2.00	4.35	1088	1366
5/9/05 18:37	1.98	4.67	1088	1366
5/9/05 18:38	2.09	4.42	1088	1365
5/9/05 18:39	2.08	4.12	1089	1366
5/9/05 18:40	2.10	4.18	1089	1366
5/9/05 18:41	2.12	4.38	1089	1366
5/9/05 18:42	2.06	4.21	1088	1366
5/9/05 18:43	2.01	4.31	1088	1366
5/9/05 18:44	2.17	4.23	1088	1366
5/9/05 18:45	2.17	4.34	1089	1366
5/9/05 18:46	2.31	4.33	1089	1366
5/9/05 18:47	2.36	4.35	1089	1366
5/9/05 18:48	2.17	4.35	1089	1366
5/9/05 18:49	1.99	4.33	1088	1366
5/9/05 18:50	2.43	4.39	1088	1366
5/9/05 18:51	2.09	4.24	1089	1366
5/9/05 18:52	2.29	4.28	1089	1366
5/9/05 18:53	2.25	4.34	1089	1366
5/9/05 18:54	2.39	4.18	1088	1366
5/9/05 18:55	2.24	4.31	1088	1366
5/9/05 18:56	2.18	4.30	1088	1366
5/9/05 18:57	2.06	4.39	1088	1366
5/9/05 18:58	2.31	4.26	1089	1366
5/9/05 18:59	2.09	4.35	1089	1366
5/9/05 19:00	2.19	4.22	1089	1366
5/9/05 19:01	2.02	4.33	1088	1366
5/9/05 19:02	2.26	4.43	1088	1366
5/9/05 19:03	2.16	4.32	1088	1366

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 11:04	1.48	14.07	1043	1350
5/9/05 11:05	1.43	12.70	1043	1350
5/9/05 11:06	1.54	12.57	1043	1350
5/9/05 11:07	1.59	12.51	1043	1350
5/9/05 11:08	1.45	12.14	1043	1350
5/9/05 11:09	1.30	12.29	1043	1350
5/9/05 11:10	1.35	11.48	1043	1350
5/9/05 11:11	1.33	11.26	1043	1350
5/9/05 11:12	1.37	11.13	1043	1350
5/9/05 11:13	1.37	10.67	1043	1350
5/9/05 11:14	1.46	10.25	1043	1350
5/9/05 11:15	1.38	9.84	1043	1350
5/9/05 11:16	1.51	9.16	1076	1362
5/9/05 11:17	1.56	9.16	1075	1362
5/9/05 11:18	1.40	9.68	1075	1362
5/9/05 11:19	1.46	9.31	1076	1362
5/9/05 11:20	1.56	9.12	1076	1362
5/9/05 11:21	1.52	7.81	1076	1362
5/9/05 11:22	1.33	7.22	1076	1362
5/9/05 11:23	1.44	6.47	1075	1362
5/9/05 11:24	1.50	6.42	1075	1362
5/9/05 11:25	1.52	5.88	1076	1362
5/9/05 11:26	1.44	5.67	1076	1362
5/9/05 11:27	1.38	5.42	1076	1362
5/9/05 11:28	1.67	4.89	1088	1368
5/9/05 11:29	1.53	5.16	1088	1368
5/9/05 11:30	1.59	4.69	1087	1368
5/9/05 11:31	1.41	4.80	1088	1368
5/9/05 11:32	1.38	4.70	1088	1368
5/9/05 11:33	1.33	4.61	1088	1368
5/9/05 11:34	1.41	4.80	1088	1368
5/9/05 11:35	1.46	4.55	1087	1368
5/9/05 11:36	1.50	4.62	1087	1368
5/9/05 11:37	1.42	4.71	1088	1368
5/9/05 11:38	1.55	4.59	1088	1368
5/9/05 11:39	1.59	4.58	1088	1368
5/9/05 11:40	1.49	4.59	1090	1368
5/9/05 11:41	1.63	4.58	1090	1368
5/9/05 11:42	1.43	4.50	1090	1368
5/9/05 11:43	1.51	4.90	1090	1369
5/9/05 11:44	1.42	4.63	1090	1369
5/9/05 11:45	1.40	4.59	1090	1369
5/9/05 11:46	1.55	4.61	1089	1368
5/9/05 11:47	1.58	4.47	1089	1368
5/9/05 11:48	1.52	4.73	1090	1369
5/9/05 11:49	1.37	4.36	1090	1369
5/9/05 11:50	1.32	4.59	1090	1369
5/9/05 11:51	1.37	4.55	1090	1368
5/9/05 11:52	1.55	4.51	1089	1368
5/9/05 11:53	1.48	4.40	1089	1367
5/9/05 11:54	1.38	4.25	1090	1368
5/9/05 11:55	1.33	4.34	1090	1368
5/9/05 11:56	1.32	4.49	1090	1368
5/9/05 11:57	1.48	4.40	1090	1367
5/9/05 11:58	1.44	4.17	1089	1367
5/9/05 11:59	1.47	4.43	1089	1367
5/9/05 12:00	1.33	4.64	1090	1368
5/9/05 12:01	1.37	4.40	1090	1368
5/9/05 12:02	1.49	4.43	1090	1368
5/9/05 12:03	1.53	4.37	1090	1368
5/9/05 12:04	1.52	4.40	1088	1365
5/9/05 12:05	1.60	4.42	1088	1365
5/9/05 12:06	1.52	4.53	1089	1366

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 15:04	1.82	7.41	1054	1356
5/9/05 15:05	1.86	7.49	1054	1356
5/9/05 15:06	1.92	7.55	1054	1356
5/9/05 15:07	1.91	7.41	1054	1356
5/9/05 15:08	1.86	7.95	1054	1356
5/9/05 15:09	2.01	7.49	1054	1356
5/9/05 15:10	1.89	7.76	1054	1356
5/9/05 15:11	1.85	8.03	1054	1356
5/9/05 15:12	1.92	7.82	1054	1356
5/9/05 15:13	2.07	7.53	1054	1356
5/9/05 15:14	1.88	7.25	1054	1356
5/9/05 15:15	1.91	7.98	1054	1356
5/9/05 15:16	2.01	7.72	1060	1360
5/9/05 15:17	1.94	7.54	1060	1360
5/9/05 15:18	1.84	7.55	1060	1360
5/9/05 15:19	1.97	7.77	1060	1360
5/9/05 15:20	2.02	7.65	1060	1360
5/9/05 15:21	1.91	7.42	1060	1360
5/9/05 15:22	2.04	7.68	1060	1360
5/9/05 15:23	1.92	7.57	1060	1360
5/9/05 15:24	1.90	7.61	1060	1360
5/9/05 15:25	1.95	7.04	1060	1360
5/9/05 15:26	1.79	6.93	1060	1360
5/9/05 15:27	1.86	6.84	1060	1360
5/9/05 15:28	1.99	7.06	1063	1361
5/9/05 15:29	1.90	7.18	1063	1361
5/9/05 15:30	1.97	7.02	1063	1361
5/9/05 15:31	1.78	6.81	1063	1361
5/9/05 15:32	1.89	6.65	1063	1361
5/9/05 15:33	1.92	6.87	1063	1361
5/9/05 15:34	1.97	7.14	1063	1361
5/9/05 15:35	2.09	6.43	1063	1361
5/9/05 15:36	1.74	6.46	1063	1361
5/9/05 15:37	1.97	6.78	1063	1361
5/9/05 15:38	1.99	6.33	1064	1361
5/9/05 15:39	1.77	6.38	1064	1361
5/9/05 15:40	1.93	6.46	1074	1366
5/9/05 15:41	2.02	6.71	1074	1366
5/9/05 15:42	1.96	7.05	1074	1366
5/9/05 15:43	2.02	7.01	1075	1366
5/9/05 15:44	1.89	6.48	1075	1366
5/9/05 15:45	1.84	6.07	1075	1366
5/9/05 15:46	1.98	5.72	1075	1367
5/9/05 15:47	1.93	5.78	1074	1366
5/9/05 15:48	1.80	6.14	1074	1366
5/9/05 15:49	1.90	5.72	1075	1366
5/9/05 15:50	2.17	5.60	1075	1367
5/9/05 15:51	2.05	5.44	1075	1367
5/9/05 15:52	2.19	5.58	1091	1374
5/9/05 15:53	2.23	5.31	1090	1374
5/9/05 15:54	2.07	4.88	1090	1374
5/9/05 15:55	2.17	4.87	1090	1374
5/9/05 15:56	2.16	5.05	1091	1374
5/9/05 15:57	2.17	4.72	1091	1374
5/9/05 15:58	2.38	4.74	1091	1374
5/9/05 15:59	2.36	4.99	1091	1374
5/9/05 16:00	2.43	5.74	1090	1374
5/9/05 16:01	2.49	6.37	1090	1374
5/9/05 16:02	2.61	5.94	1090	1374
5/9/05 16:03	2.68	5.92	1091	1374
5/9/05 16:04	2.57	5.92	1095	1374
5/9/05 16:05	2.78	5.85	1095	1374
5/9/05 16:06	2.51	6.13	1094	1374

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 19:04	2.28	4.31	1088	1367
5/9/05 19:05	2.12	4.24	1088	1367
5/9/05 19:06	2.04	4.32	1088	1367
5/9/05 19:07	2.17	4.38	1087	1367
5/9/05 19:08	2.16	4.26	1087	1367
5/9/05 19:09	2.24	4.52	1087	1367
5/9/05 19:10	2.12	4.27	1088	1367
5/9/05 19:11	2.12	4.28	1088	1367
5/9/05 19:12	2.23	4.08	1088	1367
5/9/05 19:13	2.07	4.29	1087	1367
5/9/05 19:14	2.33	4.36	1087	1367
5/9/05 19:15	2.22	4.46	1087	1367
5/9/05 19:16	2.13	4.33	1089	1368
5/9/05 19:17	2.25	4.28	1089	1368
5/9/05 19:18	2.06	4.41	1089	1368
5/9/05 19:19	2.11	4.26	1089	1368
5/9/05 19:20	2.24	4.28	1088	1368
5/9/05 19:21	2.13	4.30	1088	1368
5/9/05 19:22	1.98	4.39	1089	1368
5/9/05 19:23	2.08	4.27	1089	1368
5/9/05 19:24	2.04	4.37	1089	1368
5/9/05 19:25	2.06	4.48	1089	1368
5/9/05 19:26	2.12	4.52	1089	1368
5/9/05 19:27	2.17	4.35	1088	1368
5/9/05 19:28	1.91	4.40	1089	1369
5/9/05 19:29	1.84	4.21	1090	1370
5/9/05 19:30	2.00	4.22	1090	1370
5/9/05 19:31	1.89	4.36	1090	1370
5/9/05 19:32	2.13	4.37	1090	1370
5/9/05 19:33	1.97	4.31	1089	1369
5/9/05 19:34	2.05	4.43	1089	1370
5/9/05 19:35	1.87	4.26	1090	1370
5/9/05 19:36	1.93	4.36	1090	1370
5/9/05 19:37	2.04	4.35	1090	1370
5/9/05 19:38	2.15	4.23	1090	1370
5/9/05 19:39	2.05	4.42	1089	1369
5/9/05 19:40	2.13	4.48	1088	1367
5/9/05 19:41	2.07	4.37	1088	1367
5/9/05 19:42	1.85	4.55	1089	1368
5/9/05 19:43	1.98	4.51	1089	1368
5/9/05 19:44	3.57	4.40	1088	1367
5/9/05 19:45	2.60	4.37	1088	1367
5/9/05 19:46	2.80	4.34	1087	1367
5/9/05 19:47	2.50	4.40	1088	1367
5/9/05 19:48	2.61	4.29	1088	1367
5/9/05 19:49	2.36	4.35	1088	1367
5/9/05 19:50	2.40	4.40	1088	1368
5/9/05 19:51	2.46	4.50	1088	1367
5/9/05 19:52	2.55	4.44	1087	1366
5/9/05 19:53	2.40	4.33	1087	1366
5/9/05 19:54	2.45	4.22	1087	1366
5/9/05 19:55	2.50	4.23	1087	1366
5/9/05 19:56	2.55	4.46	1088	1366
5/9/05 19:57	2.48	4.59	1087	1366
5/9/05 19:58	2.49	4.51	1087	1365
5/9/05 19:59	2.45	4.36	1087	1366
5/9/05 20:00	2.29	4.16	1087	1366

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 12:07	1.36	4.62	1089	1366
5/9/05 12:08	1.41	4.61	1089	1366
5/9/05 12:09	1.49	4.43	1088	1365
5/9/05 12:10	1.40	4.50	1088	1365
5/9/05 12:11	1.42	4.60	1088	1365
5/9/05 12:12	1.43	4.48	1089	1366
5/9/05 12:13	1.67	4.50	1089	1366
5/9/05 12:14	1.41	4.34	1089	1366
5/9/05 12:15	1.50	4.38	1088	1365
5/9/05 12:16	1.30	4.48	1087	1366
5/9/05 12:17	1.37	4.71	1087	1366
5/9/05 12:18	1.35	4.39	1087	1366
5/9/05 12:19	1.33	4.19	1087	1366
5/9/05 12:20	1.47	4.43	1087	1366
5/9/05 12:21	1.38	4.22	1086	1365
5/9/05 12:22	1.38	4.63	1086	1365
5/9/05 12:23	1.45	4.37	1087	1365
5/9/05 12:24	1.31	4.51	1087	1366
5/9/05 12:25	1.50	4.35	1087	1366
5/9/05 12:26	1.26	4.29	1087	1366
5/9/05 12:27	1.36	4.54	1086	1366
5/9/05 12:28	1.39	4.83	1065	1357
5/9/05 12:29	1.36	4.74	1065	1357
5/9/05 12:30	1.41	4.88	1066	1357
5/9/05 12:31	1.49	4.86	1066	1357
5/9/05 12:32	1.38	4.87	1065	1357
5/9/05 12:33	1.37	5.20	1065	1357
5/9/05 12:34	1.40	5.12	1065	1357
5/9/05 12:35	1.30	5.76	1065	1357
5/9/05 12:36	1.35	5.62	1065	1357
5/9/05 12:37	1.33	5.91	1066	1357
5/9/05 12:38	1.42	6.15	1065	1357
5/9/05 12:39	1.37	6.26	1065	1357
5/9/05 12:40	1.36	6.24	1054	1353
5/9/05 12:41	1.44	6.68	1054	1353
5/9/05 12:42	1.25	7.07	1054	1353
5/9/05 12:43	1.34	6.90	1054	1353
5/9/05 12:44	1.34	7.41	1054	1353
5/9/05 12:45	1.54	7.02	1054	1353
5/9/05 12:46	1.43	7.34	1054	1352
5/9/05 12:47	1.43	7.49	1054	1352
5/9/05 12:48	1.40	8.00	1054	1352
5/9/05 12:49	1.42	7.79	1054	1353
5/9/05 12:50	1.40	7.71	1054	1353
5/9/05 12:51	1.23	7.77	1053	1353
5/9/05 12:52	1.25	7.78	1053	1352
5/9/05 12:53	1.28	8.00	1053	1352
5/9/05 12:54	1.44	8.22	1053	1352
5/9/05 12:55	1.66	7.80	1053	1352
5/9/05 12:56	1.24	7.93	1052	1352
5/9/05 12:57	1.35	7.58	1052	1352
5/9/05 12:58	1.35	7.97	1053	1352
5/9/05 12:59	1.40	8.12	1053	1352

Date/Time	Unit A CO ppm	Unit X CO ppm	Btu/scf	Wobbe
5/9/05 16:07	2.40	5.81	1094	1374
5/9/05 16:08	2.49	5.63	1094	1374
5/9/05 16:09	2.64	5.48	1095	1374
5/9/05 16:10	2.55	5.55	1095	1374
5/9/05 16:11	2.32	5.45	1095	1374
5/9/05 16:12	2.41	5.63	1095	1374
5/9/05 16:13	2.34	5.51	1094	1374
5/9/05 16:14	2.28	5.41	1094	1374
5/9/05 16:15	2.30	5.63	1094	1374
5/9/05 16:16	2.07	5.31	1096	1375
5/9/05 16:17	2.09	5.43	1096	1375
5/9/05 16:18	2.16	5.34	1096	1375
5/9/05 16:19	2.03	5.36	1096	1375
5/9/05 16:20	1.96	5.25	1095	1375
5/9/05 16:21	1.76	5.23	1095	1375
5/9/05 16:22	1.88	5.09	1095	1375
5/9/05 16:23	1.75	5.55	1096	1375
5/9/05 16:24	1.73	5.27	1096	1375
5/9/05 16:25	1.64	5.12	1096	1375
5/9/05 16:26	1.62	5.29	1095	1375
5/9/05 16:27	1.52	5.44	1095	1374
5/9/05 16:28	1.48	5.49	1097	1376
5/9/05 16:29	1.51	5.24	1098	1377
5/9/05 16:30	1.37	5.26	1098	1377
5/9/05 16:31	1.57	5.16	1098	1377
5/9/05 16:32	1.53	5.28	1098	1377
5/9/05 16:33	1.56	5.28	1097	1376
5/9/05 16:34	1.48	5.21	1097	1376
5/9/05 16:35	1.50	5.27	1097	1376
5/9/05 16:36	1.44	5.27	1098	1377
5/9/05 16:37	1.57	5.17	1098	1377
5/9/05 16:38	1.43	5.31	1098	1377
5/9/05 16:39	1.49	5.49	1098	1377
5/9/05 16:40	1.38	5.18	1094	1376
5/9/05 16:41	1.41	5.38	1094	1376
5/9/05 16:42	1.55	5.17	1094	1377
5/9/05 16:43	1.41	5.52	1095	1377
5/9/05 16:44	1.50	5.81	1095	1377
5/9/05 16:45	1.48	5.68	1095	1377
5/9/05 16:46	1.46	5.59	1094	1376
5/9/05 16:47	1.48	5.31	1094	1376
5/9/05 16:48	1.48	5.39	1094	1376
5/9/05 16:49	1.41	5.30	1094	1377
5/9/05 16:50	1.48	5.34	1095	1377
5/9/05 16:51	1.36	5.24	1095	1377
5/9/05 16:52	1.52	5.29	1085	1365
5/9/05 16:53	1.46	5.40	1084	1365
5/9/05 16:54	1.48	5.21	1084	1365
5/9/05 16:55	1.44	5.41	1085	1365
5/9/05 16:56	1.36	5.50	1085	1365
5/9/05 16:57	1.54	5.37	1085	1365
5/9/05 16:58	1.42	5.48	1085	1365
5/9/05 16:59	1.47	5.60	1084	1365

ATTACHMENT 5

REVISED MODELING RESULTS

TABLE 5.1-27 (REVISED 12/06/07)

NORMAL OPERATION AIR QUALITY MODELING RESULTS FOR NEW EQUIPMENT

Pollutant	Averaging Time	Modeled Maximum Concentrations ($\mu g/m^3$) Normal Operations AERMOD	Startup/Shutdown AERMOD	Fumigation SCREEN3	Shoreline Fumigation SCREEN3
Combined Impacts Both CTGs					
NO_2	1-hour	13.8	87.4	2.8	19.4
	Annual	0.2	a	c	c
SO_2	1-hour	4.5	b	0.8	5.6
	3-hour	2.5	b	0.7	2.8
	24-hour	0.7	b	0.3	0.4
	Annual	0.0	b	c	c
CO	1-hour	9.4	~~1127.2~~ **<u>1129.5</u>**	1.7	11.8
	8-hour	3.7	~~470.5~~ **<u>470.4</u>**	1.0	2.3
$PM_{2.5}/PM_{10}$	24-hour	2.2	b	0.6	0.9
	Annual	0.1	b	c	c
Firepump Engine					
NO_2	1-hour	83.8	d	e	E
	Annual	0.0	d	e	e
SO_2	1-hour	0.2	d	e	E
	3-hour	0.0	d	e	e
	24-hour	0.0	d	e	e
	Annual	0.0	d	e	e
CO	1-hour	17.5	d	e	E
	8-hour	4.6	d	e	e
$PM_{2.5}/PM_{10}$	24-hour	0.0	d	e	e
	Annual	0.0	d	e	e
Combined Impacts New Equipment					
NO_2	1-hour	83.8	f	f	f
	Annual	0.2	f	f	f
SO_2	1-hour	4.5	f	f	f
	3-hour	2.5	f	f	f
	24-hour	0.7	f	f	f
	Annual	0.0	f	f	f
CO	1-hour	17.5	f	f	f
	8-hour	4.6	f	f	f
$PM_{2.5}/PM_{10}$	24-hour	2.2	f	f	f
	Annual	0.1	f	f	f

a. Not applicable, because startup/shutdown emissions are included in the modeling for annual average.
b. Not applicable, because emissions are not elevated above normal operation levels during startups/shutdowns.
c. Not applicable, because inversion breakup is a short-term phenomenon and as such is evaluated only for short-term averaging periods.
d. Not applicable, because engine will not operate during CTG startups/shutdowns.
e. Not applicable, this type of modeling is not performed for small combustion sources with relatively short stacks.
f. Impacts are the same as shown for CTGs.

TABLE 5.1-28 (REVISED 12/06/07)

MODELED IMPACTS DURING COMMISSIONING (COMBINED IMPACTS BOTH CTGS)

Pollutant/Averaging Period	Modeled Concentration, µg/m^3
NO_2 - 1-hour	~~129.2~~ **127.3**
CO - 1-hour	~~3321.7~~ **3323.8**
CO - 8-hour	1363.6

TABLE 5.9-6 (REVISED 12/06/07)

Summary of Potential Health Risks

RECEPTOR	CARCINOGENIC RISK [A] (PER MILLION)	CANCER BURDEN	ACUTE HEALTH HAZARD INDEX	CHRONIC HEALTH HAZARD INDEX
Maximum Incremental Cancer Risk (MICR) at PMI	~~0.16~~ **0.15**		~~0.10~~ **0.09**	~~0.005~~ **0.004**
MEIR	~~0.075~~ **0.079**	0	~~0.057~~ **0.056**	~~0.0021~~ **0.0022**
Maximally Exposed Individual Worker [b] (MEIW)	~~0.080~~ **0.079**		0.030	Not applicable
Significance Level	10	1.0	1.0	1.0

Notes:

[a] Derived (Adjusted) Method used by San Diego Air Pollution Control District to determine compliance with Regulation 1200.

[b] The worker is assumed to be exposed at the work location 8 hours per day, instead of 24, 245 days per year, instead of 365, and for 40 years, instead of 70. Hence, a 70 year-based chronic HHI is not applicable to a worker.

ATTACHMENT 6

PM_{10} MONITORING DATA

Summary of 24-hr Avg. PM_{10} levels – Escondido Monitoring Station		
Year	1st Max ($\mu g/m^3$)	2nd Max ($\mu g/m^3$)
2004	57	42
2005	42	38
2006	51	43

Monitor Values Report - Criteria Air Pollutants

Geographic Area: San Diego Co, CA
Pollutant: Particulate (size < 10 micrometers)
Year: 2004

EPA Air Quality Standards:
Particulate (diameter < 10 micrometers): 150 µg/m3 (24-hour average), 50 µg/m3 (annual mean)

µg/m3 = micrograms per cubic meter

6 Rows
See Disclaimer

	PM10 (µg/m3)															
	24-Hour Values							Annual								
Row #	# Obs	1st Max	2nd Max	3rd Max	4th Max	# Exceed-Actual	# Exceed-Estimated	Mean	# Exceed	Monitor Number	Site ID	Site Address	City	County	State	EPA Region
SORT																
1	61	44	43	41	41	0	0.0	26	0	2	060730001	80 E. "J" St., Chula Vista	Chula Vista	San Diego Co	CA	09
2	61	55	49	48	45	0	0.0	30	0	2	060730003	1155 Redwood Ave., El Cajon	El Cajon	San Diego Co	CA	09
3	62	44	43	42	40	0	0.0	25	0	2	060730006	5555 Overland Ave., San Diego	San Diego	San Diego Co	CA	09
4	59	57	42	42	41	0	0.0	27	0	1	060731002	600 E. Valley Pkwy., Escondido	Escondido	San Diego Co	CA	09
5	59	68	65	53	53	0	0.0	33	0	1	060731007	330a 12th Ave., San Diego, Ca. 92112	San Diego	San Diego Co	CA	09
6	63	137	109	104	99	0	0.0	**51**	1	1	060732007	1100 Paseo International, Otay Mesa, Ca	Otay Mesa	San Diego Co	CA	09

Monitor Values Report - Criteria Air Pollutants

Geographic Area: San Diego Co, CA
Pollutant: Particulate (size < 10 micrometers)
Year: 2005

EPA Air Quality Standards:
Particulate (diameter < 10 micrometers): 150 µg/m3 (24-hour average), 50 µg/m3 (annual mean)

µg/m3 = micrograms per cubic meter

7 Rows
See Disclaimer

	PM10 (µg/m3)															
	24-Hour Values							Annual								
Row #	# Obs	1st Max	2nd Max	3rd Max	4th Max	# Exceed-Actual	# Exceed-Estimated	Mean	# Exceed	Monitor Number	Site ID	Site Address	City	County	State	EPA Region
SORT																
1	59	52	50	43	42	0	0.0	27	0	2	060730001	80 E. "J" St., Chula Vista	Chula Vista	San Diego Co	CA	09
2	60	48	44	41	40	0	0.0	28	0	2	060730003	1155 Redwood Ave., El Cajon	El Cajon	San Diego Co	CA	09
3	62	44	40	35	35	0	0.0	22	0	2	060730006	5555 Overland Ave., San Diego	San Diego	San Diego Co	CA	09
4	61	42	38	37	36	0	0.0	24	0	1	060731002	600 E. Valley Pkwy., Escondido	Escondido	San Diego Co	CA	09
5	31	76	48	45	43	0	0.0	28	0	1	060731007	330a 12th Ave., San Diego, Ca. 92112	San Diego	San Diego Co	CA	09
6	30	77	64	58	54	0	0.0	37	0	1	060731010	1110 Beardsley Street, San Diego, Ca 921	San Diego	San Diego Co	CA	09

Monitor Values Report - Criteria Air Pollutants

Geographic Area: San Diego Co, CA
Pollutant: Particulate (size < 10 micrometers)
Year: 2006

EPA Air Quality Standards:
Particulate (diameter < 10 micrometers): 150 µg/m3 (24-hour average), 50 µg/m3 (annual mean)

µg/m3 = micrograms per cubic meter

6 Rows
See Disclaimer

	PM10 (µg/m3)																
	24-Hour Values							Annual									
Row #	# Obs	1st Max	2nd Max	3rd Max	4th Max	# Exceed-Actual	# Exceed-Estimated	Mean	# Exceed	Monitor Number	Site ID	Site Address	City	County	State	EPA Region
SORT																
1	61	51	49	42	42	0	0.0	26	0	2	060730001	80 E. "J" St., Chula Vista	Chula Vista	San Diego Co	CA	09
2	58	47	46	42	39	0	0.0	27	0	2	060730003	1155 Redwood Ave., El Cajon	El Cajon	San Diego Co	CA	09
3	61	42	34	32	32	0	0.0	22	0	2	060730006	5555 Overland Ave., San Diego	San Diego	San Diego Co	CA	09
4	61	51	43	42	41	0	0.0	24	0	1	060731002	600 E. Valley Pkwy., Escondido	Escondido	San Diego Co	CA	09
5	62	71	69	61	57	0	0.0	34	0	1	060731010	1110 Beardsley Street, San Diego, Ca 921	San Diego	San Diego Co	CA	09
6	61	133	117	114	101	0	0.0	54	1	1	060732007	1100 Paseo International, Otay Mesa, Ca	Otay Mesa	San Diego Co	CA	09

ATTACHMENT 7

REVISED MODELING README FILE

Carlsbad Energy Center Project (Encina) Modeling Files
Sierra Research – Marc P. Valdez - December 13, 2007.

Six zipped files, enclosing modeling using three years of Camp Pendleton, CA meteorological data (2003 - 2005), together with corresponding hourly ozone concentration data for Oceanside. The original data was provided by the SDAPCD.

Template files originally developed within Lakes Environmental software, using standard Lakes naming conventions. Changes were subsequently made to these files in standard text editors. For example, for multiple pollutants, the input information for the first pollutant would be copied in a text editor to facilitate inputting the information needed for the other pollutants.

AERMET Output Met Data (6 files) to be used as AERMOD input files.

```
CMP_03.SFC          AERMOD 2003 Surface File
CMP_03.PFL          AERMOD 2003 Profile File
CMP_04.SFC          AERMOD 2004 Surface File
CMP_04.PFL          AERMOD 2004 Profile File
CMP_05.SFC          AERMOD 2005 Surface File
CMP_05.PFL          AERMOD 2005 Profile File
```

ISCST3 Input Met Data (3 Files)

```
CMP_03.MET          ISCST3 2003 Met File
CMP_04.MET          ISCST3 2004 Met File
CMP_05.MET          ISCST3 2005 Met File
```

Ozone Data (3 Files) formatted for AERMOD input.

```
O3FIL03.PRN         Hourly 2003 Ozone Data for Oceanside
O3FIL04.PRN         Hourly 2004 Ozone Data for Oceanside
O3FIL05.PRN         Hourly 2005 Ozone Data for Oceanside
```

Ozone Data (3 Files) formatted for ISCST3 input.

```
O3FIL03.ASC         Hourly 2003 Ozone Data for Oceanside
O3FIL04.ASC         Hourly 2004 Ozone Data for Oceanside
O3FIL05.ASC         Hourly 2005 Ozone Data for Oceanside
```

FUMIGATION Files (2 files)

```
ENCNS01.OUT         SCREEN3 Output for Turbines 1 & 2
FUMIGATION1.XLS     Fumigation Calculation Spreadsheet for results
```

presented in AFC Air Quality Section 5.1 text and appendix.

Three zipped folders for 2003, 2004 and 2005, respectively, each containing a set of 36 modeling files equivalent to the 2003 set listed here.

Standard Lakes naming convention

```
*.ADI    - AERMOD input file
*.OUT    - AERMOD output file
*.ROU    - various receptor grids
```

AERMOD Files (36 files)

File Name	Description
ENCN0301.ADI	Turbine SCREENING, AERMOD Input File, unit impacts For different operating MODE

ENCN0301.OUT Turbine SCREENING, AERMOD Output File

Source Group	Sources	Description (operating mode)
S01	STCK011 STCK012	Avg. Peak
S02	STCK021 STCK022	Avg. Base (cooler)
S03	STCK031 STCK032	Avg. Base
S04	STCK041 STCK042	Avg. Mid.
S05	STCK051 STCK052	Avg. Low (60%)
S06	STCK061 STCK062	Hot Peak
S07	STCK071 STCK072	Hot Base (cooler)
S08	STCK081 STCK082	Hot Base
S09	STCK091 STCK092	Hot Mid.
S10	STCK101 STCK102	Hot Low (60%)
S11	STCK111 STCK112	Mild Base (cooler)
S12	STCK121 STCK122	Mild Base
S13	STCK131 STCK132	Mild Mid.
S14	STCK141 STCK142	Mild Low (60%)
S15	STCK151 STCK152	Cold Base
S16	STCK161 STCK162	Cold Mid.
S17	STCK171 STCK172	Cold Low (60%)
S18	STCK181 STCK182	Startup/Shutdown
S19	STCK191 STCK192	Commissioning
F01	FIRE01	Firepump

File Name	Description
ENCN0302.ADI	Startup & Commissioning, NOx & CO, 1- & 8-hr, Uncorrected, AERMOD Input File
ENCN0302.OUT	Startup & Commissioning, NOx & CO, 1- & 8-hr, Uncorrected, AERMOD Output File

Source Group	Sources	Description
SNOX1	NSTCK181	Startup NOx, Turbine 1
SNOX2	NSTCK182	Startup NOx, Turbine 2
SNOXA	NSTCK181 NSTCK182	Startup NOx, Both Turbines
CNOX1	NSTCK191	Commissioning NOx, Turbine 1
CNOX2	NSTCK192	Commissioning NOx, Turbine 2
CNOXA1	NSTCK191 NSTCK182	Commissioning NOx, Turbine 1 in Commissioning Mode
CNOXA2	NSTCK192 NSTCK181	Commissioning NOx, Turbine 2 in Commissioning Mode
S_CO1	CSTCK181	Startup CO, Turbine 1
S_CO2	CSTCK182	Startup CO, Turbine 2
S_COA	CSTCK181 CSTCK182	Startup CO, Both Turbines
C_CO1	CSTCK191	Commissioning CO, Turbine 1
C_CO2	CSTCK192	Commissioning CO, Turbine 2
C_COA1	CSTCK191 CSTCK182	Commissioning CO, Turbine 1 in Commissioning Mode
C_COA2	CSTCK192 CSTCK181	Commissioning CO, Turbine 2 in Commissioning Mode

----

File Name	Description
ENCN0303.ADI	Startup NOx, 1-hr, Corrected, AERMOD Input File
ENCN0303.OUT	Startup NOx, 1-hr, Corrected, AERMOD Output File

Source Group	Sources	Description
SNOX1	NSTCK181	Startup NOx, Turbine 1
SNOX2	NSTCK182	Startup NOx, Turbine 2
SNOXA	NSTCK181 NSTCK182	Startup NOx, Both Turbines

File Name	Description
ENCN0304.ADI	Commissioning NOx, 1-hr, Corrected, AERMOD Input File, Turbine 1 in Commissioning Mode
ENCN0304.OUT	Commissioning NOx, 1-hr, Corrected, AERMOD Output File , Turbine 1 in Commissioning Mode

Source Group	Sources	Description
SNOX2	NSTCK182	Commissioning NOx, Turbine 2
CNOX1	NSTCK191	Commissioning NOx, Turbine 1, Turbine 1 in Commissioning Mode
CNOXA1	NSTCK191 NSTCK182	Both Turbines

File Name	Description
ENCN0305.ADI	Commissioning NOx, 1-hr, Corrected, AERMOD Input File, Turbine 2 in Commissioning Mode
ENCN0305.OUT	Commissioning NOx, 1-hr, Corrected, AERMOD Output File , Turbine 2 in Commissioning Mode

Source Group	Sources	Description
SNOX1	NSTCK181	Commissioning NOx, Turbine 1
CNOX2	NSTCK192	Commissioning NOx, Turbine 2, Turbine 2 in Commissioning Mode
CNOXA2	NSTCK192 NSTCK181	Both Turbines

File Name	Description
ENCN0331.ADI	Refined Run, NOx, 1-hr, Uncorrected, AERMOD Input File
ENCN0331.OUT	Refined Run, NOx, 1-hr, Uncorrected, AERMOD Output File

Source Group	Sources	Description
S01	STCK011	Turbine 1
S02	STCK012	Turbine 2
S03	STCK011 STCK012	Both Turbines
F01	FIRE01	Fire Pump
C01	STCK011 STCK012 FIRE01	All Sources

File Name	Description
ENCN0332.ADI	Refined Run, SO2, 1-, 3-, & 24-hr, AERMOD Input File

ENCN0332.OUT   Refined Run, SO2, 1-, 3-, & 24-hr, AERMOD Output File

Source Group	Sources	Description
S01	STCK011	Turbine 1
S02	STCK012	Turbine 2
S03	STCK011 STCK012	Both Turbines
F01	FIRE01	Fire Pump – 1-hr avg.
F02	FIRE02	Fire Pump – 3-hr avg.
F03	FIRE03	Fire Pump – 24-hr avg.
C01	STCK011 STCK012 FIRE01	All Sources – 1-hr avg.
C08	STCK011 STCK012 FIRE02	All Sources – 3-hr avg.
C11	STCK011 STCK012 FIRE03	All Sources – 24-hr avg.

File Name	Description
ENCN0333.ADI	Refined Run, CO, 1- & 8-hr, AERMOD Input File
ENCN0333.OUT	Refined Run, CO, 1- & 8-hr, AERMOD Output File

Source Group	Sources	Description
S01	STCK011	Turbine 1 – 1-hr avg.
S02	STCK012	Turbine 2 – 1-hr avg.
S03	STCK011 STCK012	Both Turbines – 1-hr avg.
S04	STCK041	Turbine 1 – 8-hr avg.
S05	STCK042	Turbine 2 – 8-hr avg.
S06	STCK041 STCK042	Both Turbines – 8-hr avg.
F01	FIRE01	Fire Pump
C01	STCK011 STCK012 FIRE01	All Sources – 1-hr avg.
C08	STCK041 STCK042 FIRE01	All Sources – 8-hr avg.

File Name	Description
ENCN0334.ADI	Refined Run, PM10, 24-hr, AERMOD Input File
ENCN0334.OUT	Refined Run, PM10, 24-hr, AERMOD Output File

Source Group	Sources	Description
S01	STCK101	Turbine 1
S02	STCK102	Turbine 2
S03	STCK101 STCK102	Both Turbines
F01	FIRE01	Fire Pump
C01	STCK101 STCK102 FIRE01	All Sources

File Name	Description
ENCN0335.ADI	Refined Run, NOx, Annual, Uncorrected, AERMOD Input File
ENCN0335.OUT	Refined Run, NOx, Annual, Uncorrected, AERMOD Output File

Source Group	Sources	Description
S01	STCK031	Turbine 1
S02	STCK032	Turbine 2
S03	STCK031 STCK032	Both Turbines
F01	FIRE01	Fire Pump

C01	STCK031 STCK032 FIRE01	All Sources

File Name	Description
ENCN0336.ADI	Refined Run, SO2, Annual, AERMOD Input File
ENCN0336.OUT	Refined Run, SO2, Annual, AERMOD Output File

Source Group	Sources	Description
S01	STCK031	Turbine 1
S02	STCK032	Turbine 2
S03	STCK031 STCK032	Both Turbines
F01	FIRE01	Fire Pump
C01	STCK031 STCK032 FIRE01	All Sources

File Name	Description
ENCN0337.ADI	Refined Run, PM10, Annual, AERMOD Input File
ENCN0337.OUT	Refined Run, PM10, Annual, AERMOD Output File

Source Group	Sources	Description
S01	STCK101	Turbine 1
S02	STCK102	Turbine 2
S03	STCK101 STCK102	Both Turbines
F01	FIRE01	Fire Pump
C01	STCK101 STCK102 FIRE01	All Sources

File Name	Description
ENCN0338.ADI	Refined Run, NOx, 1-hr, PVMRM, AERMOD Input File
ENCN0338.OUT	Refined Run, NOx, 1-hr, PVMRM, AERMOD Output File

Source Group	Sources	Description
S01	STCK011	Turbine 1
S02	STCK012	Turbine 2
S03	STCK011 STCK012	Both Turbines
F01	FIRE01	Fire Pump
C01	STCK011 STCK012 FIRE01	All Sources

File Name	Description
ENCN0339.ADI	HRA, AERMOD Input File
ENCN0339.OUT	HRA, AERMOD Output File
ENCN0339.PLT	HRA, AERMOD Output Plotting File

Source Group	Sources	Description
DADT	DAD031 DAD032	Derived (Adjusted) Cancer Risk (Res. – Turbines)
DADF	DADF01	Derived (Adjusted) Cancer Risk (Res. – Fire Pump)
DADA	DAD031 DAD032 DADF01	Derived (Adjusted) Cancer Risk (Res. – All Sources)
DEWT	DEW031 DEW032	Derived (Adjusted) Cancer Risk

Source Group	Sources	Description
		(Worker – Turbines)
DEWF	DEWF01	Derived (Adjusted) Cancer Risk (Worker – Fire Pump)
DEWA	DEW031 DEW032 DEWF01	Derived (Adjusted) Cancer Risk (Worker – All Sources)
CHRT	CHR031 CHR032	Chronic Risk - Turbines
CHRF	CHRF01	Chronic Risk – Fire Pump
CHRA	CHR031 CHR032 CHRF01	Chronic Risk – All Sources
ACNT	ACNX11 ACNX12	Acute Risk – Turbines, No Catalyst
ACNA	ACNX11 ACNX12 ACUF01	Acute Risk – All Sources, No Catalyst
ACUT	ACU011 ACU012	Acute Risk – Turbines, With Catalyst
ACUA	ACU011 ACU012 ACUF01	Acute Risk – All Sources, With Catalyst
ACUF	ACUF01	Acute Risk – Fire Pump

File Name	Description
ENCN0344.ADI	HRA, worst-hit residences, AERMOD Input File
ENCN0344.OUT	HRA, worst-hit residences, AERMOD Output File
ENCN0344.PLT	HRA, worst-hit residences, AERMOD Output Plotting File

Source Group	Sources	Description
DADT	DAD031 DAD032	Derived (Adjusted) Cancer Risk (Res. – Turbines)
DADF	DADF01	Derived (Adjusted) Cancer Risk (Res. – Fire Pump)
DADA	DAD031 DAD032 DADF01	Derived (Adjusted) Cancer Risk (Res. – All Sources)
DEWT	DEW031 DEW032	Derived (Adjusted) Cancer Risk (Worker – Turbines)
DEWF	DEWF01	Derived (Adjusted) Cancer Risk (Worker – Fire Pump)
DEWA	DEW031 DEW032 DEWF01	Derived (Adjusted) Cancer Risk (Worker – All Sources)
CHRT	CHR031 CHR032	Chronic Risk - Turbines
CHRF	CHRF01	Chronic Risk – Fire Pump
CHRA	CHR031 CHR032 CHRF01	Chronic Risk – All Sources
ACNT	ACNX11 ACNX12	Acute Risk – Turbines, No Catalyst
ACNA	ACNX11 ACNX12 ACUF01	Acute Risk – All Sources, No Catalyst
ACUT	ACU011 ACU012	Acute Risk – Turbines, With Catalyst
ACUA	ACU011 ACU012 ACUF01	Acute Risk – All Sources, With Catalyst
ACUF	ACUF01	Acute Risk – Fire Pump

File Name	Description
ENCN339B.ADI	Risk, AERMOD Input File (emissions x 1E+03)
ENCN339B.OUT	Risk, AERMOD Output File (emissions x 1E+03)
ENCN339B.PLT	Risk, AERMOD Output Plotting File (emissions x 1E+03)

Source Group	Sources	Description

CHRT	CHR031 CHR032	Chronic Risk - Turbines
CHRF	CHRF01	Chronic Risk – Fire Pump
CHRA	CHR031 CHR032 CHRF01	Chronic Risk – All Sources
ACNT	ACNX11 ACNX12	Acute Risk – Turbines, No Catalyst
ACNA	ACNX11 ACNX12 ACUF01	Acute Risk – All Sources, No Catalyst
ACUT	ACU011 ACU012	Acute Risk – Turbines, With Catalyst
ACUA	ACU011 ACU012 ACUF01	Acute Risk – All Sources, With Catalyst
ACUF	ACUF01	Acute Risk – Fire Pump

File Name	Description
ENCN0347.ADI	Startup & Commissioning, AERMOD Input File
ENCN0347.OUT	Startup & Commissioning, AERMOD Output File

Source Group	Sources	Description
SNOX1	NSTCK181	Startup NO2, Turbine 1
SNOX2	NSTCK182	Startup NO2, Turbine 2
SNOXA	NSTCK181 NSTCK182	Startup NO2, Both Turbines
CNOX1	NSTCK191	Commissioning NO2, Turbine 1
CNOX2	NSTCK192	Commissioning NO2, Turbine 2
CNOXA1	NSTCK191 NSTCK182	Commissioning NO2, Both Turbines, Case A
CNOXA2	NSTCK192 NSTCK181	Commissioning NO2, Both Turbines, Case B
S_CO1	CSTCK181	Startup CO, Turbine 1
S_CO2	CSTCK182	Startup CO, Turbine 2
S_COA	CSTCK181 CSTCK182	Startup CO, Both Turbines
C_CO1	CSTCK191	Commissioning CO, Turbine 1
C_CO2	CSTCK192	Commissioning CO, Turbine 2
C_COA1	CSTCK191 CSTCK182	Commissioning CO, Both Turbines, Case A
C_COA2	CSTCK192 CSTCK181	Commissioning CO, Both Turbines, Case B
NEXIST	NPKGTG NBOILG	Existing Sources NO2 (Turbine, Boilers)
SENX1	NSTCK181 NPKGTG NBOILG	Startup NO2, Turbine 1, Existing Srcs.
SENX2	NSTCK182 NPKGTG NBOILG	Startup NO2, Turbine 2, Existing Srcs.
SENXA	NSTCK181 NSTCK182 NPKGTG NBOILG	Startup NO2, Both Turbines, Existing Srcs.
CENX1	NSTCK191 NPKGTG NBOILG	Commissioning NO2, Turbine 1, Existing Srcs.
CENX2	NSTCK192 NPKGTG NBOILG	Commissioning NO2, Turbine 2, Existing Srcs.
CENXA1	NSTCK191 NSTCK182 NPKGTG NBOILG	Commissioning NO2, Both Turbines, Case A, Existing Srcs.
CENXA2	NSTCK192 NSTCK181 NPKGTG NBOILG	Commissioning NO2, Both Turbines, Case B, Existing Srcs.
CEXIST	CPKGTG CBOILG	Existing Sources CO (Turbine, Boilers)
SECO1	CSTCK181 CPKGTG CBOILG	Startup CO, Turbine 1, Existing Srcs.
SECO2	CSTCK182 CPKGTG CBOILG	Startup CO, Turbine 2, Existing Srcs.
SECOA	CSTCK181 CSTCK182 CPKGTG CBOILG	Startup CO, Both Turbines, Existing Srcs.

CECO1	CSTCK191 CPKGTG CBOILG	Commissioning CO, Turbine 1, Existing Srcs.
CECO2	CSTCK192 CPKGTG CBOILG	Commissioning CO, Turbine 2, Existing Srcs.
CECOA1	CSTCK191 CSTCK182 CPKGTG CBOILG	Commissioning CO, Both Turbines, Case A, Existing Srcs.
CECOA2	CSTCK192 CSTCK181 CPKGTG CBOILG	Commissioning CO, Both Turbines, Case B, Existing Srcs.

Receptor Data - 3 Files

ENC1.ROU	Coarse receptor grid
ENC2.ROU	Coarse & fine receptor grids
ENC3.ROU	Nearby and maximum impact residences and workplaces

ISCST3 Files - Construction - Combustion w. 4 volume sources - 3 years x 12 files = 36 files

12 files for 2003

File Name	Description
ENCN0326.ADI	Construction, Case 1, ISCST3 Input File
ENCN0326.OUT	Construction, Case 1, ISCST3 Output File
ENCN0326.PLT	Construction, Case 1, ISCST3 Output Plotting File

Source Group	Sources	Description
NXSC	NV01 NV11 NV21 NV31	NOx, Short-Term
COSC	CV01 CV11 CV21 CV31	CO, Short-Term
SXSC	SV01 SV11 SV21 SV31	SO2, Short-Term
NXLC	NV04 NV14 NV24 NV34	NOx, Long-Term
SXLC	SV04 SV14 SV24 SV34	SO2, Long-Term
PM10S	PV01-PV02 PA03 PV11-PV12 PV21-PV22 PV31-PV32	PM10, Short-Term
PM10L	PV04-PV05 PA06 PV14-PV15 PV24-PV25 PV34-PV35	PM10, Long-Term
PM25S	FV01-FV02 FA03 FV11-FV12 FV21-FV22 FV31-FV32	PM2.5, Short-Term
PM25L	FV04-FV05 FA06 FV14-FV15 FV24-FV25 FV34-FV35	PM2.5, Long-Term
PM25CS	FV01 FV11 FV21 FV31	PM2.5, Combustion, Short-Term
PM25CL	FV04 FV14 FV24 FV34	PM2.5, Combustion, Long-Term

File Name   Description

ENCN0327.ADI	Construction, Case 2, ISCST3 Input File
ENCN0327.OUT	Construction, Case 2, ISCST3 Output File
ENCN0327.PLT	Construction, Case 2, ISCST3 Output Plotting File

Source Group	Sources	Description
NXSC	NV01 NV11 NV21 NV31	NOx, Short-Term
COSC	CV01 CV11 CV21 CV31	CO, Short-Term
SXSC	SV01 SV11 SV21 SV31	SO2, Short-Term
NXLC	NV04 NV14 NV24 NV34	NOx, Long-Term
SXLC	SV04 SV14 SV24 SV34	SO2, Long-Term
PM10S	PV01-PV02 PA03 PV11-PV12 PV21-PV22 PV31-PV32	PM10, Short-Term
PM10L	PV04-PV05 PA06 PV14-PV15 PV24-PV25 PV34-PV35	PM10, Long-Term
PM25S	FV01-FV02 FA03 FV11-FV12 FV21-FV22 FV31-FV32	PM2.5, Short-Term
PM25L	FV04-FV05 FA06 FV14-FV15 FV24-FV25 FV34-FV35	PM2.5, Long-Term
PM25CS	FV01 FV11 FV21 FV31	PM2.5, Combustion, Short-Term
PM25CL	FV04 FV14 FV24 FV34	PM2.5, Combustion, Long-Term

File Name	Description
ENCN0328.ADI	Construction, Case 1, NOx, 1-hr, OLM, ISCST3 Input File
ENCN0328.OUT	Construction, Case 1, NOx, 1-hr, OLM, ISCST3 Output File
ENCN0328.PLT	Construction, Case 1, NOx, 1-hr, OLM, ISCST3 Output Plotting File

Source Group	Sources	Description
NXSC	NV01 NV11 NV21 NV31	NOx, Short-Term

File Name	Description
ENCN0329.ADI	Construction, Case 2, NOx, 1-hr, OLM, ISCST3 Input File
ENCN0329.OUT	Construction, Case 2, NOx, 1-hr, OLM, ISCST3 Output File
ENCN0329.PLT	Construction, Case 2, NOx, 1-hr, OLM, ISCST3 Output Plotting File

Source Group	Sources	Description
NXSC	NV01 NV11 NV21 NV31	NOx, Short-Term

BPIP FILES AND DEM DATA (NAD27 DATUM)
Eight DEM files (DEM.ZIP) for the following quadrangles:

SNMARCOS.DEM
SLUISREY.DEM
BONSALL.DEM
ENCINITAS.DEM
LAPULGS.DEM
MORROHIL.DEM
OCEANSIDE.DEM
RSANTAFE.DEM

Three BPIP Files

ENC1_WTIER5.SUP	Summary Output File
ENC1_WTIER5.PRO	Output File
ENC1_WTIER5.BPI	BPIP Input File

ATTACHMENT 8

SIEMENS GAS TURBINE PERFORMANCE RUNS AT LOW LOADS

SIEMENS

NRG

Estimated SGT6-5000F Gas Turbine Performance
Combined Cycle / Ultra Low NO_X Combustor
SGen6-1000A (Static) / 0.90 Power Factor

Based on USAadh_r1v.xls
Oct. 9, 2007

SITE CONDITIONS:	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11	CASE 12	CASE 13	CASE 14	CASE 15	CASE 16
FUEL TYPE	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
LOAD LEVEL	BASE	BASE	PWR AUG	50%	BASE	BASE	PWR AUG	50%	BASE	BASE	90%	80%	70%	60%	50%	40%
NET FUEL HEATING VALUE, Btu/lb_m (LHV)	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522
GROSS FUEL HEATING VALUE, Btu/lb_m (HHV)	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634
AMBIENT DRY BULB TEMPERATURE, °F	77.8	77.8	77.8	77.8	83.0	83.0	83.0	83.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
AMBIENT WET BULB TEMPERATURE, °F	64.7	64.7	64.7	64.7	68.1	68.1	68.1	68.1	56.2	56.1	56.1	56.1	56.1	56.1	56.1	56.1
AMBIENT RELATIVE HUMIDITY, %	49.5	49.6	49.6	49.5	46.9	47.0	47.0	46.9	70.0	69.9	69.9	69.9	69.9	69.9	69.9	69.9
BAROMETRIC PRESSURE, psia	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640
COMPRESSOR INLET TEMPERATURE, °F	77.8	66.7	66.7	77.8	83.0	70.3	70.3	83.0	57.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
EVAPORATIVE COOLER STATUS / EFFECTIVENESS, %	OFF	85	85	OFF	OFF	85	85	OFF	85	OFF	OFF	OFF	OFF	OFF	OFF	OFF
INLET PRESSURE LOSS, in. H_2O (Total)	4.3	4.5	4.5	2.0	4.2	4.4	4.4	2.0	4.6	4.5	3.9	3.4	2.9	2.5	2.1	1.9
EXHAUST PRESSURE LOSS, in. H_2O (Total)	16.8	17.6	19.2	8.0	16.4	17.3	18.9	7.8	18.4	18.0	15.5	13.6	11.7	10.0	8.5	7.5
EXHAUST PRESSURE LOSS, in. H_2O (Static)	13.7	14.3	15.7	6.5	13.4	14.1	15.4	6.4	14.9	14.7	12.7	11.1	9.5	8.1	6.9	6.1
INJECTION FLUID	---	---	Steam	---	---	---	Steam	---	---	---	---	---	---	---	---	---
INJECTION RATIO	---	---	1.40	---	---	---	1.40	---	---	---	---	---	---	---	---	---
FUEL FLOW, lb_m/hr	86,926	90,175	96,876	53,381	85,541	89,199	95,813	52,666	92,634	91,263	83,513	76,626	69,513	62,489	55,595	48,314
INJECTION RATE, lb_m/hr	---	---	135,610	---	---	---	134,123	---	---	---	---	---	---	---	---	---
HEAT INPUT, MMBtu/hr (LHV)	1,697	1,760	1,891	1,042	1,670	1,741	1,870	1,028	1,808	1,782	1,630	1,496	1,357	1,220	1,085	943
HEAT INPUT, MMBtu/hr (HHV)	1,881	1,951	2,096	1,155	1,851	1,930	2,073	1,139	2,004	1,974	1,807	1,658	1,504	1,352	1,203	1,045
EXHAUST TEMPERATURE, °F	1,108	1,100	1,101	1,108	1,113	1,104	1,105	1,113	1,091	1,094	1,094	1,094	1,094	1,094	1,094	1,037
EXHAUST FLOW, lb_m/hr	3,807,504	3,910,963	4,052,150	2,606,850	3,753,248	3,869,195	4,008,652	2,576,579	4,011,052	3,968,993	3,675,321	3,427,684	3,176,508	2,930,795	2,693,356	2,581,759
STACK TEMPERATURES, °F	354	358	361	336	351	356	360	334	363	361	356	352	348	344	340	360
EXHAUST GAS COMPOSITION (% BY VOLUME):																
OXYGEN	12.52	12.38	11.18	13.35	12.50	12.33	11.15	13.32	12.45	12.51	12.61	12.74	12.90	13.10	13.34	14.01
CARBON DIOXIDE	3.82	3.85	3.91	3.43	3.81	3.84	3.90	3.42	3.86	3.85	3.80	3.74	3.67	3.57	3.46	3.15
WATER	8.71	9.15	14.33	7.99	8.88	9.38	14.54	8.16	8.69	8.49	8.41	8.30	8.15	7.98	7.77	7.17
NITROGEN	74.08	73.76	69.77	74.37	73.94	73.58	69.60	74.22	74.13	74.27	74.31	74.35	74.41	74.48	74.56	74.79
ARGON	0.87	0.86	0.82	0.87	0.87	0.86	0.82	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.88
MOLECULAR WEIGHT	28.36	28.31	27.75	28.40	28.34	28.28	27.73	28.38	28.36	28.38	28.39	28.39	28.40	28.41	28.43	28.46

SITE CONDITIONS:	CASE 17	CASE 18	CASE 19	CASE 20	CASE 21	CASE 22	CASE 23	CASE 24	CASE 25	CASE 26	CASE 27	CASE 28	CASE 29	CASE 30	CASE 31
FUEL TYPE	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
LOAD LEVEL	30%	20%	10%	FSNL	BASE	90%	80%	70%	60%	50%	40%	30%	20%	10%	FSNL
NET FUEL HEATING VALUE, Btu/lb_m (LHV)	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522	19,522
GROSS FUEL HEATING VALUE, Btu/lb_m (HHV)	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634	21,634
AMBIENT DRY BULB TEMPERATURE, °F	62.0	62.0	62.0	62.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0
AMBIENT WET BULB TEMPERATURE, °F	56.1	56.1	56.1	56.1	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9
AMBIENT RELATIVE HUMIDITY, %	69.9	69.9	69.9	69.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9	75.9
BAROMETRIC PRESSURE, psia	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640	14.640
COMPRESSOR INLET TEMPERATURE, °F	62.0	62.0	62.0	62.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0
EVAPORATIVE COOLER STATUS / EFFECTIVENESS, %	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
INLET PRESSURE LOSS, in. H_2O (Total)	1.9	1.9	1.9	1.9	4.7	4.0	3.5	3.0	2.6	2.2	2.0	2.0	2.0	2.0	2.0
EXHAUST PRESSURE LOSS, in. H_2O (Total)	6.9	6.3	5.7	5.1	19.4	16.6	14.5	12.5	10.6	9.0	7.9	7.2	6.6	6.0	5.3
EXHAUST PRESSURE LOSS, in. H_2O (Static)	5.6	5.1	4.6	4.1	15.8	13.5	11.8	10.2	8.7	7.3	6.4	5.9	5.3	4.8	4.3
INJECTION FLUID	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
INJECTION RATIO	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FUEL FLOW, lb_m/hr	40,761	33,379	26,095	18,726	96,040	87,724	80,405	72,869	65,415	58,097	50,440	42,434	34,634	26,960	19,219
INJECTION RATE, lb_m/hr	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
HEAT INPUT, MMBtu/hr (LHV)	796	652	509	366	1,875	1,713	1,570	1,423	1,277	1,134	985	828	676	526	375
HEAT INPUT, MMBtu/hr (HHV)	882	722	565	405	2,078	1,898	1,739	1,576	1,415	1,257	1,091	918	749	583	416
EXHAUST TEMPERATURE, °F	931	827	723	614	1,078	1,078	1,078	1,078	1,078	1,078	1,026	918	812	705	596
EXHAUST FLOW, lb_m/hr	2,574,277	2,566,970	2,559,766	2,552,480	4,148,335	3,831,196	3,568,969	3,304,101	3,044,153	2,793,053	2,660,153	2,652,203	2,644,460	2,636,849	2,629,177
STACK TEMPERATURES, °F	396	429	464	503	369	364	360	355	350	346	365	401	434	471	506
EXHAUST GAS COMPOSITION (% BY VOLUME):															
OXYGEN	15.03	16.03	17.02	18.04	12.57	12.66	12.79	12.96	13.16	13.40	14.04	15.09	16.12	17.14	18.18
CARBON DIOXIDE	2.67	2.20	1.74	1.26	3.88	3.84	3.78	3.70	3.61	3.50	3.19	2.71	2.23	1.75	1.26
WATER	6.28	5.40	4.52	3.63	7.93	7.85	7.73	7.59	7.41	7.20	6.63	5.70	4.80	3.89	2.98
NITROGEN	75.14	75.48	75.82	76.17	74.74	74.77	74.82	74.88	74.95	75.03	75.25	75.61	75.97	76.32	76.68
ARGON	0.88	0.88	0.89	0.89	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89	0.90
MOLECULAR WEIGHT	28.52	28.57	28.62	28.68	28.45	28.45	28.46	28.47	28.48	28.49	28.53	28.58	28.64	28.69	28.75

NOTES:

- All data is estimated and not guaranteed.
- Performance is based on new and clean condition.
- Gross power output is at the generator terminals, minus excitation losses. It does not include ECONOPAC™ auxiliary load losses.
- IGV schedule may be adjusted during commissioning. Part load performance will be adjusted accordingly.
- Gas fuel composition is (vol%) 90.443% CH_4, 2.512% C_2H_6, 2.043% C_3H_8, 0.139% iC_4H_{10}, 0.139% nC_4H_{10}, 0.0235% iC_5H_{12}, 0.0235% nC_5H_{12}, 0.050% nC_6H_6, 3.116% N_2, 0.09% O_2 and 1.423% CO_2.
- Gas fuel must be in compliance with the SIEMENS Gas Fuel Spec (ZDX555-DC01-MBP-2500-01).
- Average temperature of the gas fuel is 59° F.
- Sensible Heat of the fuel is not included in the calculated Heat Input values.
- Injection is for power augmentation and not for NO_X control.
- Performance has been derated for fast start capabilities.
- Please be advised that the information contained in this transmittal has been prepared and is being transmitted per customer request specifically for information purposes only. Such information is not intended to be used for evaluation of plant design and/or performance relative to contractual commitments. Data included in any permit application or Environmental Impact Statement are strictly the customer's responsibility. Siemens is available to review permit application data upon request.