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December 20, 2007

BY HAND DELIVERY

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

Re: Carlsbad Energy Center (07-AFC-6)
Responses to Staff's Data Requests, Set 1

Dear Mr. Monasmith:

On behalf of Carlsbad Energy Center LLC ("Applicant"), enclosed are the original and requisite copies of Applicant's Responses to Staff's Data Requests (Set 1A, Requests 1 – 73). These data responses cover the topic areas of Air Quality, Cultural Resources, Power Plant Efficiency, Public Health, Socioeconomics, Soil and Water, Transmission System Engineering, Visual Resources, and Waste Management.

Should you have any questions regarding this submittal, please do not hesitate to contact me at the number above.

Respectfully submitted,

John McKinsey /kjh

John A. McKinsey

JAM:kjh
Enclosures
cc: See Attached Proof of Service

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, Kimberly J. Hellwig, declare that on December 20, 2007, I personally served ***OR*** 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 RESPONSES (SET 1A) TO STAFF'S DATA REQUESTS, SET 1

CALIFORNIA ENERGY COMMISSION
(Via Electronic Service & Hand Delivery)
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INTERVENORS
None as of 12/13/07

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

Kimberly J. Hellwig

Carlsbad Energy Center Project

(07-AFC-6)

Data Response, Set 1A

(Response to Data Requests 1 though 73)

Submitted to the

California Energy Commission

Submitted by

Carlsbad Energy Center LLC

December 2007

With Assistance from

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

Shaw™ Stone & Webster, Inc.

Contents

Introduction

Attached are Carlsbad Energy Center LLC's (Applicant) responses to the California Energy Commission (CEC) Staff's data requests numbers 1 through 73 for Carlsbad Energy Center Project (CECP) (07-AFC-6). The CEC Staff served these data requests on November 21, 2007, as part of the discovery process for the CECP. The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as CEC Staff presented them and are keyed to the Data Request numbers (1 through 73). New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 15 would be numbered Table DR15-1. The first figure used in response to Data Request 15 would be Figure DR15-1, and so on.

Additional tables, figures, or documents submitted in response to a data request (supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of a discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

The Applicant looks forward to working cooperatively with CEC Staff as the CECP proceeds through the siting process. We trust that these responses address the Staff's questions and remain available to have any additional dialogue the Staff may require.

Air Quality (1 – 27)

Background: San Diego Air Pollution Control District Information Requests

Staff will need the applicant to provide copies of all of the information provided to the San Diego Air Pollution Control District (SDAPCD or District) to respond to the District information requests provided in the District's October 17, 2007, Application Status letter. The District's letter can be viewed at the following electronic link: http://www.energy.ca.gov/sitingcases/carlsbad/documents/others/2007-10-17_COMPLETE+INFORMATION_REQUEST.PDF

Data Request

1. Please provide the Best Available Control Technology (BACT) information requested for the evaporative cooler and reclaimed water in the District's October 17th Letter (page 1).

Response: These issues are addressed in the Applicant's December 18, 2007 letter to the District. A copy of this letter is included as Attachment DR1-1.

2. It is likely that the project may be operated continuously or intermittently on natural gas derived from imported liquefied natural gas (LNG). Please provide the LNG operations impact information requested in the District's October 17th Letter (page 2).

Response: This issue is addressed in the Applicant's December 18, 2007 letter to the District. A copy of this letter is included as Attachment DR1-1. 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 (CEC Information on LNG) of Attachment DR1-1. Since both the Colusa Generating Station and the CECP are gas turbine combined-cycle designs, a similar conclusion can be reached for the CECP with respect to the use of LNG.

3. Please provide the revised Air Quality and HRA modeling analysis information, including electronic input and output files, using the current or other District approved version of the AERMOD modeling system that was requested in the District's October 17th Letter (pages 2 through 4).

Response: This issue is addressed in the Applicant's December 18, 2007 letter to the District. A copy of this letter is included as Attachment DR1-1. Copies of the electronic input and output files for the air quality and health risk assessment modeling are included on the enclosed CD labeled "CECP Modeling Files." Five CDs are being provided to the CEC. Copies of the CD will be provided to the other parties upon request.

4. Please provide the toxic air contaminant emission factor and emission rate information requested in the District's October 17th Letter (pages 4 and 5).

Response: This issue is addressed in the Applicant's December 18, 2007 letter to the District. A copy of this letter is included as Attachment DR1-1.

Background: Gas Turbine Operating Hours

The Application for Certification (AFC) is inconsistent regarding the maximum operating hours for the gas turbines. The project description and water resources technical section of the AFC use different maximum bases for operating hours (8,760 hours) than the air quality section of the AFC (4,100 hours), and the application's Data Adequacy Supplement A did not explicitly clarify whether the applicant will be willing to stipulate to the limited operations assumed in the air quality emissions calculations. Staff needs the applicant to clarify the maximum operating basis to confirm the air quality emissions basis.

Data Request

5. Please confirm that the applicant is willing to stipulate to maximum turbine operations as presented in the air quality emission calculations, or if not, please revise the air quality emissions calculations and modeling analysis to a maximum operating basis to which the applicant will stipulate.

Response: The Applicant is willing to stipulate to the maximum annual gas turbine operations (i.e., 4,100 hours) shown in the air quality section of the AFC. This will likely occur in the form of an annual limit or limits in the Preliminary and Final Determinations of Compliance (PDOC and FDOC) issued by the San Diego County Air Pollution Control District (SDAPCD).

Background: Operations Mitigation – Emission Reductions

Staff's position for a California Environmental Quality Act (CEQA) impact determination of operating emissions is that all nonattainment pollutants and their precursors need to be mitigated through emission reductions at a minimum ratio of 1:1. The San Diego Air Basin in the area of the project site is classified as nonattainment for the state ozone, PM10 and PM2.5 standards and federal ozone standard. Without proper emission reduction mitigation, this project could contribute to existing violations of the state and federal ambient air quality standards.

The applicant does not appear to propose to fully mitigate the project's emissions with actual emission reductions from the shutdown of existing Boilers 1 through 3 at the adjacent Encina Power Station (Encina). Additionally, the boiler shutdown emissions as presented may not be allowed per District rules, and the shutdown is not proposed to occur prior to the first fire of the project turbines, which raises additional District Rule compliance questions. Staff needs additional information to understand the sequencing and emission offset potential of the boiler shutdown and a determination of whether the applicant will propose to mitigate the project's

emissions of nonattainment and precursor pollutants to address staff's impact concerns.

Data Request

6. Please discuss and provide a schedule as to when the applicant will provide a list of potential offset sources or other emission mitigation programs to be used by the applicant to obtain emission reduction credits that would mitigate the project's NOx, PM10, PM2.5, VOC and SOx emissions on a 1:1 basis.

Response: As discussed in Section 5.1.9 of the Air Quality Section of the AFC, the shutdown of the existing Units 1, 2, and 3 at the Encina Power Station will be used to fully mitigate the emissions associated with the proposed project. With regard to the SDAPCD's New Source Review (NSR) offset requirements, as shown on Table 5.1-35 of the AFC, the proposed project's net emission increases, after accounting for the reductions from the shutdown of Units 1, 2, and 3, are below offset trigger levels for NOx and VOC. The SDAPCD NSR regulations do not require offsets for CO, SOx, and PM_{10} because the District is a federal attainment area for these pollutants. Consequently, emission offsets are not required for the proposed project. As discussed in AFC Section 5.1.6.2.2, the emission reductions associated with the shutdown of the existing Units 1, 2, and 3 are based on baseline emissions calculated using the maximum 2-year average during the past 5 years. The Applicant believes this is the most representative period for the existing units because operation of these units is expected to increase in the future due to the increased demand for electricity in the project area. The SDAPCD is in the process of reviewing these baseline emission calculations for Units 1, 2, and 3. The emission reductions for the shutdown of Units 1, 2, and 3 will change if the SDAPCD decides that a different 2-year average baseline period must be used for the existing units. The various 2-year average baseline emission levels for Units 1, 2, and 3 are shown on AFC Tables 5.1B-12 and 5.1B-13. The lowest emission reductions for the shutdown of Units 1, 2, and 3 occur if the most recent 2-year average is used as the baseline period for the existing units. The Applicant does not believe that this period should be used for baseline purposes since operation of Units 1, 2, and 3 during 2006 was uncharacteristically low compared to the previous four years (2002 to 2005). For example, the total natural gas use for Units 1, 2, and 3 during 2006 of approximately 3,004 MMscf/year is less than 50 percent of the average fuel use during the period from 2002 to 2005. If this baseline period is required by the SDAPCD for the existing units, then the proposed project will trigger NSR emission offsets requirements for NOx (the net emission increase for VOC would remain below the NSR offset trigger level). The Applicant currently controls approximately 37.6 tons/year of NOx emission reduction credits (ERCs) that will be used for the proposed project if necessary. If additional NOx ERCs are needed to comply with SDAPCD NSR requirements, the Applicant will obtain these ERCs on the open market.

With regard to compliance with CEQA mitigation requirements, air quality benefits associated with the shutdown of the existing Units 1, 2, and 3 are not limited and/or regulated by the SDAPCD NSR regulations. As shown on AFC Table 5.1-38, if a 10-year look back is used to develop the baseline emission levels for Units 1, 2, and 3, the emission reductions for the shutdown of these units fully mitigates both the

ozone and PM_{10} precursors for the proposed project. AFC Tables 5.1B-12 and 5.1B-13 provide additional details regarding the baseline emission levels calculated for the existing units using the 10-year look back period. A 10-year look back to establish baseline emission levels for existing units is not unreasonable given that such a baseline period is generally allowed under the federal Prevention of Significant Deterioration (PSD) regulation (40 CFR 52.21) and New Source Review regulation (40 CFR 51.165), and given the possible increase in operation of the existing units due to the ongoing increase in demand for electrical generation in the project area.

7. Please discuss the amount of mitigation fees the applicant is willing to pay to the SDAPCD and the basis for calculating those fees.

Response: At this point in the process, the Applicant does not expect to pay any mitigation fees to the SDAPCD.

8. Please provide written confirmation from the District that shows that they agree with the emission reduction values identified in the AFC for the proposed Boilers 1 through 3 shutdown.

Response: The SDAPCD is in the process of reviewing the permit application package submitted on October 8, 2007. As part of this review, the SDAPCD will be reviewing the emission reduction calculations for the shutdown of the existing Units 1, 2, and 3 at the Encina Power Station. Once the Applicant receives written confirmation from the SDAPCD on this issue, copies of this confirmation will be submitted to the CEC Dockets office and CEC project manager for CECP.

9. Please provide written confirmation from the District that they will allow the boiler shutdown to occur after the start of commercial operation, rather than before first turbine fire.

Response: The SDAPCD is in the process of reviewing the permit application package submitted on October 8, 2007. As part of this review, the SDAPCD will be reviewing the timing of the shutdown of the existing Units 1, 2, and 3 at the Encina Power Station. As discussed in Section 5.1.6.2.2 of the AFC for the proposed project, it is possible that there could be a six-month stagger between the initial commercial operation dates of the two new gas turbines. Therefore, there may be a corresponding staged shutdown of the existing Units 1, 2, and 3, with Unit 1 shutting down upon the commercial operation date of the first new gas turbine, followed by the shutdown of Units 2 and 3 upon the commercial operation date of the second new gas turbine. It is likely that the PDOC and/or FDOC will include permit conditions regarding the required shutdown of Units 1, 2, and 3, including facility-total emission rates. Copies of these documents will be submitted to the CEC Dockets office and CEC project manager for CECP.

Background: Construction – Worst Case Conditions

The AFC, pg 2-17, indicates that some construction activities may occur 24 hours per day and 7 days per week, while the construction impact modeling assumed a schedule of 9 hours per day and 5 days per week. Staff needs additional information

from the applicant to ensure that the worst case construction emissions conditions were estimated and modeled.

Data Request

10. Please describe the types of construction activities and related emissions, if any, that could occur 24 hours per day and 7 days per week.

Response: The need to change from the construction schedule of 9 hours per day/5 days per week to a longer period of up to 24 hours per day/7 days per week will depend on situations that arise during the construction/commissioning of the proposed project. There could be three or four of these construction recovery periods during the construction/commissioning of the proposed project, with each of these periods lasting up to two weeks. During these periods, the amount of construction activity and corresponding emissions could nearly double on a daily basis. However, this type of construction recovery is not expected to occur during the early part of the construction schedule (Months 1 through 3), which is the peak period for construction activities/construction emissions. In addition, such construction recovery periods will be significantly limited and/or prohibited by noise mitigation requirements of the City of Carlsbad.

11. Please demonstrate that the 24/7 construction activities would not create higher daily emissions or higher short-term impacts (1, 3, 8, and 24 hour) than result from the worst-case conditions used in the construction emission estimate and modeling analysis.

Response: As discussed in Appendix 5.1E of the AFC for the proposed project, the maximum daily emissions and associated short-term ambient impacts are expected to occur during Month 2 of the construction schedule when a number of construction activities will be occurring simultaneously (i.e., removal of intermediate berms, installation of reclaim water pipeline, and site preparation). As discussed in Response Number 10, the 24/7 construction period is not expected to occur during the early months of the construction schedule. Consequently, the 24/7 construction period is not expected to affect the maximum daily construction emissions or short-term construction modeling results for the proposed project.

Background: Construction Emissions Dispersion Modeling

The applicant's construction emission dispersion modeling analysis, using the ISCST3 model with the NOx ozone limiting method (NOx_OLM), predicts offsite impacts that are higher than the NO_2 1-hour standard. The model and modeling method can be improved using modeling methods similar to those that were used for the operation modeling (AERMOD with Plume Volume Molar Ratio Method [PVMRM] for 1-hour NO_2 impact determination), along with the use of concurrent NO_2 hourly background data rather than use of a single maximum background value. Staff needs the applicant to remodel the construction 1-hour NOx emissions using these improved modeling methods to determine a more reasonable worst-case maximum impact. Staff also needs additional information to assess the volume source height and area source size used in the construction modeling analysis.

Data Request

12. Please provide a revised 1-hour NOx modeling analysis for construction using AERMOD with PVMRM that uses both hourly ozone and concurrent hourly NO2 background to determine the maximum hourly NOx impacts.

Response: The use of the ISCST3 model to analyze ambient impacts for construction activities was clearly specified in both the June 28, 2007 and revised August 9, 2007 modeling protocols for the CECP submitted by the Applicant to the SDCAPCD. Copies of both of these modeling protocols were submitted to the CEC. Since this is the first objection that the Applicant has received from the CEC regarding the use of the ISCST3 model to analyze construction impacts for the proposed project, the Applicant does not believe it is equitable at this point in the process for the CEC to require the use of the AERMOD model to analyze construction impacts. In addition, as recently as the November 29, 2007 Preliminary Staff Assessment for the Humboldt Bay Repowering Project (06-AFC-7), the CEC staff has accepted the use of the ISCST3 model to analyze construction impacts.

13. Please describe the derivation of the area source height (6 meters) used for the construction equipment exhaust emission modeling and used for the equipment caused fugitive dust emission modeling. In particular, staff would like to know why the same value was used for both equipment and fugitive dust emissions.

Response: For the construction modeling performed for the proposed project, volume sources with a height of 6 meters were used for construction equipment exhaust and construction equipment mechanically generated dust emissions. For dust generated from wind erosion, area sources were used with a release height of 0.5 meters. The 6-meter height for volume sources used to analyze impacts from construction activities (including mechanically generated dust emissions from construction equipment) was first developed by the CEC staff for an analysis performed for the Preliminary Staff Assessment for the Walnut Energy Center (02-AFC-4). Based on this approach developed by the CEC staff, Sierra Research has performed several construction impact analyses using volume sources with a height of 6 meters (to analyze combustion and mechanically generated dust emissions) including the revised analysis performed for the Walnut Energy Center, Modesto Irrigation District Generating Station at Ripon (03-SPPE-1), Los Esteros 2 Power Plant (03-AFC-2), San Francisco Electric Reliability Project (04-AFC-1), and Humboldt Bay Repowering Project (06-AFC-7). The CEC has reviewed and approved all of these construction modeling analyses.

14. Please confirm staff's estimate of 40,383 square meters as the size of the polygon area source used to model the wind caused fugitive dust in the construction modeling analysis.

Response: This area is very close to the 40,412 square meter area source size used by the Applicant to model dust emissions from wind erosion.

Background: Construction Modeling – Annual Emissions

The AFC and the modeling analysis are inconsistent regarding the construction annual emissions for NOx, PM10 and PM2.5. The AFC shows annual emissions of 18.04 tons of NOx, and the modeling analysis, per staff calculation using the 9 hours per day and five days per week construction schedule used in the model, indicates a value of 19.55 tons was modeled. There is a similar issue with the PM10 and PM2.5 construction equipment emissions and the PM10 fugitive dust emissions. Staff needs the applicant to confirm which emission values are correct.

Data Request

15. Please confirm the annual construction emission for NOx, PM10, and PM2.5.

Response: The annual construction emissions shown on Tables 5.1E-2 and 5.1E1-19 of the AFC are correct (i.e., 18.04 tons/year for NOx, 3.61 tons/year for PM_{10}, and 1.32 tons/year for $PM_{2.5}$). There is insufficient information in this data request to determine how the CEC staff calculated 19.55 tons/year of NOx based on construction modeling analysis performed as part of the AFC.

Background: Gas Turbine Screening Modeling Analysis

The screening level modeling analysis was described on page 5.1-40 to 5.1-42 of the AFC, and the results were summarized in Tables 5.1D-2, -3. However, the modeling input and output files for the screening level modeling analysis were not provided. Staff needs the applicant to provide these files to confirm the results of the screening modeling analysis.

Data Request

16. Please provide the modeling input and output files for the gas turbine screening modeling analysis.

Response: The gas turbine screening modeling files were inadvertently excluded from the files included on the air quality modeling CD submitted as part of the AFC for the proposed project. As discussed in the enclosed copy of the December 18, 2007 letter to the SDAPCD (see Attachment DR1-1), the modeling included as part of the AFC and SDAPCD 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 revised results are included in Attachment DR1-1. As part of this revised modeling, the gas turbine screening modeling was performed using the current version of AERMOD. The detailed modeling files for the revised modeling analysis are included on the enclosed modeling CD called "CECP Modeling Files."

Background: Startup and Initial Commissioning Modeling Analysis

The modeling analysis for startup and initial commissioning, unlike the modeling for normal operations, did not include modeling of the existing Encina Boilers 4 and 5 and the existing gas turbine. In order to determine the worst-case impacts from the

operation of the entire power generation site, staff needs the applicant to include the potential for the concurrent operation of all site emission sources.

Data Request

17. Please model the project startup and initial commissioning short-term emissions from the proposed project along with the other site emission sources (Boilers 4 and 5 and existing gas turbine) that may operate concurrently during turbine startup and during initial commissioning.

Response: Included in the attached CD-ROM titled "CECP Modeling Files" are the results of the requested modeling analysis of the short-term CO impacts associated with the startup of the proposed new gas turbines and the operation of existing Boilers 4 and 5 and the existing gas turbine. Also shown in Attachment DR17-1 is a similar analysis of the short-term CO impacts associated with the commissioning of the proposed new gas turbines and the operation of the existing units (Boilers 4 and 5, existing gas turbine). The short-term combined NO_2 impacts are not included for either gas turbine commissioning or startups due to an apparent error in the AERMOD dispersion model that Sierra Research has recently discovered. This apparent error in the AERMOD model occurs when the Plume Volume Molar Ratio Method (PVMRM) is used to correct NO_2 impacts for the combined impacts of the new gas turbines and the existing boilers. For certain hours during the year when the existing boilers are included in the analysis the PVMRM results are unrealistic. For example, simply adding the existing boilers to the analysis results in a significant increase in NO_2 impacts regardless of the emission rate for the boilers (NO_2 impacts increase significantly even if the boiler NOx emissions are virtually zero). Also the order in which the emission sources are listed in the model input file significantly impacts modeling results which is unreasonable. Sierra Research is in the process of working with the Environmental Protection Agency (EPA) to determine the reason for this apparent modeling anomaly. The requested modeling analysis for short-term NO_2 will be performed and the results submitted to the CEC as soon as this apparent modeling programming error is corrected. Please note that short term SO_2 and PM_{10} impacts are not shown in Attachment DR17-1 because ambient impacts for these pollutants during gas turbine startups and commissioning are not expected to be higher than impacts during normal operations.

Background: BACT Gas Turbine VOC Emissions

The AFC Section 5.1 notes proposed BACT emission levels for VOC to be 2.0 ppm, while the BACT analysis provided in Appendix 5.1C (Table 5.1C-4) provides a proposed BACT level for VOC to be 1.5 ppm. Staff needs the applicant to clarify the proposed BACT level for VOC.

Data Request

18. Please confirm the value of the proposed VOC BACT emission concentration level.

Response: As discussed in Section 5.1.7.3.2 of the AFC, the proposed BACT level for VOC is 2.0 ppmv @ 15% O_2. The VOC level of 1.5 ppmv @ 15% O_2 shown on Table 5.1C-4 of the AFC is a typographical error.

Background: Operating Emissions Assumptions – PM10 Emissions

The AFC and the modeling analysis are inconsistent regarding the gas turbine PM10 emissions. The AFC notes that the hourly PM10 emissions will be 9.5 lbs/hour, while the modeling analysis uses 10.0 lbs/hour. Staff needs to understand which emission level is being proposed and needs revision of the emission values or modeling results depending on which is the correct value.

Data Request

19. Please confirm the gas turbine PM10 hourly emissions limit.

Response: As shown on Table 5.1-20 of the AFC, the expected PM_{10} hourly emission level for the new gas turbines is 9.5 lbs/hour. The air quality modeling analysis was performed using a gas turbine PM_{10} emission rate of 10.0 lbs/hr. This was done to ensure modeled impacts from the proposed project are accounted for due to the remote chance that the final emission guarantee from Siemens for the proposed project has a PM_{10} emission rate of 10.0 lbs/hr, rather than the expected level of 9.5 lbs/hr. At this point, the Applicant expects Siemens to provide a guaranteed PM_{10} emission level of 9.5 lbs/hr.

20. Please revise facility PM10 emission calculations and all impacted emissions tables if the gas turbine PM10 emission limit should be 10.0 lbs/hour.

Response: As discussed in Response Number 19, the expected PM_{10} hourly emission rate for the gas turbines is 9.5 lbs/hr rather than 10.0 lbs/hr. The modeled ambient impacts for the proposed project conservatively overestimate impacts because they are based on a gas turbine PM_{10} emission rate of 10.0 lbs/hr.

Background: Fire Pump Engine Design

Staff believes that the fire pump engine should be a new engine meeting the latest available US Environmental Protection Agency (US EPA) and California Air Resources Board (CARB) non-road diesel engine emission standards. A Tier 2 compliant engine has been proposed by the applicant; however, for the engine size proposed and considering the time frame for construction, staff believes that a Tier 3 engine may be available prior to the necessary equipment purchase date. Staff needs the applicant to identify whether they would be willing to stipulate to the use of a Tier 3 engine, if such engines are available prior to the necessary engine purchase date.

Data Request

21. Please identify whether the applicant would be willing to stipulate to using a Tier 3 compliant fire pump engine if such engines are available in time for purchase.

Response: The Applicant will select a Tier 3 compliant fire pump engine for the CECP provided that such an engine is commercially available early enough during the project final design/procurement process to be incorporated into the project.

Background: Source Test Port Compliance

Staff has not found any information regarding the location of the source test ports for this project. Due to the relatively low stacks and large stack diameters, staff has concerns regarding the effectiveness of EPA Method 1 compliance and source test and continuous emission monitoring accuracy. Furthermore, there are concerns regarding potential safety issues if the test ports and platforms are located too close to the top of the stacks. Staff needs additional information from the applicant to assess compliance with relevant stack test port regulations.

Data Request

22. Please identify the height of the stack test ports and stack test platform.

Response: The test ports will be located approximately 10 feet below the top of the exhaust stack. This location is approximately one-half a stack diameter upstream of the exhaust exit and approximately 2 feet downstream of the top of the heat recovery steam generator transition to the stack. At this location it may be necessary to install two, rather than four, test ports due to the limited space available. Two test ports would increase the length of the test probe needed for stack testing. The Applicant is in the process of preparing a testing/monitoring plan for the proposed project that will be submitted to the SDAPCD for approval (with a copy being submitted to the CEC). In this plan, the Applicant will provide further details regarding the number and location of test ports.

23. Please discuss the stack port's location compliance with U.S.EPA Method 1 requirements.

Response: Because the test port locations discussed in Response Number 22 would not meet the minimum requirement under U.S. EPA Method 1 for the "simplified procedure" of two stack diameters downstream and one-half stack diameter upstream of any flow disturbance (40 CFR 60, Appendix A, Method 1, Section 1.2), the alternative sampling location procedure will be developed in accordance with EPA Method 1 (40 CFR 60, Appendix A, Method 1, Section 11.5). This issue will be addressed in more detail in the testing/monitoring plan that is being developed for the proposed project.

24. a. Please discuss additional source test procedures (i.e. cyclonic flow testing) that might be necessary due to the test port location to ensure that both source testing and continuous monitoring results are accurate.

Response: The alternative test procedure due to possible cyclonic flow is discussed in Response Number 23 regarding the alternative sampling location procedure allowed under EPA Method 1. With regards to the proper operation of a continuous emissions monitoring (CEM) system, cyclonic flow would not be an issue because stack exhaust flow rates are calculated using fuel flow rates and an EPA Method 19 type exhaust flow calculation procedure. For a CEM system and gaseous pollutant source test method like EPA Method 7E, a possible issue is concentration stratification. A multi-hole sampling probe is a solution to concentration stratification for a CEM system. For a gaseous pollutant source test method like EPA

Method 7E, an increased number of sampling traverse points is required to deal with concentration stratification (see 40 CFR 60, Appendix A, Method 7E, Section 8.1.2). This issue will be addressed in more detail in the testing/monitoring plan that is being developed for the proposed project.

b. Please discuss the potential for long-term problems with source test/monitoring accuracy for this stack/port configuration.

Response: Provided that the alternative monitoring/sampling methods are used as discussed in Response Number 24.a, the Applicant does not expect any long-term problems with source test/monitoring accuracy.

25. Please discuss the potential for the source test platform location to create an undue safety hazard to source test personnel or negatively impact source test equipment performance or method compliance if the base of the source test platform is proposed to be less than 15 feet from the top of the stack (i.e. from stack tip downwash, etc.).

Response: The source test platform and location of source test ports will need to comply with applicable requirements under the SDAPCD Rule 19 (Provision of Sampling and Testing) and Occupational Safety and Health Administration (OSHA) regulations. This issue will be addressed in more detail in the testing/monitoring plan that is being developed for the proposed project.

Background: Air Quality Permit Application

A Determination of Compliance (DOC) analysis from the District will be needed for staff's analysis. The application for the DOC has been submitted to the District. Staff will need to coordinate with the District to keep apprised of any air quality issues determined during their permit review.

Data Request

26. Please provide copies of any permit application materials, other than AFC materials, submitted to the District.

Response: The following documents have been submitted thus far to the SDAPCD for the project:

- Two modeling protocols (June 28, 2007 and revised August 9, 2007)
- Application for an authority to construct (September 12, 2007)
- Letter to Steve Moore with SDAPCD (October 10, 2007)

Copies of these documents have been previously submitted to the CEC Dockets office.

27. Please provide copies of any subsequent submittals to or from the District within 5 days of their submittal to or their receipt from the District.

Response: The Applicant will submit copies of these documents to the CEC when they are available and within the required time period.

ATTACHMENT DR1-1

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 $\mu g/m^3$ (2^{nd} maximum) during 2004 and 43 $\mu g/m^3$ (2^{nd} maximum) during 2006. No 2^{nd} 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.

[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

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

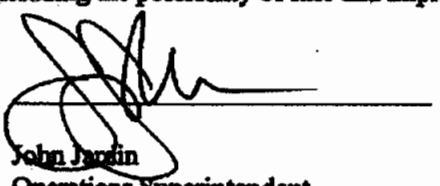
1. Currently performing a study to identify manganese levels in our service area.

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 Jansin
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*

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 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: Tony 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

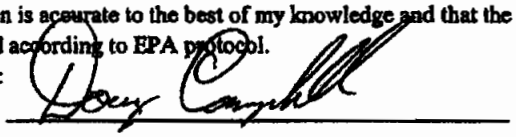
REPORT FREQUENCY: QUARTERLY | SAMPLING POINT: CCT EFFLUENT

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: 

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: Doug Campbell

QUARTERLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

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

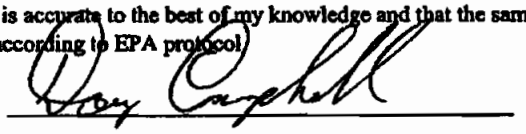
REPORT FREQUENCY: QUARTERLY SAMPLING POINT: CCT EFFLUENT

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: 

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 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 DUE: FEBRUARY 1, 2007

REPORT FREQUENCY: QUARTERLY SAMPLING POINT: CCT EFFLUENT

SAMPLES COLLECTED BY: JOEL CAMARILLO 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: Gary Campbell

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: Stacy Campbell

MONTHLY MONITORING REPORT

CARLSBAD WATER RECYCLING FACILITY

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

REPORT FREQUENCY: MONTHLY **SAMPLING POINT: CCF EFFLUENT**

SAMPLES COLLECTED BY: CONTINUOUS **SAMPLES ANALYZED BY: EMCINA STAFF**

MONTHLY CONTINUOUS NTU MONITORING

Date and Time Stamp		(NTU)	Date and Time Stamp		(NTU)
12/2/2006	09:28:58	1.50	12/7/2006	09:32:52	1.00
12/01/2006	00:02:58	1.10	12/7/2006	00:32:52	1.00
12/2/2006	01:02:58	1.20	12/7/2006	01:32:52	1.00
12/2/2006	01:32:58	1.30	12/7/2006	01:32:52	1.00
12/01/2006	02:32:58	0.00	12/7/2006	02:32:52	1.00
12/2/2006	02:32:58	1.20	12/7/2006	02:32:52	1.00
12/2/2006	03:02:58	1.20	12/7/2006	03:02:52	1.00
12/2/2006	04:02:58	1.30	12/7/2006	04:32:53	1.00
12/2/2006	04:32:58	1.00	12/7/2006	04:32:53	1.30
12/2/2006	05:02:58	1.00	12/7/2006	05:02:53	1.00
12/2/2006	05:32:58	1.00	12/7/2006	05:32:53	1.00
12/2/2006	06:02:58	0.00	12/7/2006	06:02:53	1.00
12/2/2006	06:32:58	0.00	12/7/2006	06:32:53	1.00
12/2/2006	07:02:58	0.00	12/7/2006	07:02:53	1.00
12/2/2006	07:32:58	0.00	12/7/2006	07:32:53	1.00
12/2/2006	08:02:58	0.00	12/7/2006	08:02:53	1.00
12/2/2006	08:32:58	0.00	12/7/2006	08:32:53	1.00
12/2/2006	09:02:58	0.00	12/7/2006	09:02:53	1.00
12/2/2006	09:32:58	0.00	12/7/2006	09:32:53	1.00
12/2/2006	10:02:58	0.00	12/7/2006	10:02:53	1.00
12/2/2006	10:32:58	0.00	12/7/2006	10:32:53	1.00
12/2/2006	11:02:58	0.00	12/7/2006	11:02:53	1.00
12/2/2006	11:32:58	0.00	12/7/2006	11:32:53	1.00
12/2/2006	12:02:58	0.00	12/7/2006	12:02:53	1.00
12/2/2006	12:32:58	0.00	12/7/2006	12:32:53	1.00
12/2/2006	13:02:58	0.00	12/7/2006	13:02:53	1.00
12/2/2006	13:32:58	0.00	12/7/2006	13:32:53	1.00
12/2/2006	14:02:58	0.00	12/7/2006	14:02:54	0.90
12/2/2006	14:32:58	0.00	12/7/2006	14:32:54	0.00
12/2/2006	15:02:58	0.00	12/7/2006	15:02:54	0.00
12/2/2006	15:32:58	1.10	12/7/2006	15:32:54	0.90
12/2/2006	16:02:58	1.70	12/7/2006	16:04:00	0.00
12/2/2006	16:32:58	1.80	12/7/2006	17:04:00	0.00
12/2/2006	17:02:58	2.00	12/7/2006	17:34:00	0.90
12/2/2006	17:32:58	2.00	12/7/2006	18:34:00	0.00
12/2/2006	18:02:58	1.80	12/7/2006	18:54:00	0.00
12/2/2006	18:32:58	1.30	12/7/2006	19:34:00	0.90
12/2/2006	19:02:58	1.80	12/7/2006	19:54:00	0.00
12/2/2006	19:32:58	1.40	12/7/2006	20:34:00	0.90
12/2/2006	20:02:58	2.00	12/7/2006	20:54:00	0.70
12/2/2006	20:32:58	2.00	12/7/2006	21:34:00	0.70
12/2/2006	21:02:58	2.30	12/7/2006	21:54:00	0.70
12/2/2006	21:32:58	1.20	12/7/2006	22:34:00	0.70
12/2/2006	22:02:58	2.10	12/7/2006	22:54:00	0.70
12/2/2006	22:32:58	1.30	12/7/2006	23:34:00	0.70
12/2/2006	23:02:58	1.40	12/7/2006	23:54:01	0.70
12/2/2006	23:32:58	1.40			

Date and Time Stamp		DNTU
12/8/2006	00:24:01	0.70
12/8/2006	00:34:01	0.80
12/8/2006	01:24:01	0.80
12/8/2006	01:34:01	0.80
12/8/2006	02:24:01	0.80
12/8/2006	02:34:01	0.70
12/8/2006	03:24:01	0.70
12/8/2006	03:34:01	0.80
12/8/2006	04:24:01	0.70
12/8/2006	04:34:01	0.80
12/8/2006	05:24:01	0.70
12/8/2006	05:34:01	0.80
12/8/2006	06:24:01	0.80
12/8/2006	06:34:01	0.80
12/8/2006	07:24:01	0.80
12/8/2006	07:34:01	0.80
12/8/2006	08:24:01	0.80
12/8/2006	08:34:01	0.80
12/8/2006	09:24:01	0.80
12/8/2006	09:34:02	0.80
12/8/2006	10:24:02	0.80
12/8/2006	10:34:02	0.80
12/8/2006	11:24:02	0.80
12/8/2006	11:34:02	0.80
12/8/2006	12:24:02	0.80
12/8/2006	12:34:02	0.90
12/8/2006	13:24:02	0.90
12/8/2006	13:34:02	0.80
12/8/2006	14:34:02	0.80
12/8/2006	14:54:02	0.80
12/8/2006	15:24:02	0.80
12/8/2006	15:34:03	0.80
12/8/2006	16:24:03	0.80
12/8/2006	16:34:02	0.80
12/8/2006	17:24:02	0.80
12/8/2006	17:34:02	0.80
12/8/2006	18:24:02	0.90
12/8/2006	18:34:02	0.80
12/8/2006	19:24:02	0.80
12/8/2006	19:34:02	0.80
12/8/2006	20:24:03	0.80
12/8/2006	20:34:03	0.80
12/8/2006	21:24:03	0.80
12/8/2006	21:34:03	0.80
12/8/2006	22:24:03	0.80
12/8/2006	22:34:03	0.80
12/8/2006	23:24:03	0.80
12/8/2006	23:34:03	0.80

Date and Time Stamp		DNTU
13/8/2006	00:24:03	0.80
13/8/2006	00:34:03	0.70
13/8/2006	01:24:03	0.70
13/8/2006	01:34:03	0.70
13/8/2006	02:24:03	0.80
13/8/2006	02:34:03	0.80
13/8/2006	03:24:03	0.80
13/8/2006	03:34:03	0.80
13/8/2006	04:34:03	0.80
13/8/2006	04:54:03	0.80
13/8/2006	05:24:03	1.00
13/8/2006	05:34:03	1.00
13/8/2006	06:34:03	0.80
13/8/2006	06:34:03	0.80
13/8/2006	06:54:04	0.80
13/8/2006	07:34:04	0.80
13/8/2006	07:54:04	1.00
13/8/2006	08:21:57	1.00
13/8/2006	09:14:52	0.80
13/8/2006	09:21:52	1.00
13/8/2006	09:51:52	1.00
13/8/2006	10:21:52	1.00
13/8/2006	10:51:52	1.00
13/8/2006	11:21:53	1.00
13/8/2006	11:31:53	1.00
13/8/2006	12:21:53	1.00
13/8/2006	12:51:53	1.80
13/8/2006	13:21:54	1.80
13/8/2006	13:31:54	1.80
13/8/2006	14:21:54	1.00
13/8/2006	14:51:54	1.80
13/8/2006	15:21:54	1.00
13/8/2006	15:51:54	1.80
13/8/2006	16:21:54	1.00
13/8/2006	16:51:54	1.00
13/8/2006	17:21:54	1.00
13/8/2006	17:51:54	1.00
13/8/2006	18:21:54	1.00
13/8/2006	18:51:54	1.00
13/8/2006	19:21:54	1.00
13/8/2006	19:51:55	1.00
13/8/2006	20:21:55	1.00
13/8/2006	20:51:55	1.20
13/8/2006	21:21:55	1.10
13/8/2006	21:51:55	1.10
13/8/2006	22:21:55	1.10
13/8/2006	22:51:55	1.10
13/8/2006	23:21:55	1.10
13/8/2006	23:51:55	1.10

Date and Time Stamp		(NTU)
12/11/2000	00:21:30	1.30
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12/11/2000	01:21:30	1.30
12/11/2000	01:51:30	1.40
12/11/2000	02:21:30	1.30
12/11/2000	02:51:30	1.30
12/11/2000	03:21:30	1.30
12/11/2000	03:51:30	1.30
12/11/2000	04:21:30	1.30
12/11/2000	04:51:30	1.30
12/11/2000	05:21:30	1.30
12/11/2000	05:51:30	1.30
12/11/2000	06:21:30	1.30
12/11/2000	06:51:30	1.30
12/11/2000	07:21:30	1.30
12/11/2000	07:51:30	1.30
12/11/2000	08:21:30	1.30
12/11/2000	08:51:30	1.30
12/11/2000	09:21:30	1.30
12/11/2000	09:51:30	1.30
12/11/2000	10:21:30	1.30
12/11/2000	10:51:30	1.30
12/11/2000	11:21:30	1.30
12/11/2000	11:51:30	1.30
12/11/2000	12:22:00	1.30
12/11/2000	12:52:00	1.30
12/11/2000	13:22:00	1.30
12/11/2000	13:52:00	1.30
12/11/2000	14:22:00	1.30
12/11/2000	14:52:00	1.10
12/11/2000	15:22:00	1.00
12/11/2000	15:52:00	1.00
12/11/2000	16:22:00	1.00
12/11/2000	16:52:00	1.00
12/11/2000	17:22:00	1.00
12/11/2000	17:52:00	1.00
12/11/2000	18:22:00	1.00
12/11/2000	18:52:00	1.00
12/11/2000	19:22:00	1.00
12/11/2000	19:52:00	1.00
12/11/2000	20:22:00	1.00
12/11/2000	20:52:00	1.00
12/11/2000	21:22:00	1.00
12/11/2000	21:52:00	1.00
12/11/2000	22:22:01	0.90
12/11/2000	22:52:01	0.90
12/11/2000	23:22:01	0.90
12/11/2000	23:52:01	0.90

Date and Time Stamp		(NTU)
12/16/2000	00:22:12	0.40
12/16/2000	00:52:12	0.40
12/16/2000	01:22:12	0.40
12/16/2000	01:52:13	0.40
12/16/2000	02:22:13	0.40
12/16/2000	02:52:13	0.40
12/16/2000	03:22:13	0.40
12/16/2000	03:52:13	0.40
12/16/2000	04:22:13	0.40
12/16/2000	04:52:13	0.40
12/16/2000	05:22:13	0.40
12/16/2000	05:52:13	0.40
12/16/2000	06:22:13	0.40
12/16/2000	06:52:13	0.40
12/16/2000	07:22:13	0.40
12/16/2000	07:52:13	0.40
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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@sempra utilities.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
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
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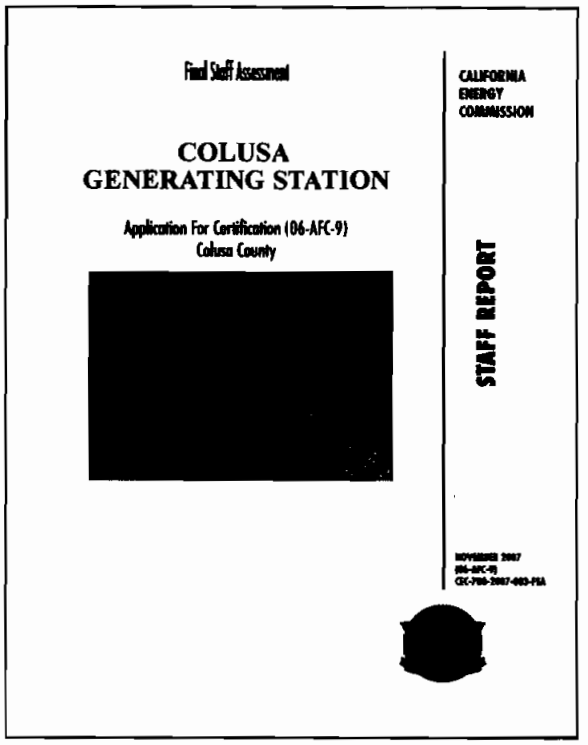

CALIFORNIA ENERGY COMMISSION

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

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Project Manager

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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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LIST OF TABLES AND FIGURES

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

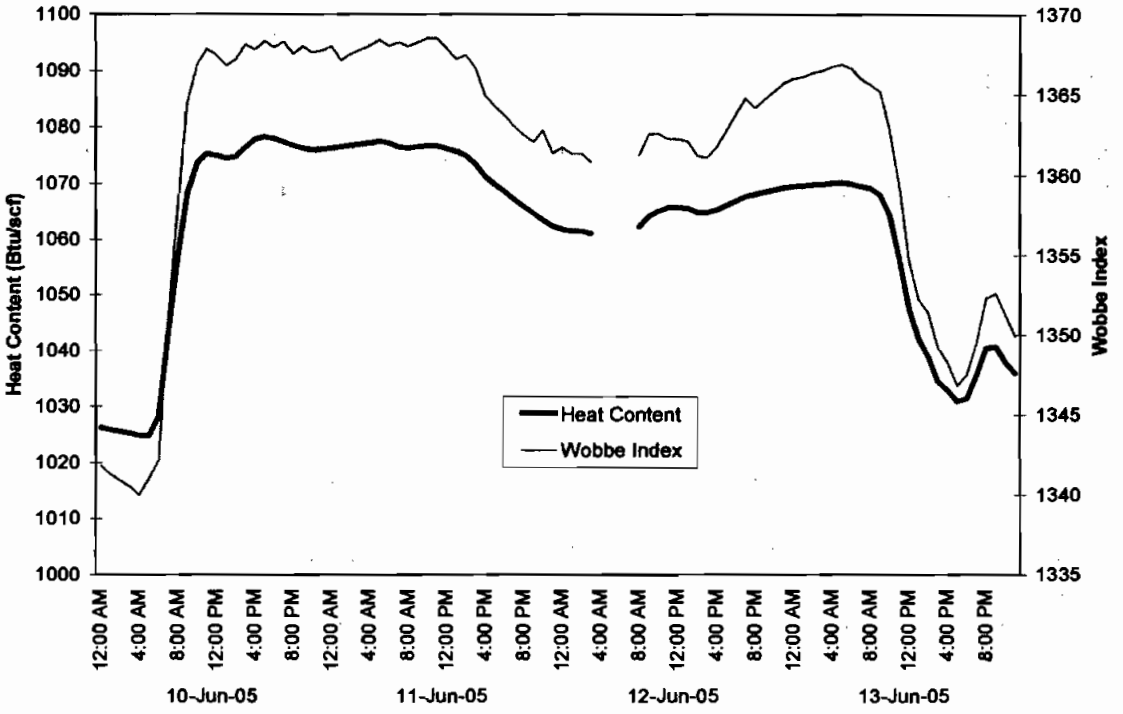
This study reports the testing results on emissions and performance of various electrical generating facilities in commercial operation that burned higher than normal heating value natural gas. During the second week of June 2005, a natural gas liquids extraction plant in Canada failed, which resulted 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

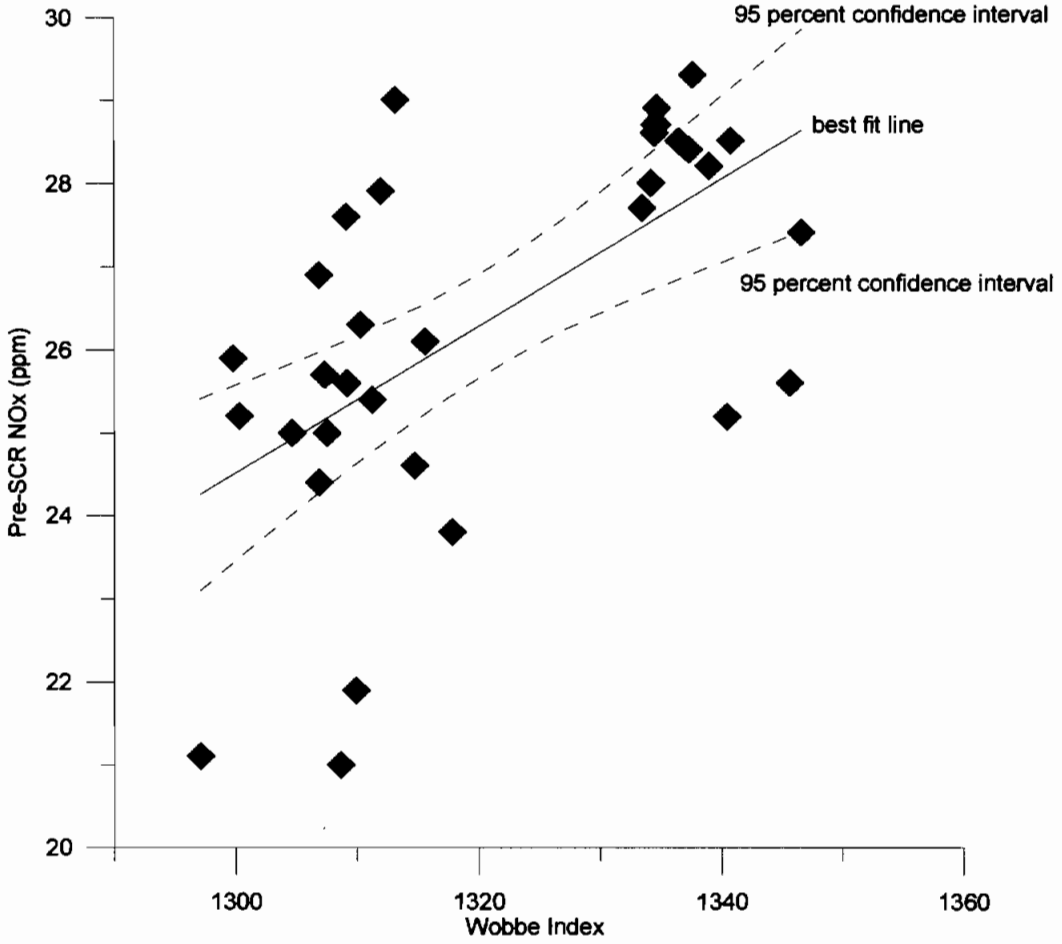
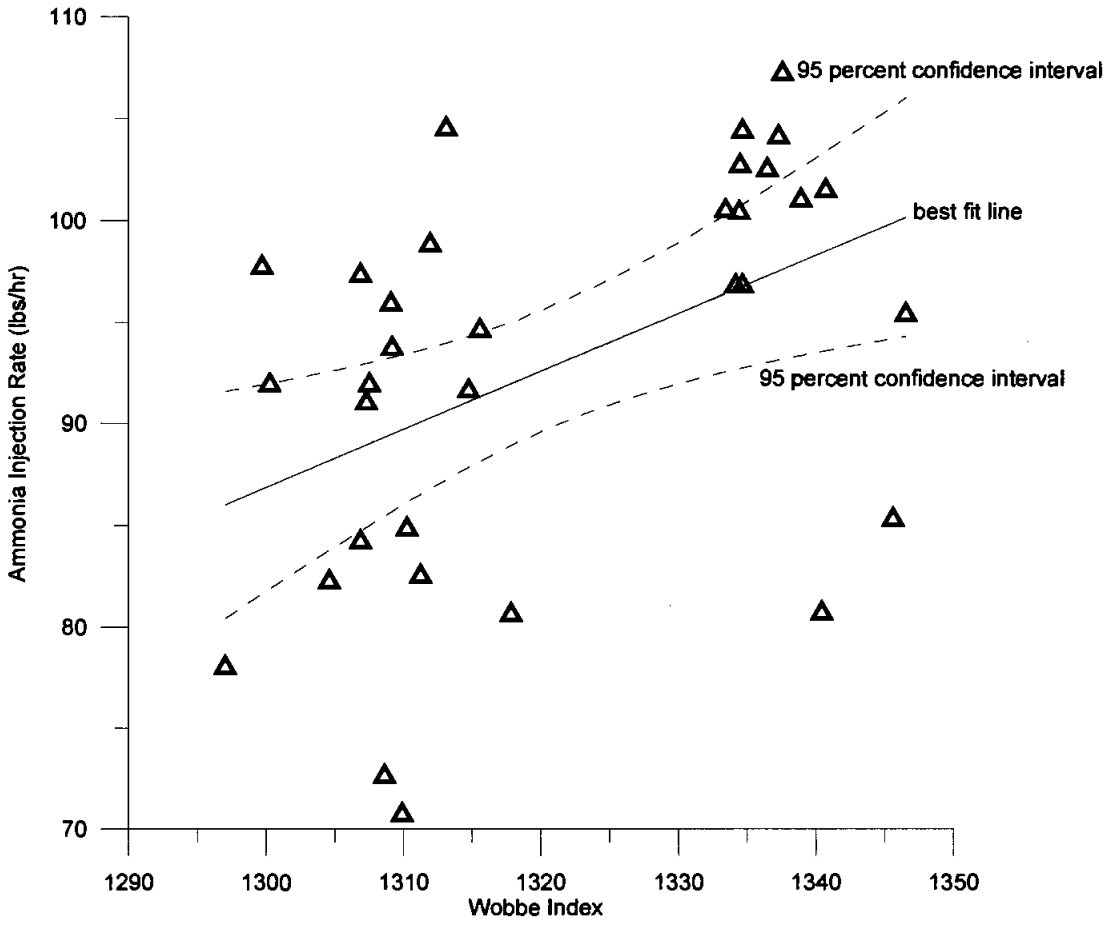


Figure ES-2 shows the best fit linear equation line with a 95 percent confidence interval for that fit. The high load interval presented in the figure is for high load hours that range in heat input from 1,700 and 1,800 million Btu per hour (MMBtu/hr). An approximate 15 percent increase in pre-SCR NOx 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

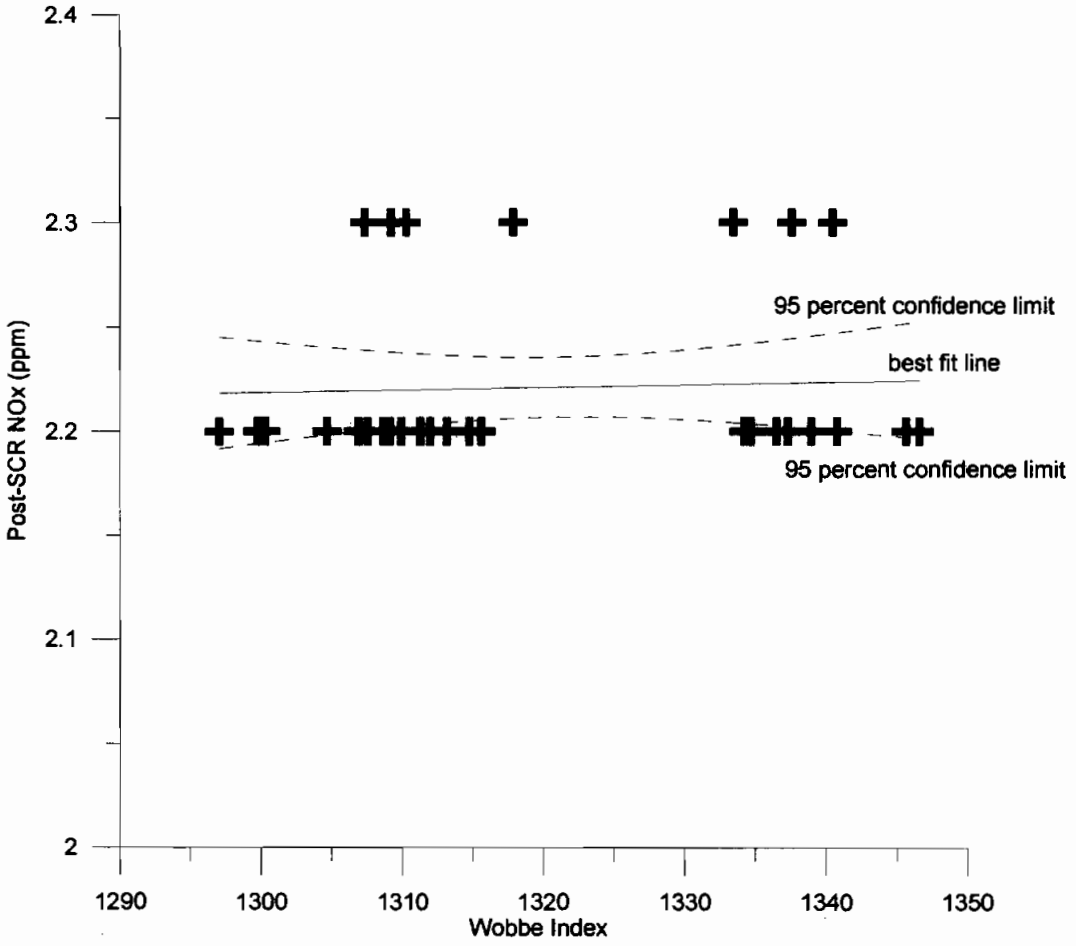


Figure ES-4 includes a best linear fit and a 95 percent confidence interval for that fit. No apparent trend in controlled NOx concentrations at the higher load interval is predicted. Additional data on controlled NOx concentrations for the other facilities are provided in Section 4.

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

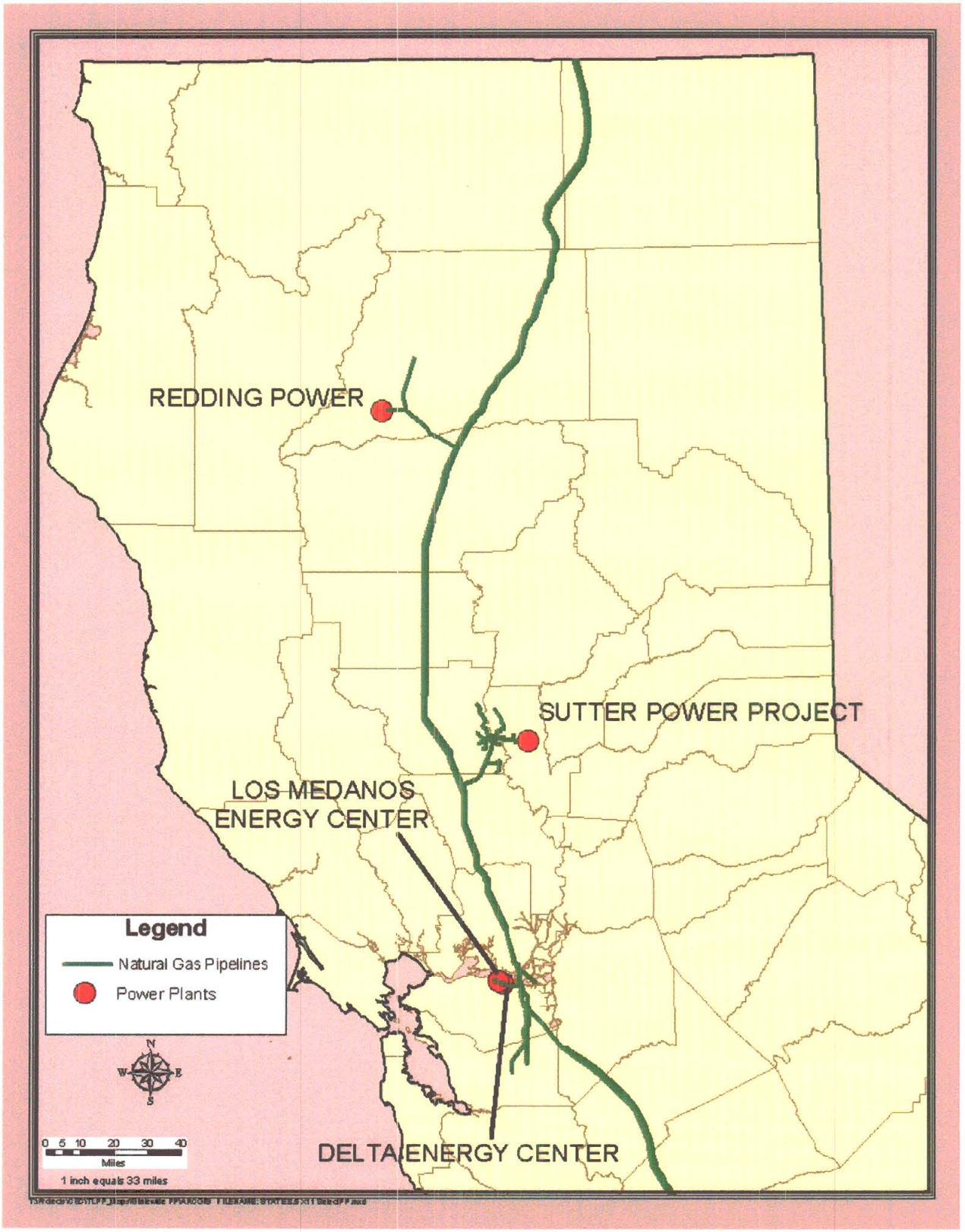
The data that were available and collected from each of the power facilities varied due to facility design and data access. A summary of the natural gas and facility operating data provided from each plant is provided in Table 1-1. The collected data are presented in Appendix A.

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

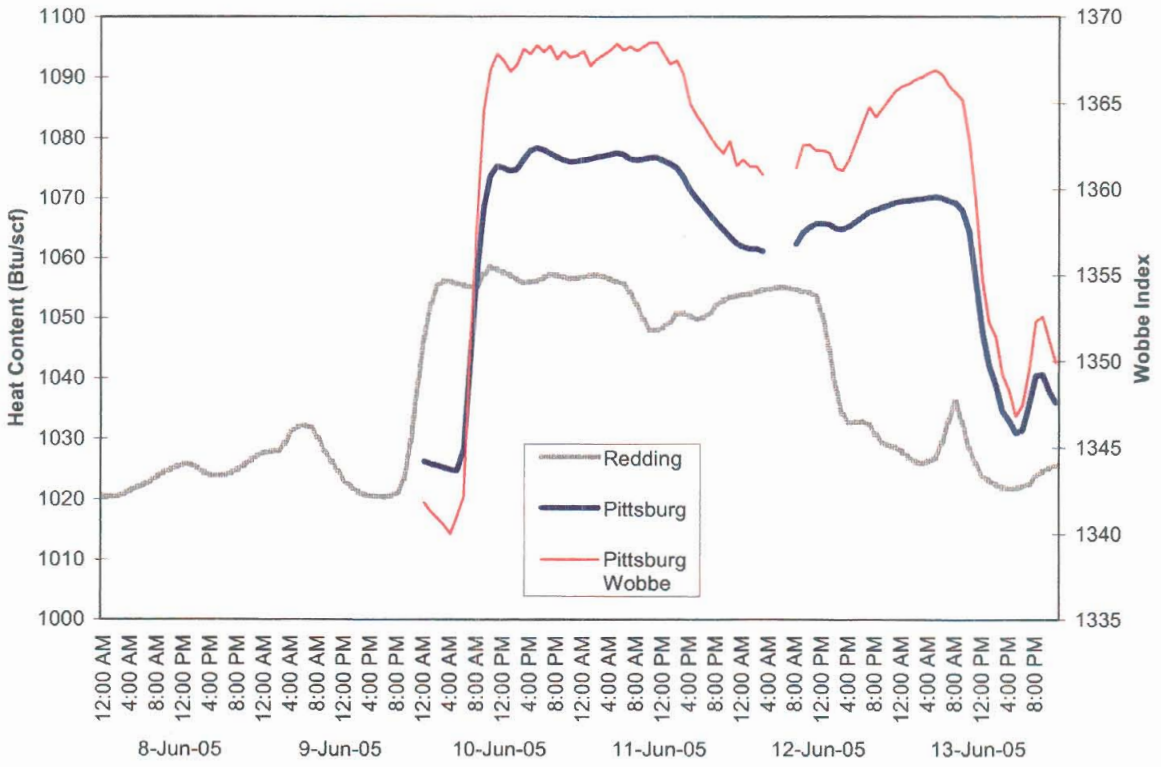
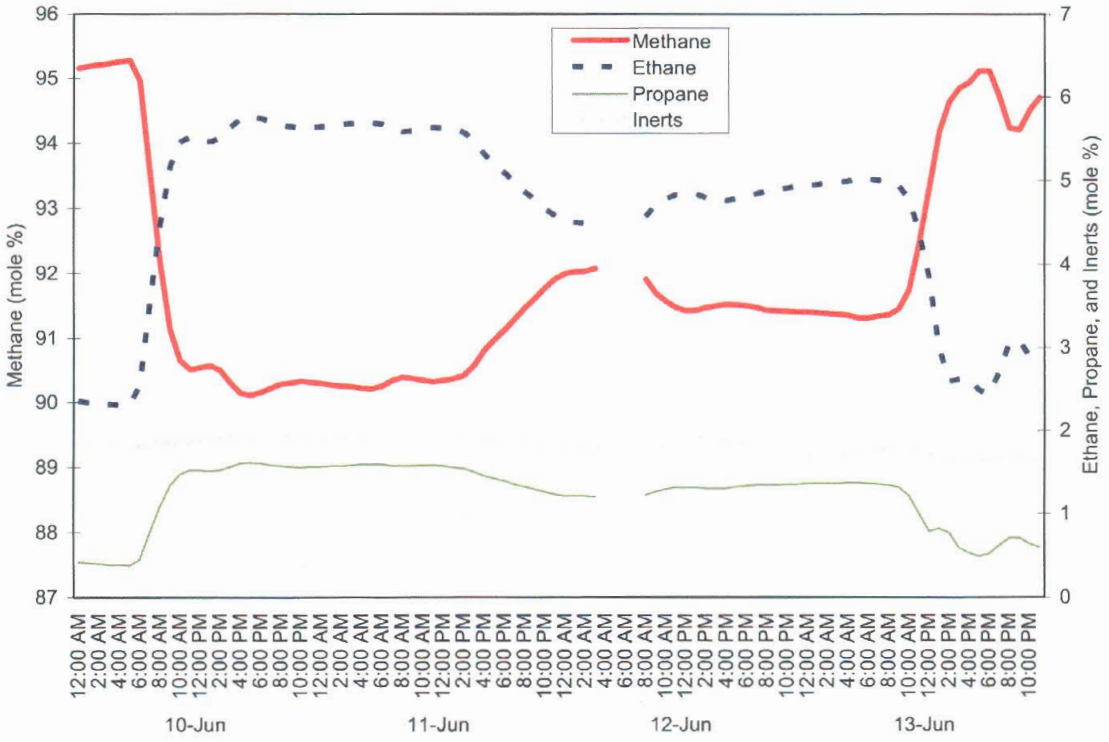


Figure 2-1 shows that the data for the excursion event at the two separate pipeline locations have a very similar shape with a time lag of several hours for the gas to

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

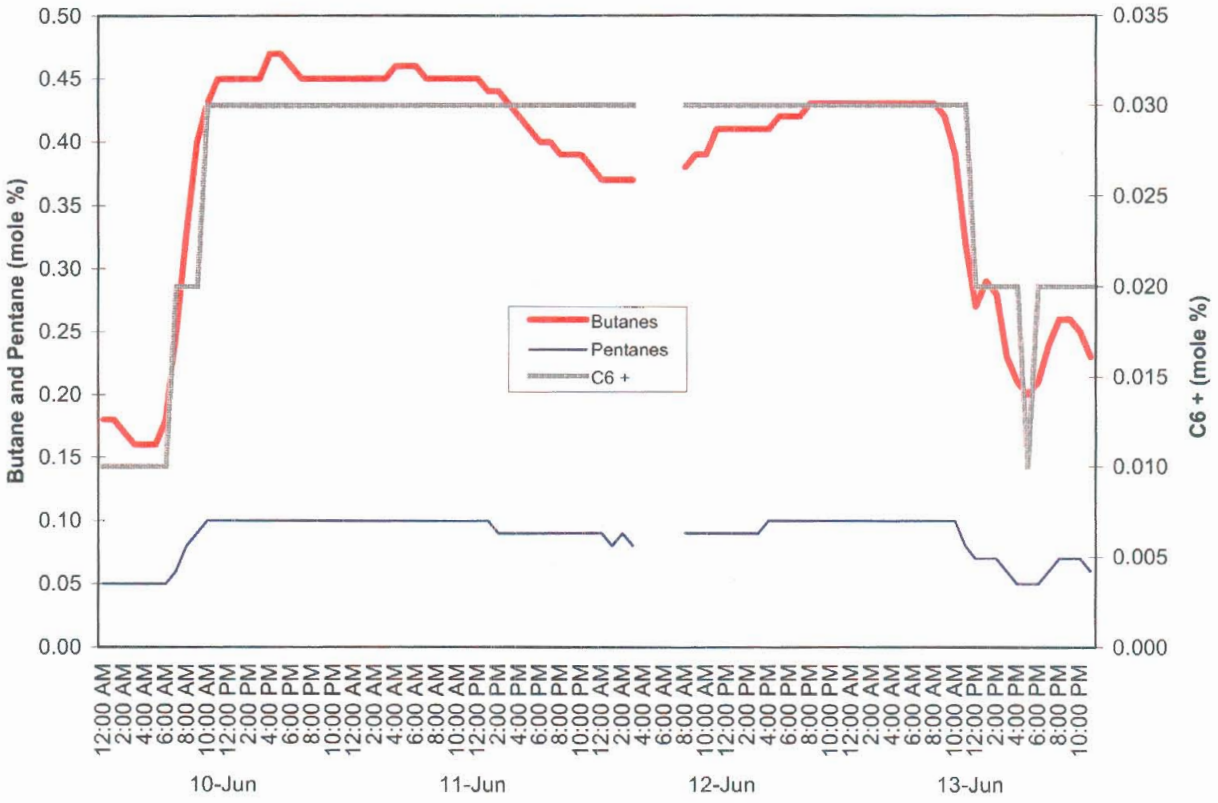


Figure 2-3, like Figure 2-2, shows an increase in the heavier hydrocarbon composition during the heat content excursion event. The total butane (i-butane and n-butane) and total C6 + hydrocarbon concentrations (hydrocarbons with six or more carbon molecules) essentially tripled during the excursion and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

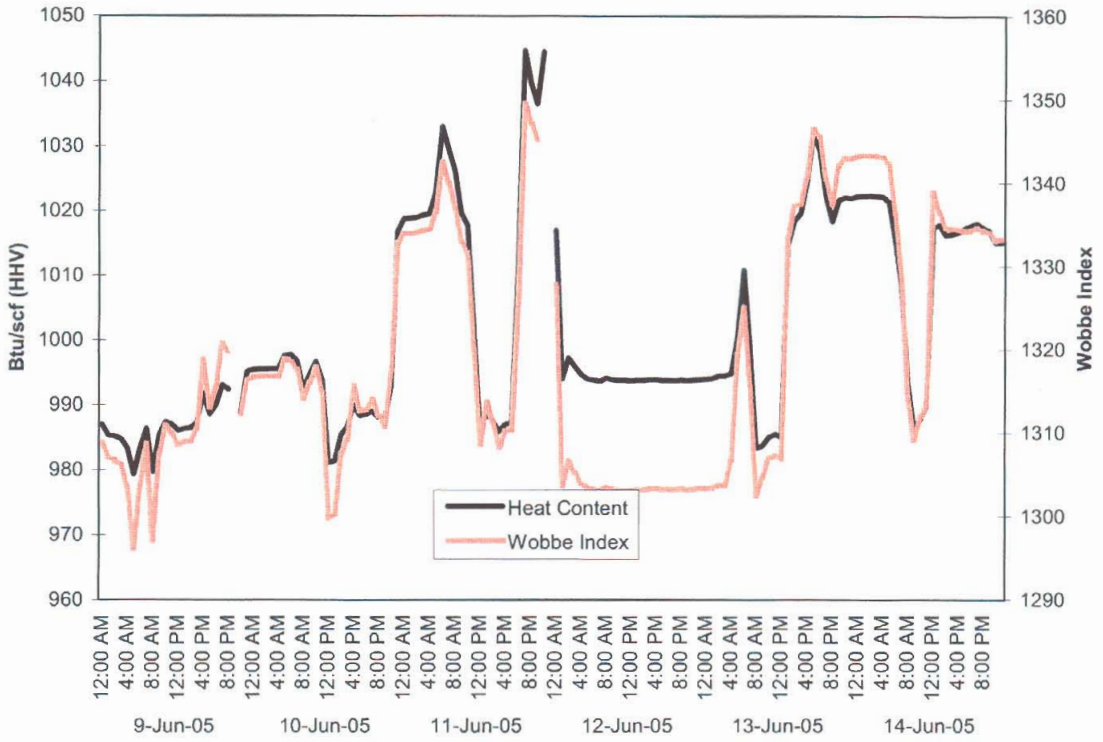


Figure 2-4 shows that the heat content and Wobbe index of the natural gas were variable during the excursion period and do not match the excursion event curve shown in Figure 2-1. The mixing of separate fuel sources allowed the Sutter facility to buffer the impact of the heat content excursion for most 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

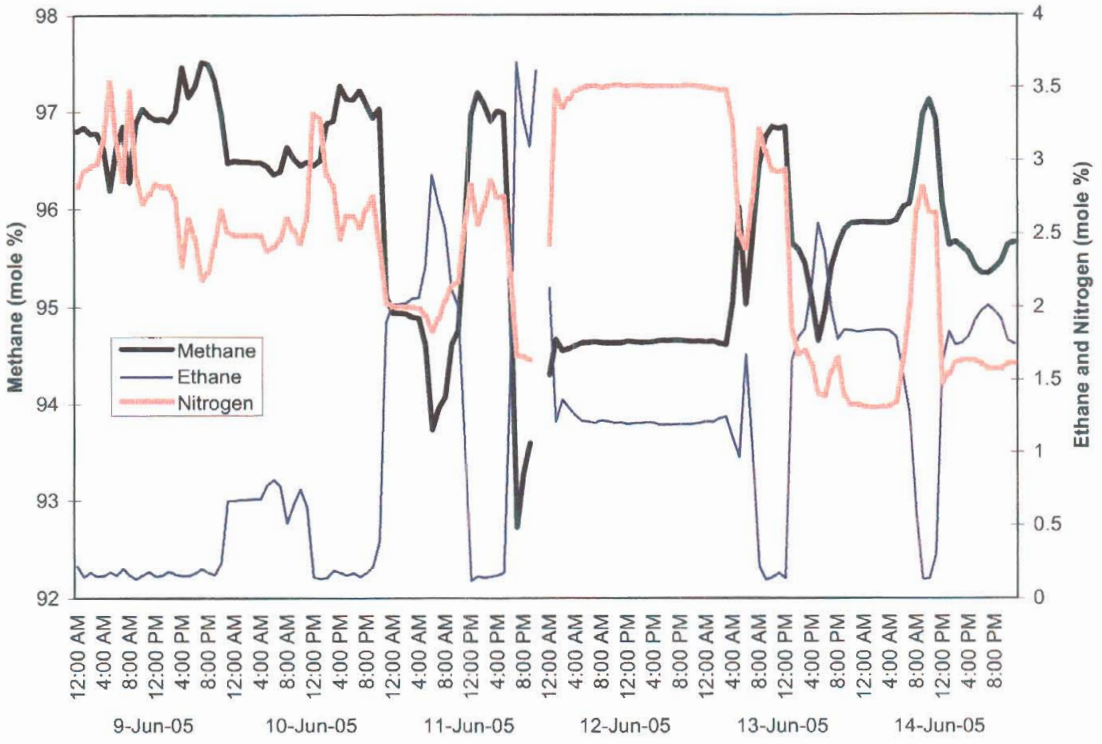
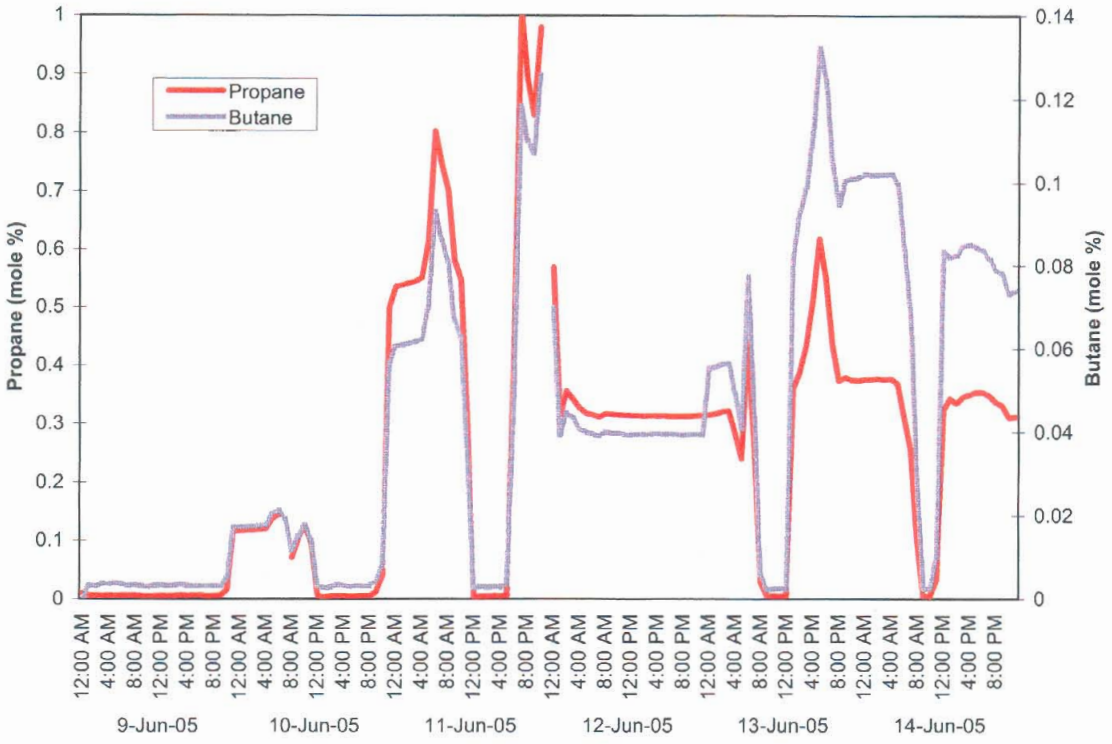


Figure 2-5 shows that the composition of the major components varied significantly during the excursion period. The variable mixture of different fuel sources created a highly variable fuel mix. The methane composition varies by almost 5 percent, the ethane composition varies from near 0 percent to over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

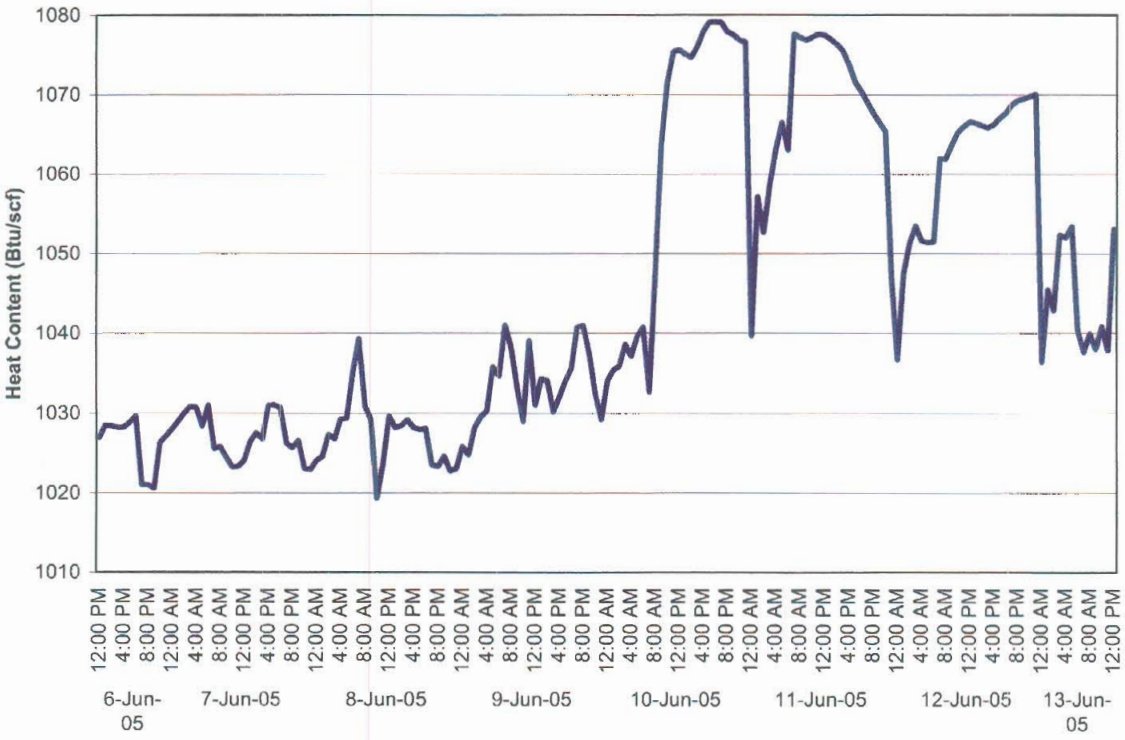


Overall, the monitored propane and butane concentrations at Sutter are significantly lower than the pipeline concentrations monitored at Pittsburg due to the fuel bending.

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

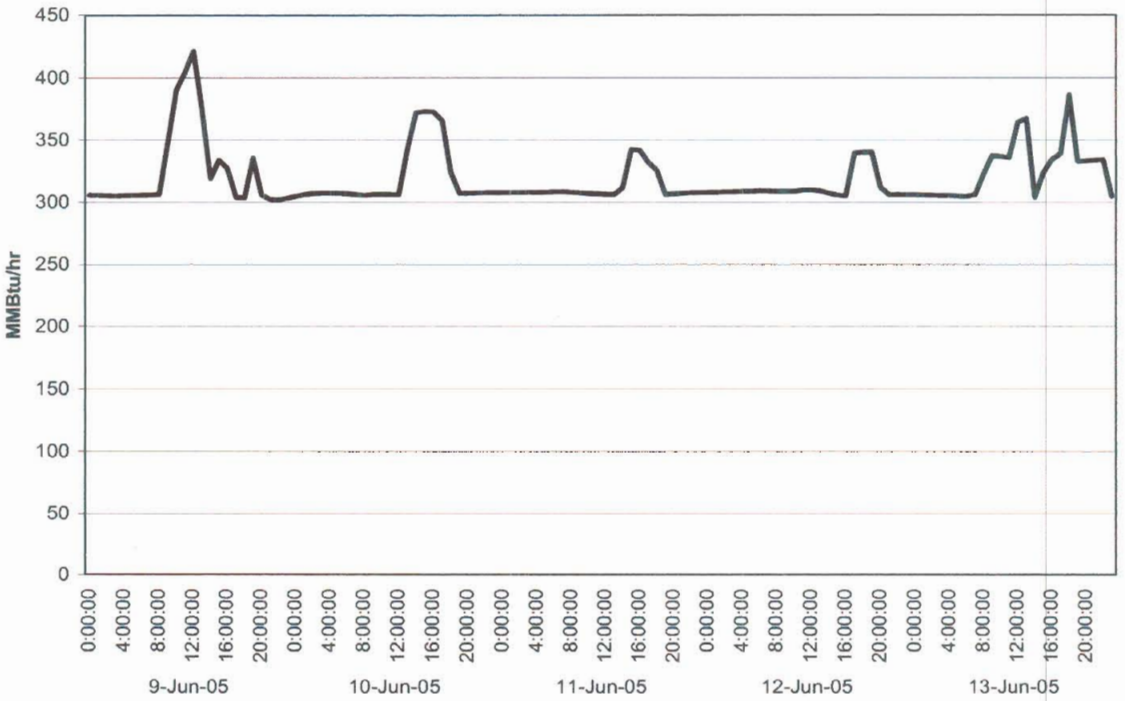
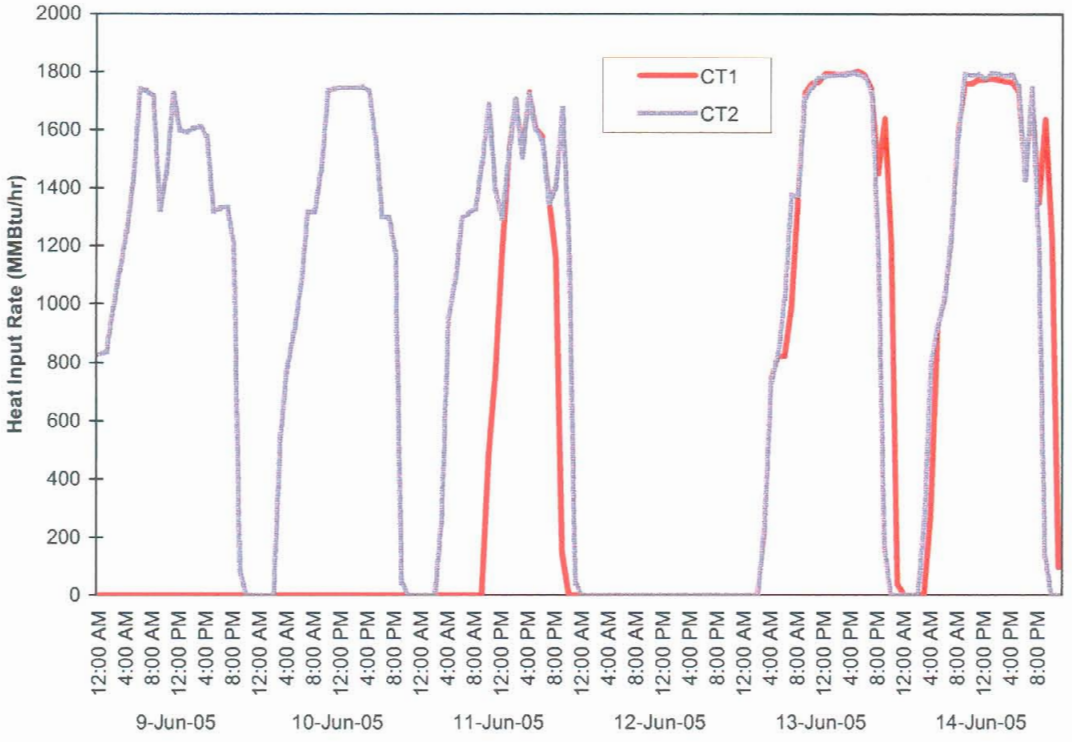


Figure 3-1 shows that the facility was running in a fairly consistent reduced load mode with daily increases in load during the afternoon. Less variable operating conditions are desired when determining the effect of the gas heat content increase on turbine operations. The more operating parameters that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

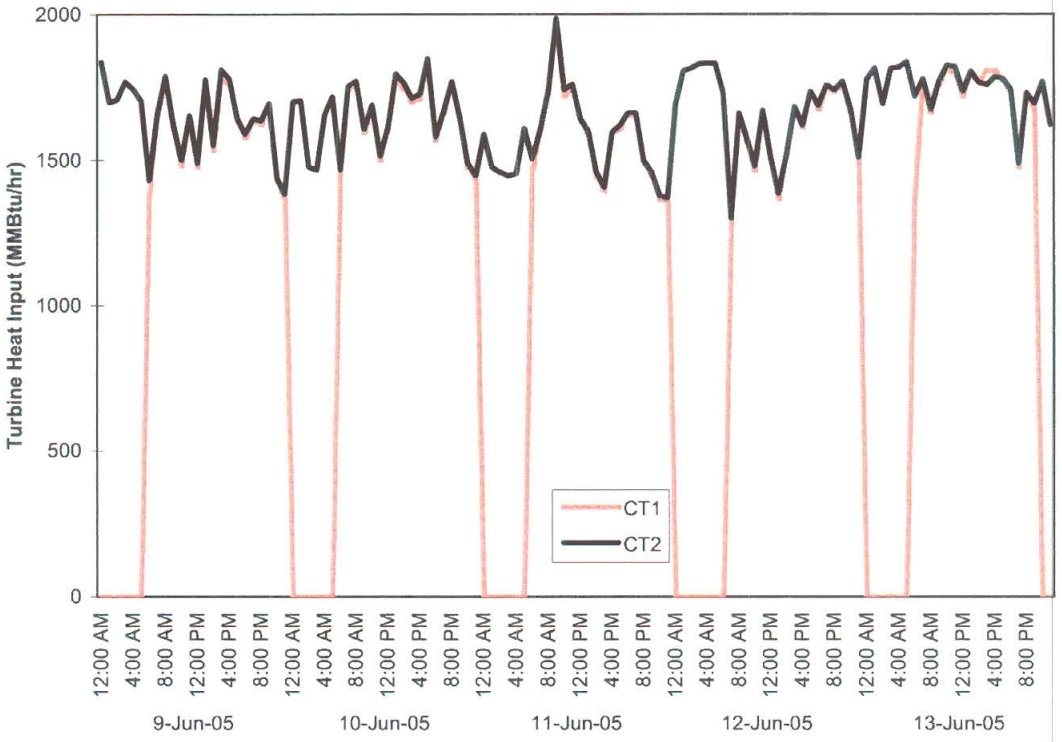


This figure shows that the Sutter facility operations were variable during the excursion period. However, there are three times when operations were consistent for a few hours at a time (on June 10, June 13, and June 14) that may provide some useful effects data. However, the rest of the period either 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

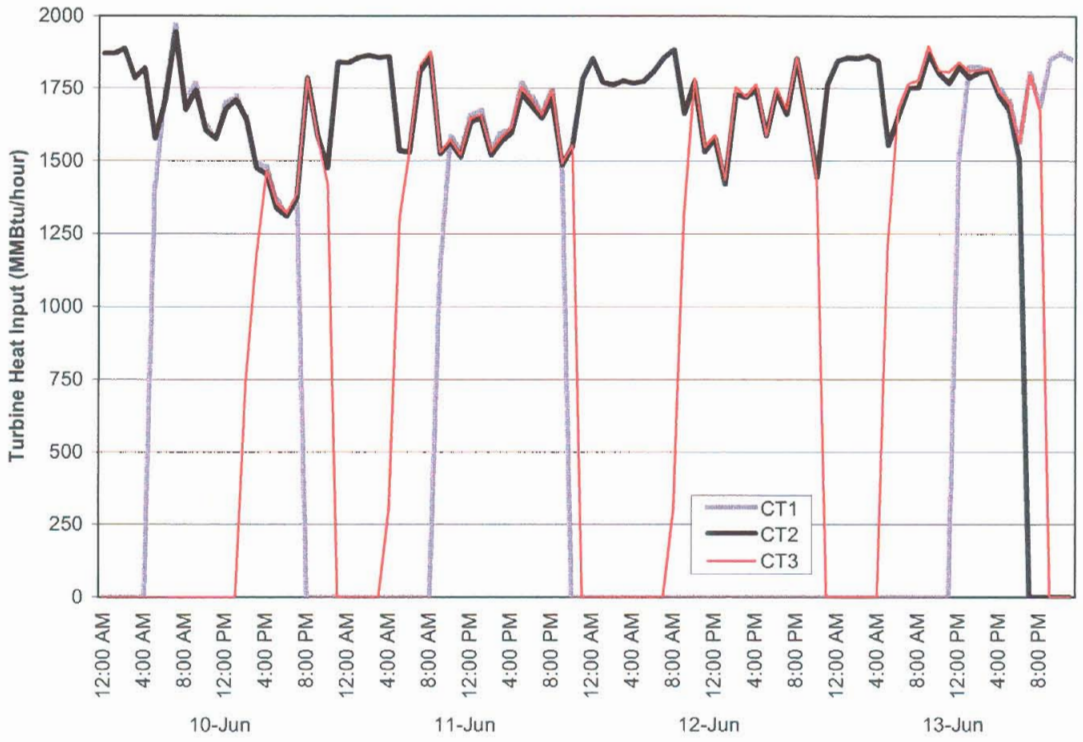


As shown in Figure 3-3, the load input of Turbine 2 (CT2), while somewhat variable, ranged between approximately 1300 and 2000 MM Btu/hr for the entire period of the heat content excursion, while Turbine 1 (CT1) underwent many startup/shutdown cycles during the period. The major limitation for using 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.

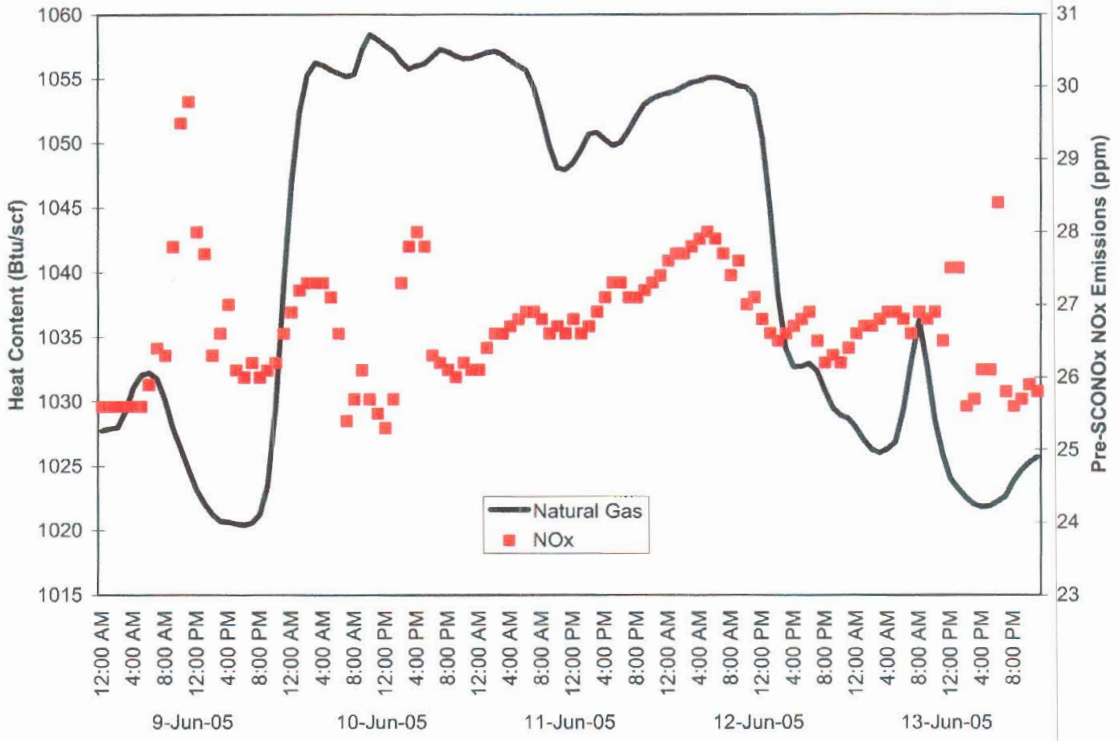
CHAPTER 4: OBSERVED EVENT EFFECTS

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

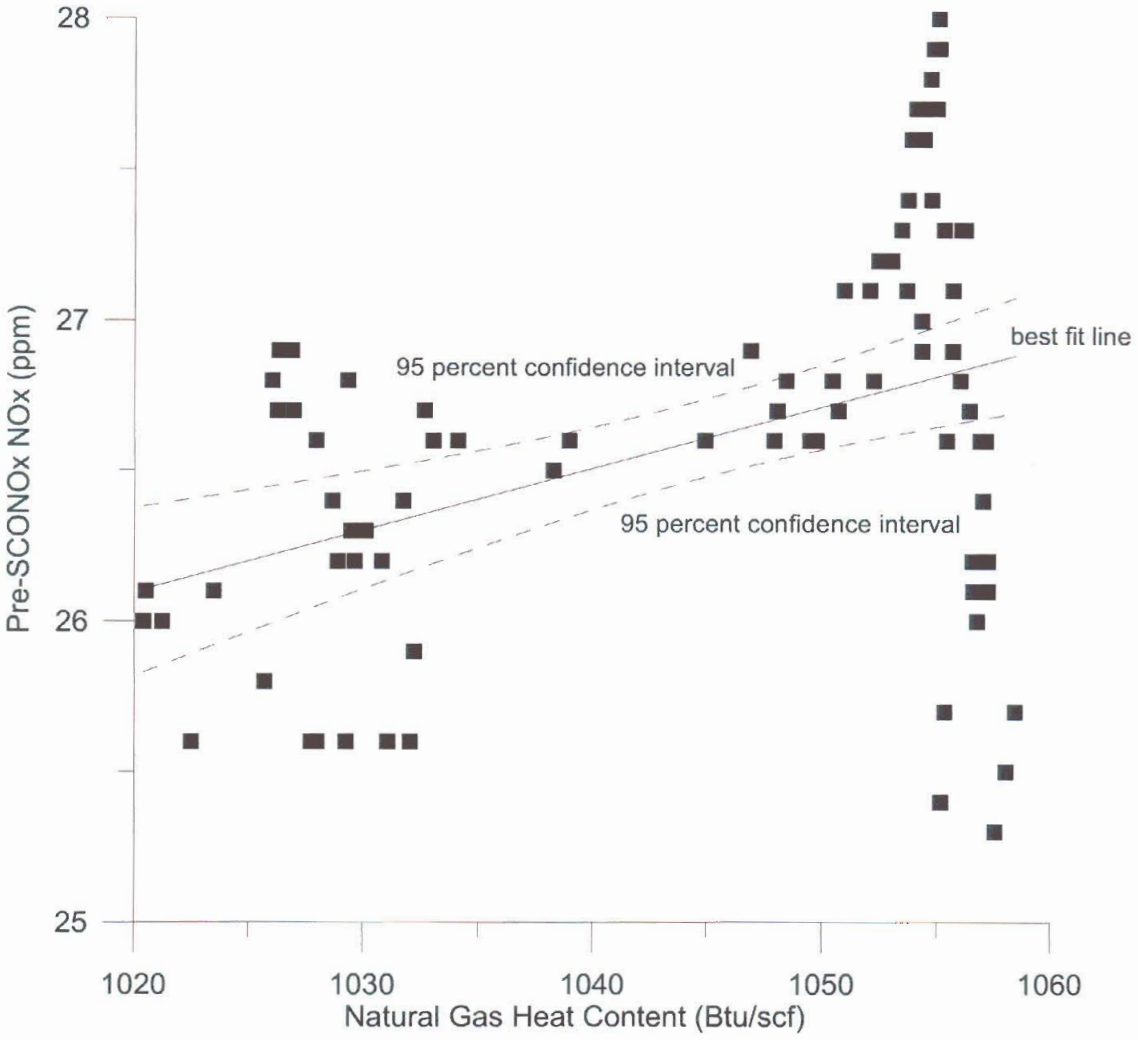
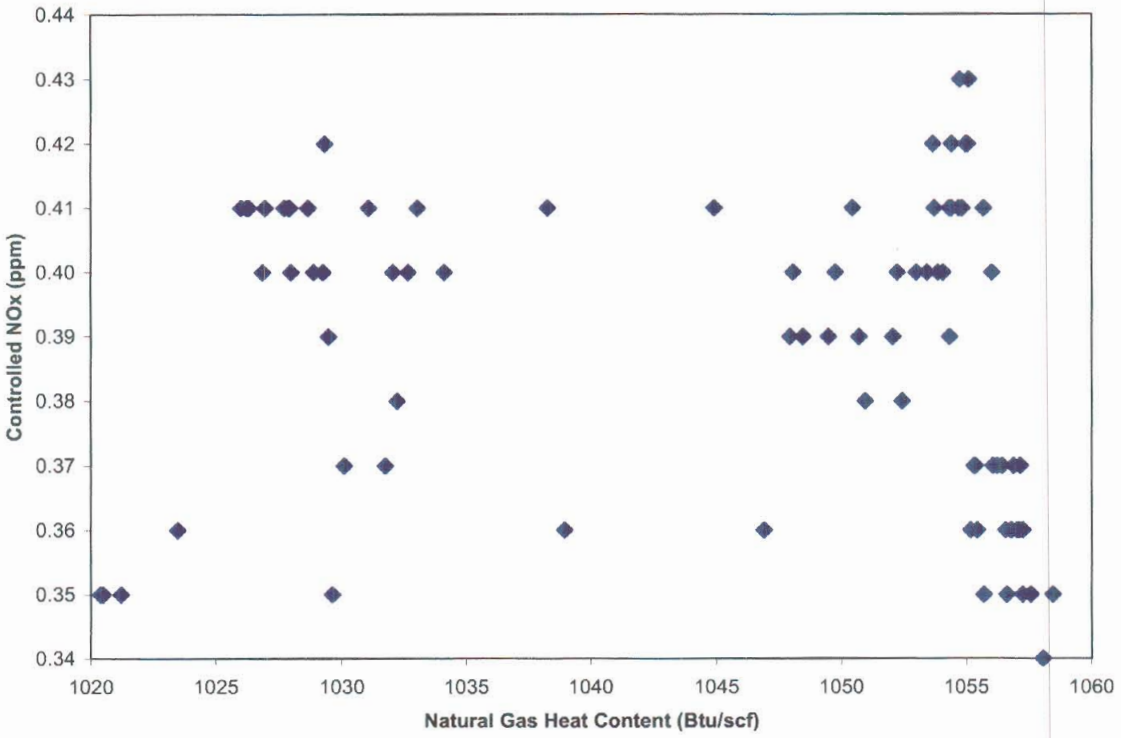


Figure 4-2 predicts that, for the range of natural gas heat contents observed, the pre-SCONOx NOx emissions will increase approximately 4 percent for a heat content increase of 4 percent. The turbine load represented by this data was limited to approximate values between 300 and 310 MMBtu/hr heat input (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

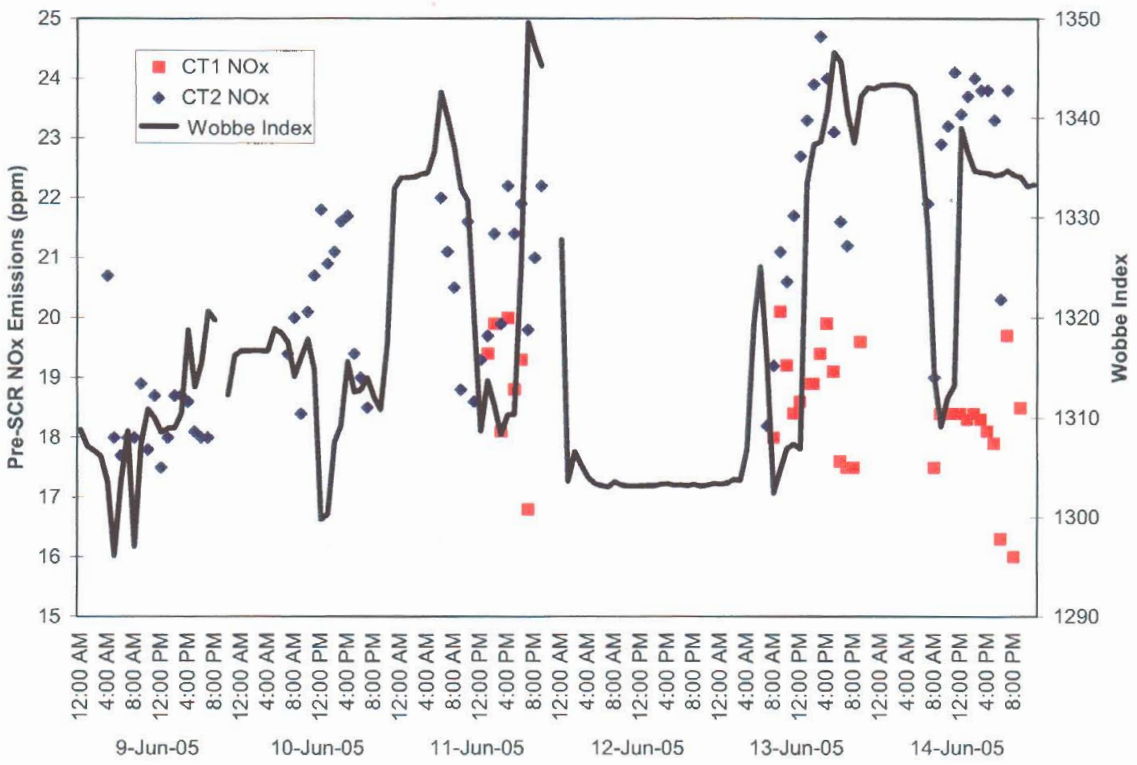


In conclusion, the increased heat content of the natural gas caused a slight increase in pre-SCONOx NOx emissions; however, the SCONOx control system was able to compensate so that the exhaust emissions did not increase by the same factor.

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

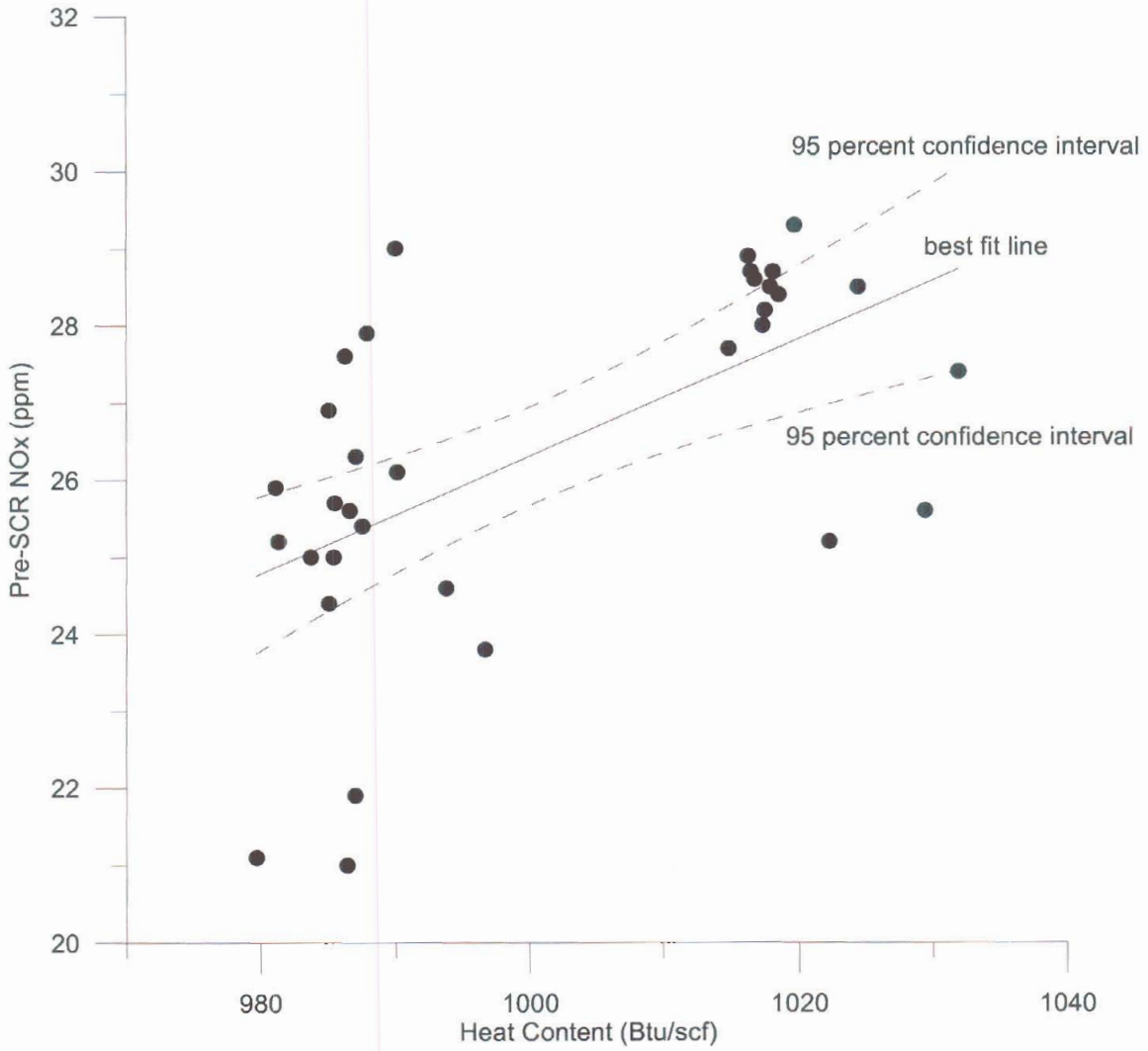


Figure 4-5 predicts that, for the range of natural gas heat contents observed, the pre-SCR NOx emissions will increase approximately 15 percent for a heat content increase of 5 percent at high turbine loads (1700 to 1800 MMBtu/hr). Figure 4-5 also presents a linear regression best fit line and 95 percent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

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

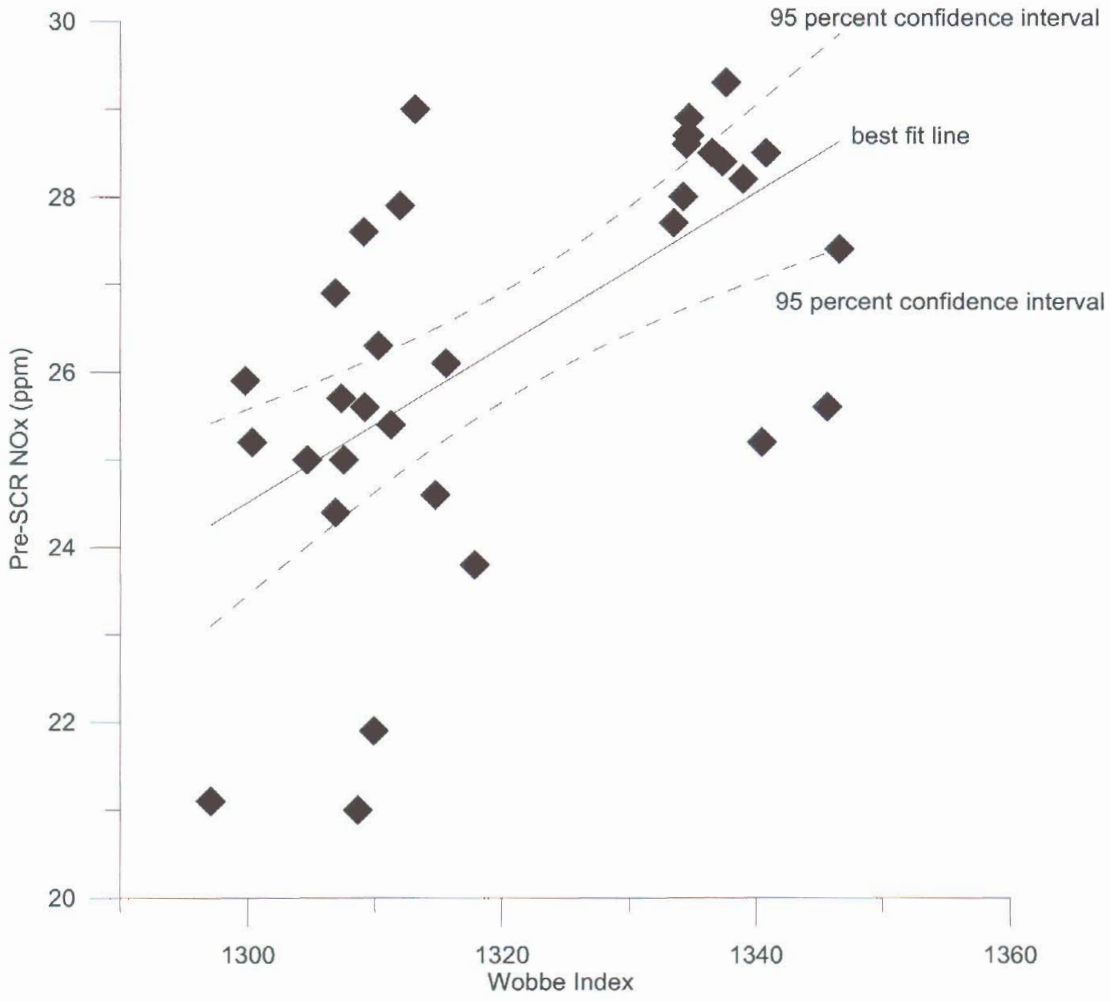


Figure 4-6 predicts that, for the range of Wobbe index observed, the pre-SCR NOx emissions will increase approximately 15 percent for a Wobbe index increase of 3.5 percent at high turbine loads (1700 to 1800 MMBtu/hr). Figure 4-6 also presents a linear regression best fit line and 95 percent confidence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

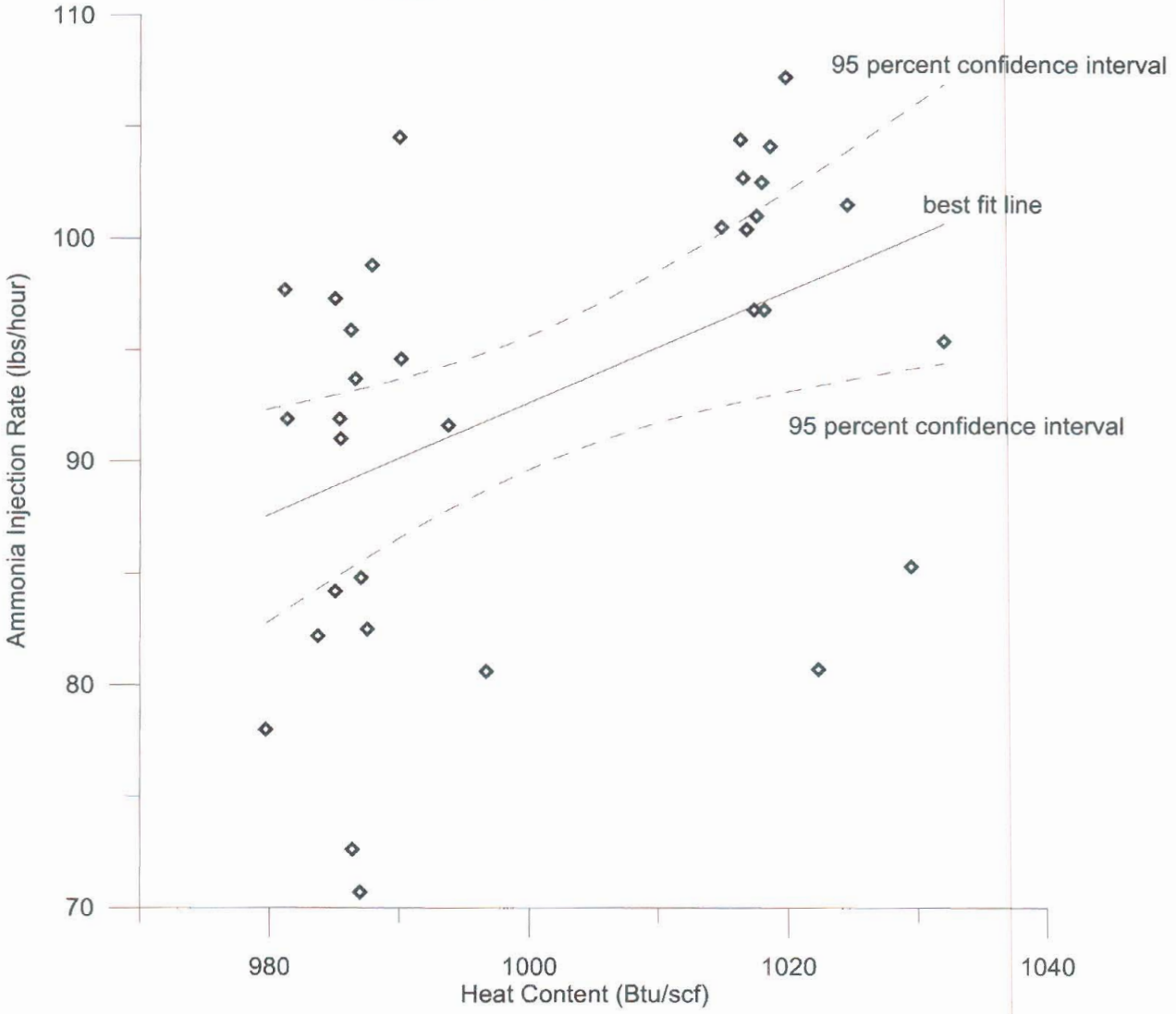


Figure 4-7 predicts that, for the range of natural gas heat contents observed, the ammonia consumption will increase approximately 10 percent for a heat content increase of 5 percent. Figure 4-7 also presents a linear regression best fit line and a 95 percent confidence interval for that fit.

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

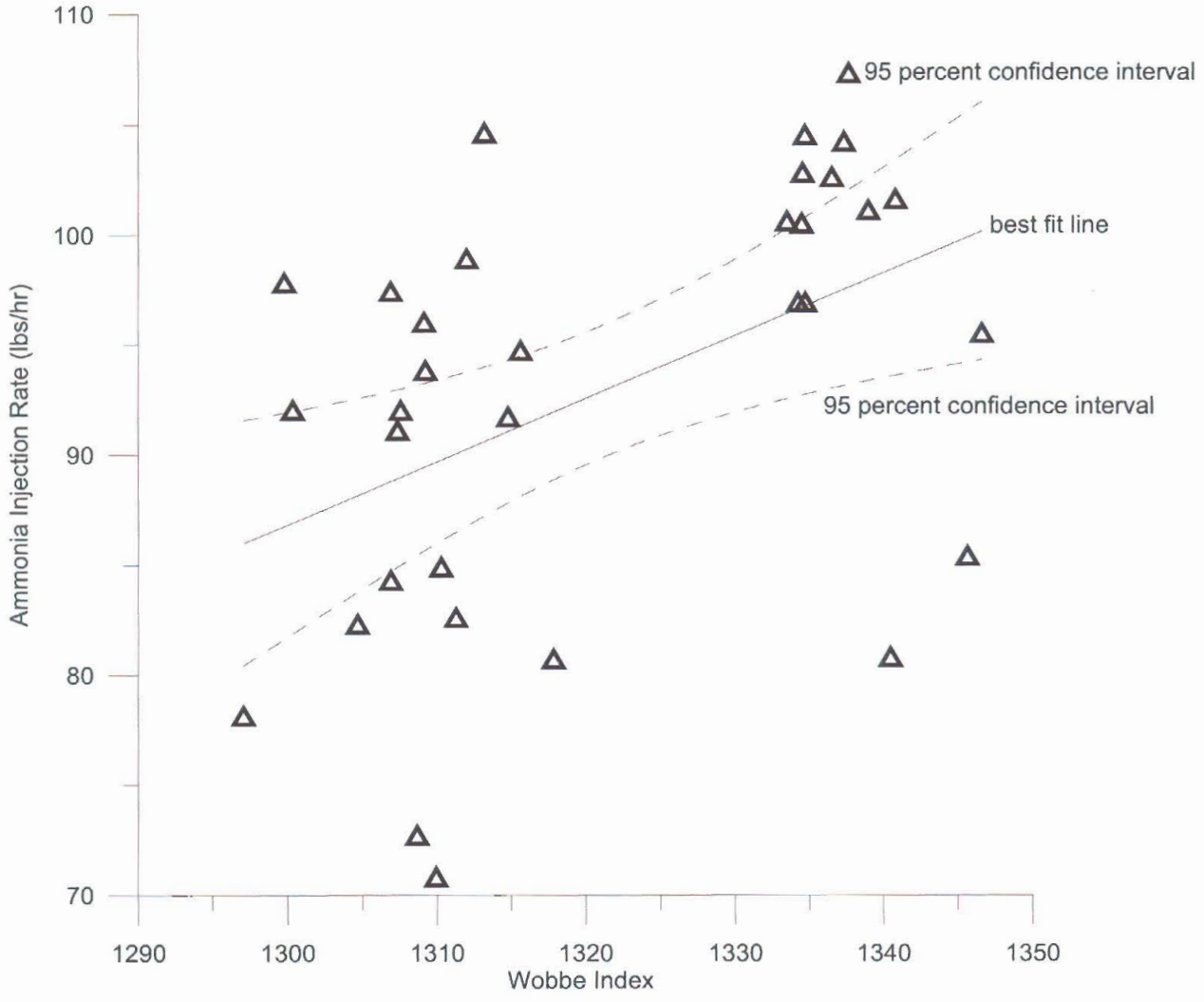


Figure 4-8 predicts that, for the range of natural gas heat contents observed, the ammonia consumption will increase approximately 10 percent for a 3.5 percent increase in Wobbe index. Figure 4-8 also presents a linear regression best fit line and a 95 percent confidence interval for that fit.

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

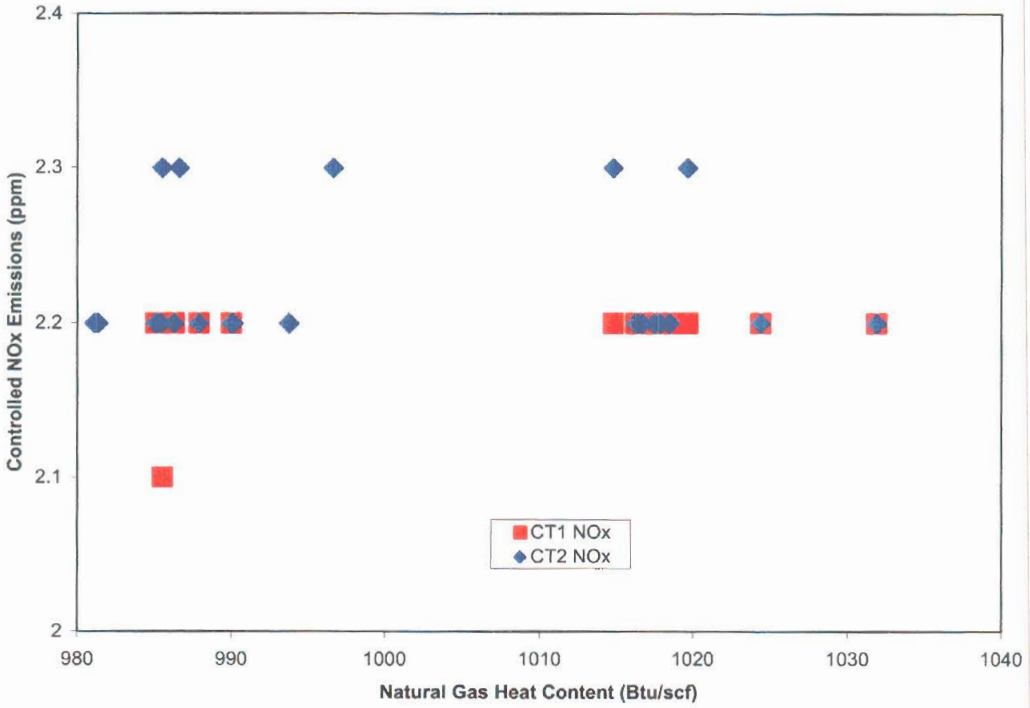
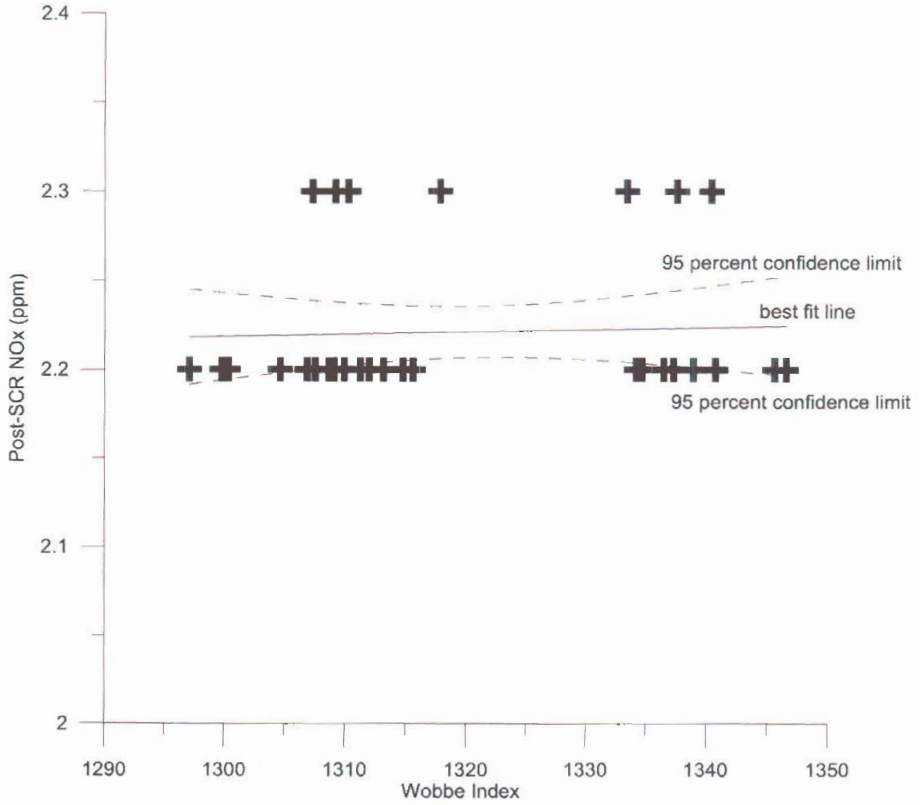


Figure 4-10: Sutter Turbines Controlled NOx Concentration versus Wobbe Index



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

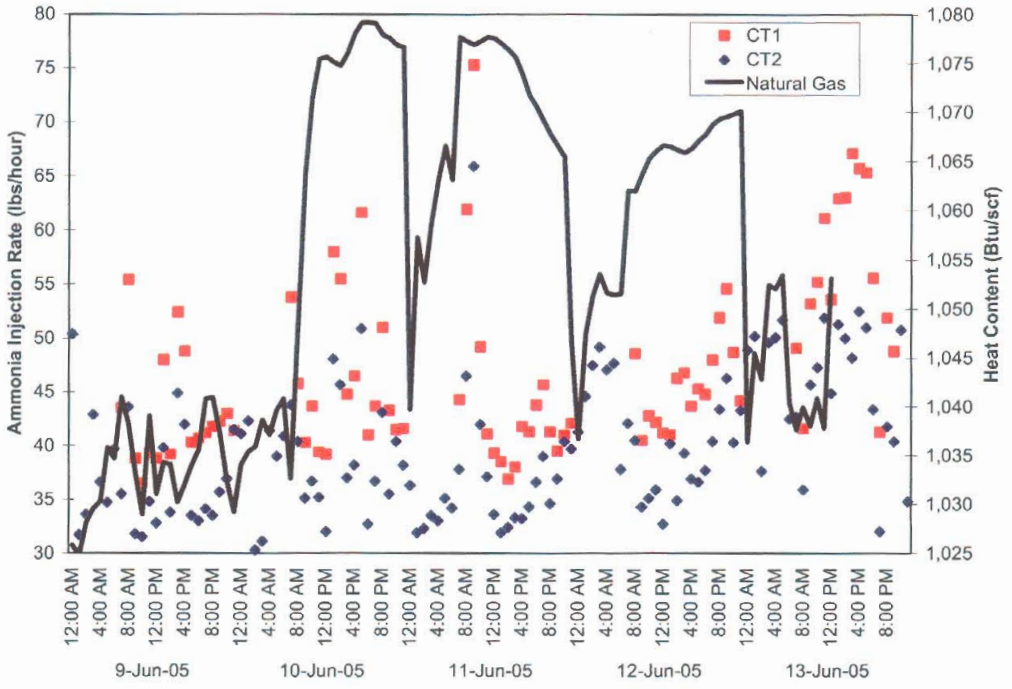


Figure 4-11 shows a potential minor increase in ammonia flow versus increased natural gas heat content. This relationship has been further compared in Figure 4-12 which plots ammonia injection rates per unit heat rate versus the natural gas heat content.

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

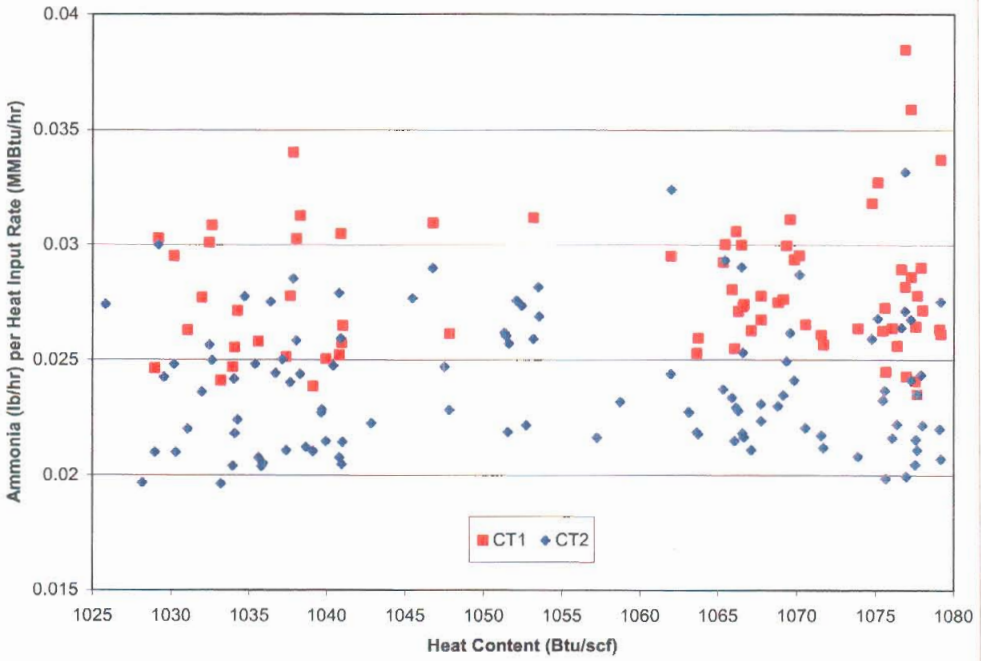


Figure 4-12 shows that there may be a small increase in the ammonia injection rate as the heat content of the natural gas increases. However, due to the operational variability, specific statistical relationships cannot be reliably determined.

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

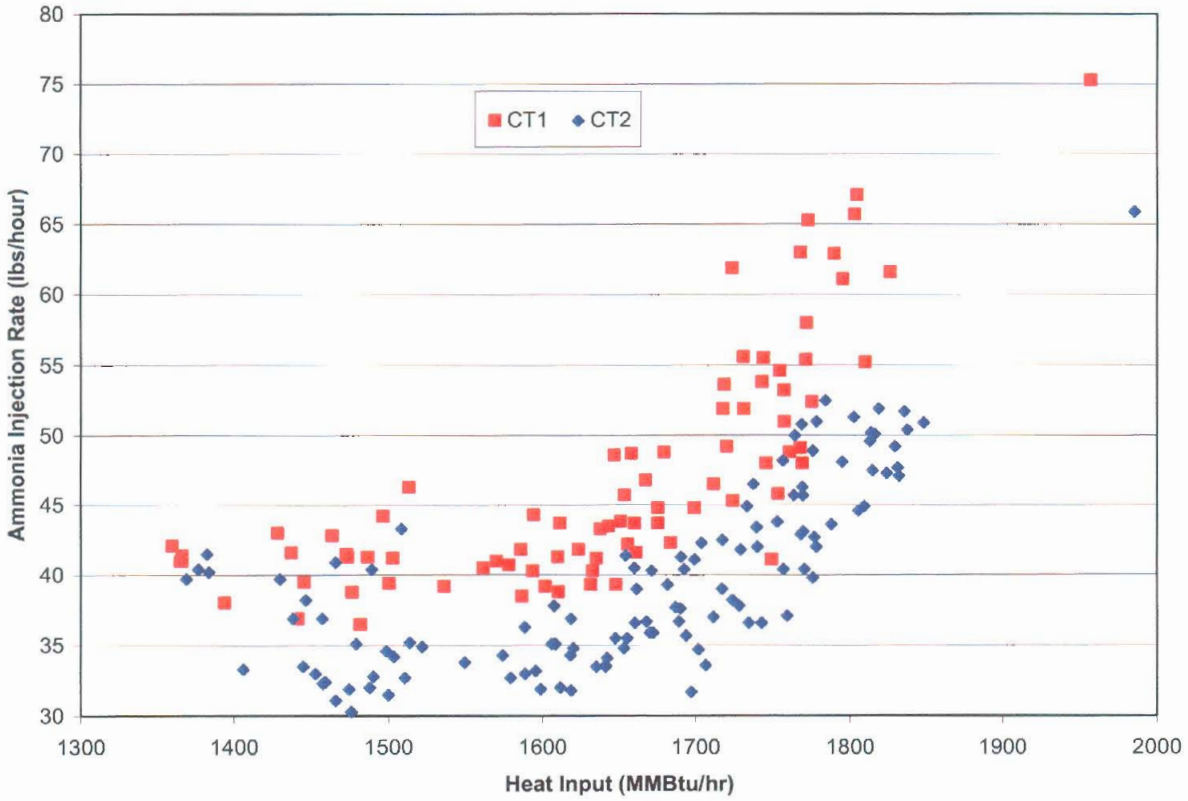
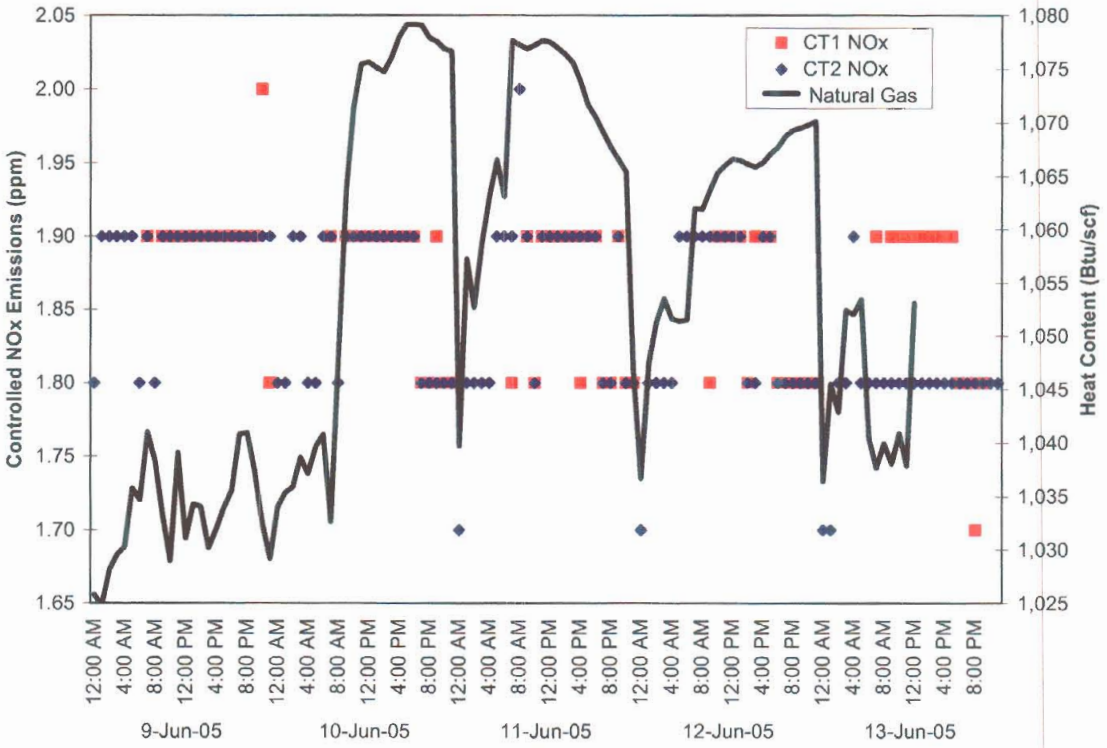


Figure 4-14, below (NOx shown @15% O_2), shows that the NOx control system was able to compensate for probable increases in pre-SCR NOx due to the higher natural gas heat content. However, it also shows that the Turbine 2 system was slow in compensating for the three rapid decreases in heat content when 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

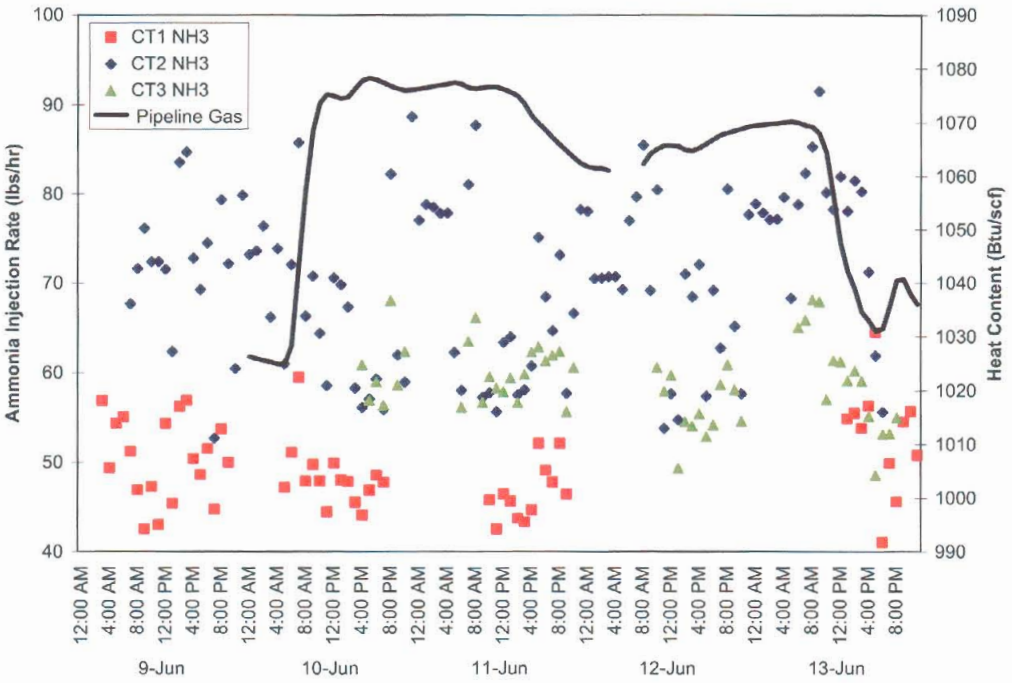


Delta

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.

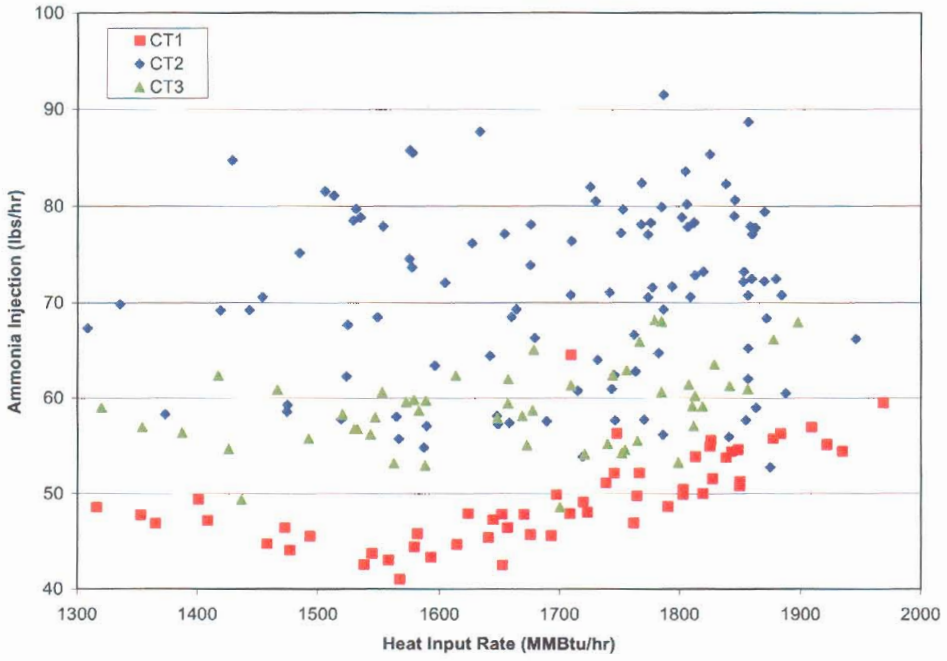
For information purposes, the ammonia injection rate over the period of the excursion event, the ammonia injection rate versus input heat rate data, and the NOx emission concentrations during the period for all three turbines are provided in Figures 4-15 through 4-17, respectively. The corresponding 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.

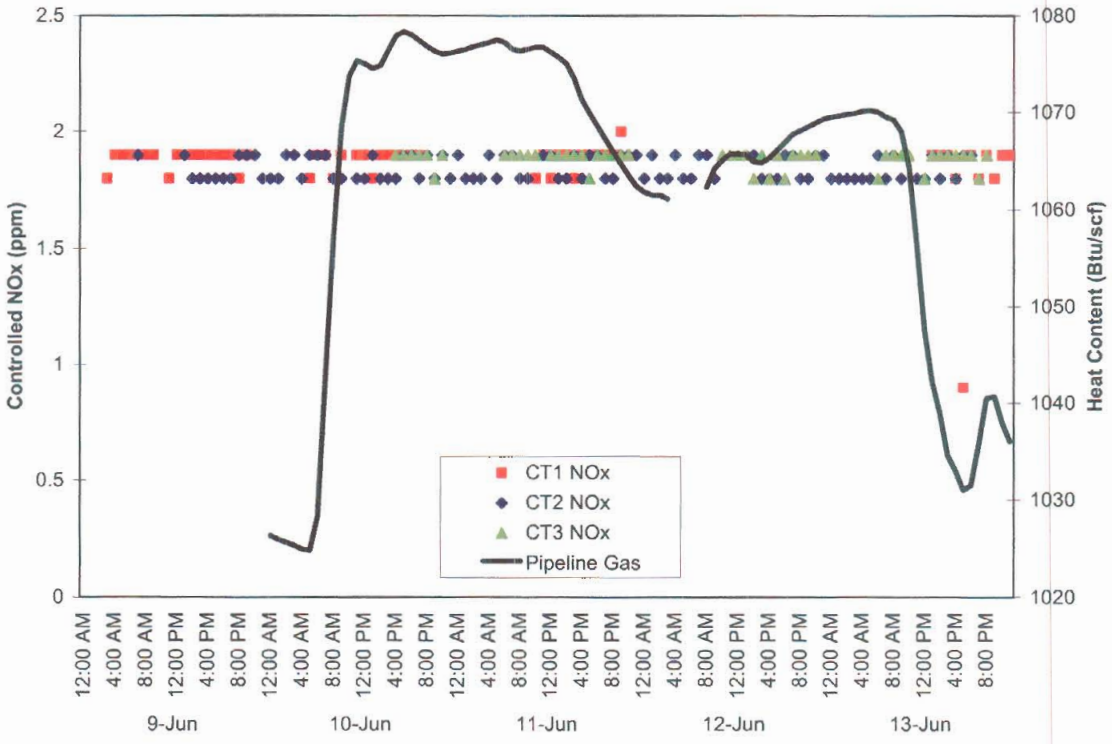
Figure 4-16: Delta Gas Turbines Ammonia Injection Rates versus Heat Input Rate



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

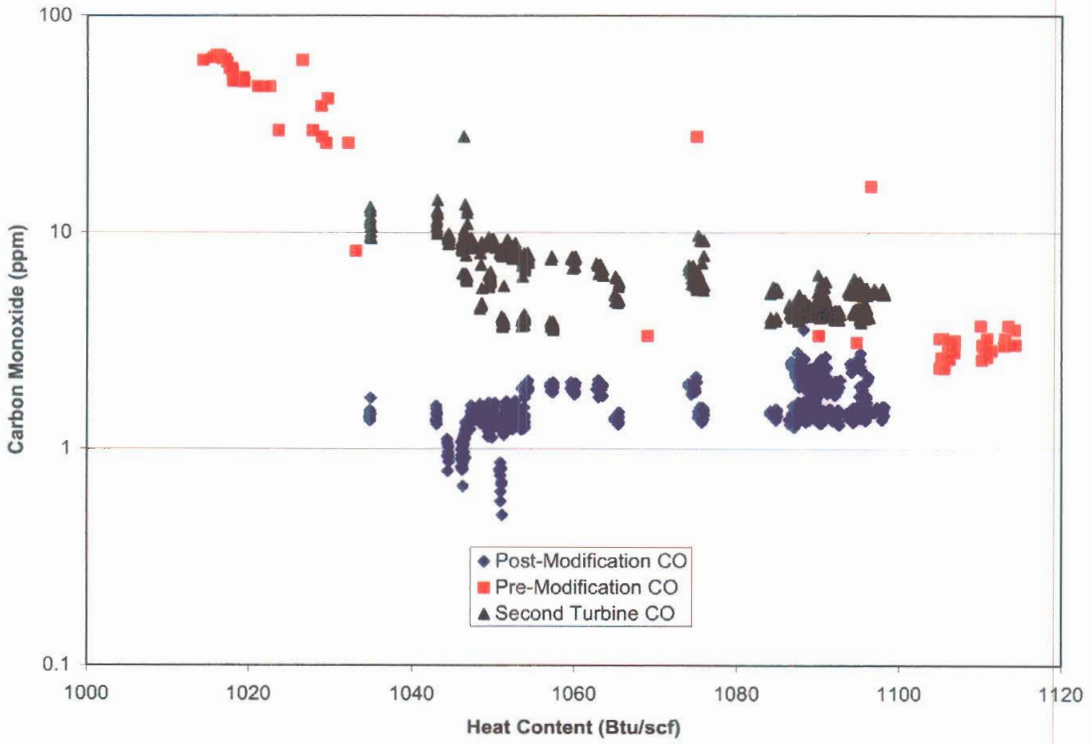
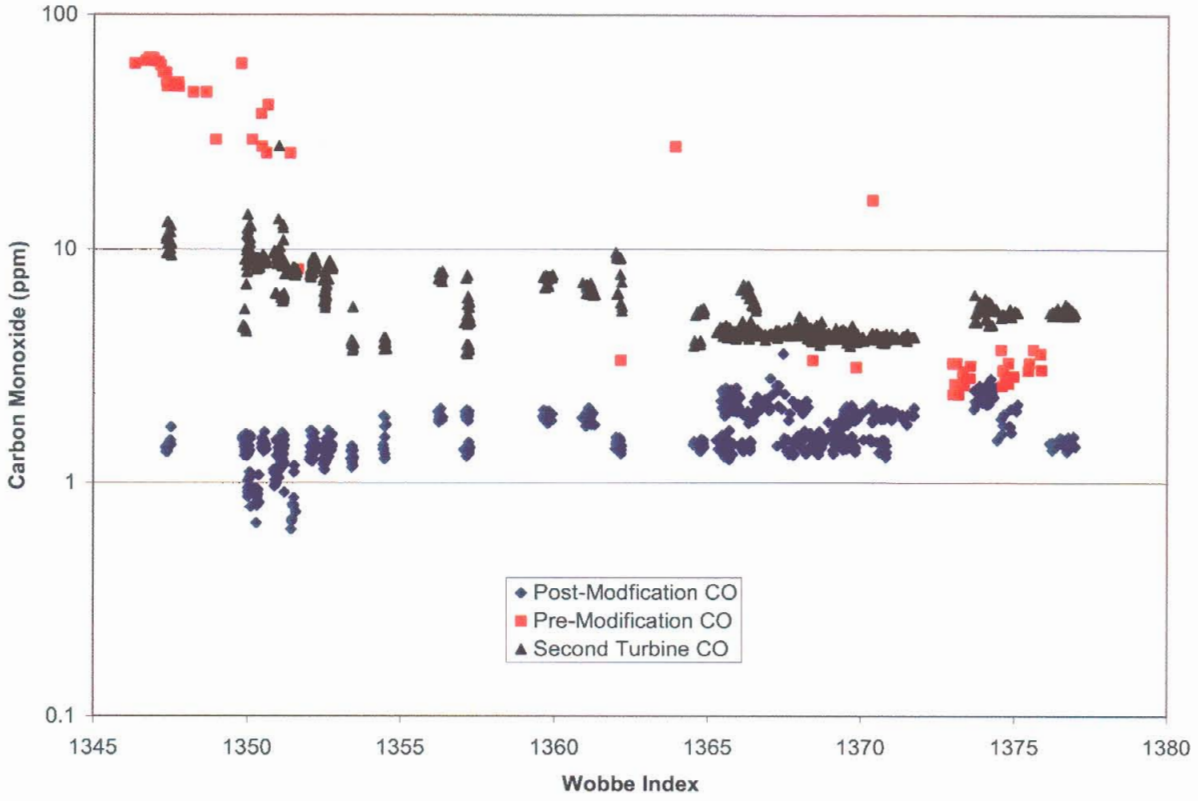


Figure 5-1: Midway Sunset CO Emissions versus Wobbe Index



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

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[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

		Turbine Fuel Data							
		Heat Content	Specific	Composition Data (%)					
Day	Hour	Btu/scf	Gravity	Methane	Ethane	Butane	Propane	Nitrogen	Wobbe
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

		Turbine Fuel Data							
		Heat Content	Specific	Composition Data (%)					
Day	Hour	Btu/scf	Gravity	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	186.3	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	238.9	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	239.2	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	247.9	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	249.8	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	249.8	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	249.7	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	208.3	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	199.5	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	236.4	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	209.2	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	198.8	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	98
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	186.7	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	96
	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	178.8	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Normal	105
	10:00:00	22.0	0.07	484	Down	0.00	Down	Down	0.00	277.5	10.1	Startup	18.2	13.8	29.7	0.1992	52.8	369.4	856.9	1.894	939.4	Inval	21.7	47.4	Startup	115
	11:00:00	34.5	1.00	760	Down	0.00	Down	0.0	0.20	485.4	46.8	Startup	16.9	21.3	31.4	0.1705	87.8	33.6	46.6	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	548.8	163.2	Startup	14.4	4.7	4.3	0.0157	18.6	0.5	0.5	0.001	1.2	336.3	24.3	22.1	Startup	267
	13:00:00	66.5	1.00	1526	Down	0.00	Down	58.8	1.00	586.3	144.8	Normal	14.8	2.8	2.2	0.0062	12.5	0.0	0.0	0.000	0.0	26.5	22.7	19.4	Normal	217
	14:00:00	77.5	1.00	1766	Down	0.00	Down	72.5	1.00	606.7	164.5	Normal	13.9	2.8	2.2	0.0061	13.6	0.0	0.0	0.000	0.0	0.4	23.8	19.9	Normal	217
	15:00:00	68.9	1.00	1516	Down	0.00	Down	59.5	1.00	586.3	144.2	Normal	14.0	2.8	2.2	0.0062	12.4	0.0	0.0	0.000	0.0	0.0	21.2	18.1	Normal	222
	16:00:00	78.5	1.00	1731	Down	0.00	Down	73.4	1.00	610.9	186.5	Normal	13.9	2.6	2.2	0.0061	14.0	0.0	0.0	0.000	0.0	0.0	23.7	20.0	Normal	216
	17:00:00	69.0	1.00	1606	Down	0.00	Down	61.9	1.00	663.3	151.2	Normal	13.9	2.6	2.2	0.0061	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	0.0062	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	49.5	1.00	586.5	121.4	Normal	14.1	2.5	2.2	0.0060	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	0.0060	10.4	6.7	6.8	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	16.5	7.9	19.4	0.0714	10.4	30.5	75.0	0.188	24.5	14.0	20.3	49.9	Shutdown	269
	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	116
	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	281.8	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	272.8	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	10.8	0.43	221	Down	0.00	Down	Down	0.00	249.5	7.6	Startup	18.3	14.1	32.0	0.1176	26.0	627.7	1424.4	3.187	704.8	Invalid	17.4	39.5	Startup	114
	4:00:00	33.2	1.00	741	Down	0.00	Down	Down	0.00	462.0	35.8	Startup	17.1	24.8	36.5	0.1415	104.8	36.8	88.2	0.135	100.0	Invalid	34.8	54.0	Startup	146
	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	283.4	37.8	49.6	Startup	263
	6:00:00	37.9	1.00	822	Down	0.00	Down	Down	0.00	519.4	50.1	Startup	16.5	28.3	36.3	0.1298	106.8	33.0	44.3	0.099	81.4	85.7	35.3	47.3	Startup	270
	7:00:00	45.1	1.00	997	Down	0.00	Down	23.9	0.80	530.9	76.1	Startup	15.6	17.1	19.9	0.0790	88.1	19.1	17.8	0.040	39.5	65.5	31.8	35.4	Startup	224
	8:00:00	62.9	1.00	1378	Down	0.00	Down	50.0	1.00	584.9	126.0	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	76.7	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	0.8	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	0.0078	13.4	0.2	0.2	0.000	0.0	0.8	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	0.8	22.4	18.8	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	0.8	22.8	18.9	Normal	226
	14:00:00	78.8	1.00	1790	Down	0.00	Down	73.8	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	1782	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	1788	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	78.7	1.00	1790	Down	0.00	Down	62.3	1.00	618.3	167.8	Normal	13.8	2.7	2.2	0.0082	14.3	0.2	0.2	0.000	0.0	0.8	21.1	17.5	Normal	224
	20:00:00	63.8	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	0.8	20.2	17.5	Normal	223
	21:00:00	72.0	1.00	1639	Down	0.00	Down	78.3	1.00	580.9	155.7	Normal	13.9	2.5	2.1	0.0077	12.8	0.2	0.2	0.000	0.0	0.0	23.2	19.8	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	0.0096	11.8	7.1	6.8	0.015	18.0	8.0	20.9	19.8	Shutdown	207
	23:00:00	1.6	0.07	37	Down	0.00	Down	Down	0.00	453.8	0.5	Shutdown	18.7	5.3	14.2	0.0522	1.9	29.7	79.7	0.178	6.8	9.2	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	Invalid	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	Invalid	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	18.8	0.0699	18.8	31.9	80.7	0.138	37.5	Invalid	26.2	38.4	Startup	117
	5:00:00	40.8	1.00	922	Down	0.00	Down	0.2	0.78	510.9	87.8	Startup	15.8	29.9	24.2	0.0898	82.0	22.2	25.7	0.057	52.6	Invalid	32.1	37.1	Startup	172
	6:00:00	45.3	1.00	1017	Down	0.00	Down	10.8	1.00	538.6	90.9	Startup	15.3	17.1	18.0	0.0662	67.3	12.3	13.8	0.028	29.5	38.9	28.5	30.8	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	27.6	22.0	19.7	Normal	217
	8:00:00	72.4	1.00	1581	Down	0.00	Down	46.3	1.00	584.2	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	1.8	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	0.8	22.5	18.4	Normal	226
	11:00:00	78.2	1.00	1774	Down	0.00	Down	70.5	1.00	620.1	170.8	Normal	13.7	2.7	2.2	0.0081	14.4	0.1	0.1	0.000	0.0	0.8	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	623.8	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	168.1	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	605.8	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	70.8	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	14.8	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	95	Down	0.00	Down	Down	0.00	454.2	2.7	Shutdown	18.5	8.8	21.5	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 Mlbs	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	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	68.8	Startup	16.5	23.0	39.8	8.1154	93.8	36.9	41.4	0.0451	78.8	434.1	30.4	49.8	Startup	199
	1:00:00	38.2	1.00	838	0.0	0.16	535.8	52.1	Startup	16.4	23.3	39.5	8.1123	94.1	31.9	41.6	0.0364	78.7	84.7	29.7	38.9	Startup	230
	2:00:00	44.8	1.00	983	8.4	1.00	597.2	76.2	Startup	16.5	18.2	19.9	6.8731	71.8	11.8	12.7	0.0035	27.5	61.8	26.7	31.4	Startup	224
	3:00:00	51.2	1.00	1117	176.1	1.00	626.1	83.7	Startup	14.4	3.8	3.4	0.6127	14.2	0.2	0.2	0.000	0.0	36.4	24.9	22.8	Startup	232
	4:00:00	57.0	1.00	1248	260.0	1.00	646.9	111.5	Normal	14.1	2.1	1.6	0.4667	8.4	0.0	0.0	0.000	0.0	9.2	23.9	26.7	Normal	212
	5:00:00	64.7	1.00	1422	113.3	1.00	667.3	134.4	Normal	13.9	2.2	1.8	0.0008	9.7	0.3	0.3	0.001	1.4	0.5	21.4	18.0	Normal	205
	6:00:00	70.9	1.00	1742	191.8	1.00	686.8	171.0	Normal	14.0	2.3	2.0	0.0872	12.5	0.2	0.2	0.000	0.0	0.5	20.7	17.7	Normal	207
	7:00:00	70.9	1.00	1735	72.6	1.00	692.9	171.0	Normal	14.0	2.6	2.2	0.0992	14.2	0.0	0.0	0.000	0.0	0.5	21.9	18.0	Normal	212
	8:00:00	70.0	1.00	1715	78.0	1.00	694.1	168.4	Normal	14.0	2.6	2.2	0.0992	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	562.6	129.9	Normal	14.1	2.5	2.2	0.0990	10.8	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	588.6	137.7	Normal	14.0	2.4	2.1	0.0875	10.9	0.0	0.0	0.000	0.0	0.0	20.8	17.6	Normal	201
	11:00:00	78.5	1.00	1724	78.7	1.00	693.6	169.0	Normal	14.0	2.6	2.2	0.0992	14.1	0.0	0.0	0.000	0.0	0.0	21.9	18.7	Normal	206
	12:00:00	72.6	1.00	1599	99.3	1.00	698.5	155.4	Normal	14.0	2.6	2.2	0.0992	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	99.3	1.00	699.7	154.8	Normal	14.0	2.6	2.2	0.0992	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	1600	73.0	1.00	690.7	156.5	Normal	14.0	2.6	2.2	0.0992	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	691.3	158.7	Normal	14.0	2.6	2.2	0.0992	13.2	0.0	0.0	0.000	0.0	0.0	21.9	18.7	Normal	209
	16:00:00	71.8	1.00	1579	76.2	1.00	690.8	152.9	Normal	14.0	2.6	2.2	0.0992	12.9	0.0	0.0	0.000	0.0	0.0	21.8	18.6	Normal	208
	17:00:00	59.8	1.00	1318	71.8	1.00	563.7	126.8	Normal	14.1	2.4	2.1	0.0877	10.1	0.0	0.0	0.000	0.0	0.0	20.9	16.1	Normal	208
	18:00:00	60.2	1.00	1326	58.8	1.00	699.2	122.5	Normal	14.1	2.5	2.2	0.0990	10.6	0.0	0.0	0.000	0.0	0.0	20.8	18.9	Normal	202
	19:00:00	60.5	1.00	1334	55.7	1.00	698.5	122.8	Normal	14.1	2.6	2.3	0.0993	11.1	0.0	0.0	0.000	0.0	0.0	20.8	19.0	Normal	203
	20:00:00	54.8	1.00	1207	43.6	0.97	579.5	103.7	Shutdown	14.7	2.8	2.7	0.0998	11.8	5.6	5.3	0.012	14.5	4.8	21.6	20.6	Shutdown	205
	21:00:00	3.8	0.15	80	Down	0.00	470.7	1.9	Shutdown	18.8	5.5	14.1	0.8519	4.2	24.2	62.1	0.139	11.2	8.8	17.2	44.1	Shutdown	296
	22:00:00	Down	0.00	Down	Down	0.00	388.0	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Invalid	Down	Down	Normal	180
	23:00:00	Down	0.00	Down	Down	0.00	359.2	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Invalid	Down	Down	Normal	122
10-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	348.1	Down	Normal	Down	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	Down	Normal	100
	2:00:00	Down	0.00	Down	Down	0.00	335.5	Down	Normal	Down	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	458.5	16.6	Startup	17.8	12.7	24.2	0.8800	46.1	29.2	58.8	0.154	66.0	Invalid	21.0	40.9	Startup	100
	4:00:00	36.5	1.00	788	Down	0.00	534.8	42.8	Startup	16.8	22.6	32.5	0.1195	84.2	33.8	46.6	0.169	86.0	Invalid	28.4	42.3	Startup	236
	5:00:00	49.7	1.00	963	5.4	0.78	514.1	63.3	Startup	16.9	22.4	27.0	0.0891	86.5	27.0	32.5	0.073	65.9	73.5	30.3	36.5	Startup	292
	6:00:00	46.0	1.00	1000	80.7	1.00	540.9	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	588.7	120.4	Normal	14.0	2.6	2.2	0.0992	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	89.8	1.00	576.1	120.2	Normal	14.1	2.5	2.2	0.0990	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	1481	66.0	1.00	586.2	138.2	Normal	13.9	2.4	2.0	0.0874	10.8	0.0	0.0	0.000	0.0	0.0	21.8	18.4	Normal	209
	10:00:00	70.5	1.00	1736	80.8	1.00	665.8	168.3	Normal	13.9	2.7	2.3	0.0984	14.8	0.0	0.0	0.000	0.0	0.0	23.8	20.1	Normal	207
	11:00:00	70.7	1.00	1742	81.8	1.00	619.7	169.4	Normal	13.9	2.6	2.2	0.0991	14.1	0.0	0.0	0.000	0.0	0.0	24.8	20.7	Normal	213
	12:00:00	70.5	1.00	1745	97.7	1.00	612.8	169.4	Normal	13.9	2.6	2.2	0.0991	14.1	0.0	0.0	0.000	0.0	0.0	25.9	21.8	Normal	213
	13:00:00	70.4	1.00	1745	91.9	1.00	612.3	170.2	Normal	13.8	2.6	2.2	0.0979	13.8	0.0	0.0	0.000	0.0	0.0	25.2	20.9	Normal	212
	14:00:00	70.1	1.00	1744	91.9	1.00	612.5	170.5	Normal	13.9	2.6	2.2	0.0991	14.1	0.0	0.0	0.000	0.0	0.0	25.6	21.1	Normal	212
	15:00:00	70.5	1.00	1749	83.7	1.00	613.1	170.5	Normal	13.9	2.7	2.3	0.0994	14.7	0.0	0.0	0.000	0.0	0.0	25.6	21.6	Normal	211
	16:00:00	70.7	1.00	1732	94.6	1.00	612.9	169.8	Normal	13.8	2.6	2.2	0.0979	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	0.0979	12.4	0.0	0.0	0.000	0.0	0.0	23.3	19.4	Normal	208
	18:00:00	59.1	1.00	1306	69.8	1.00	562.9	119.8	Normal	14.1	2.6	2.3	0.0983	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	578.9	118.0	Normal	14.1	2.5	2.2	0.0989	10.4	0.0	0.0	0.000	0.0	0.0	21.3	18.5	Normal	206
	20:00:00	53.3	1.00	1180	48.9	0.87	574.9	100.9	Shutdown	14.6	2.5	2.3	0.0995	10.1	5.2	4.8	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	18.8	3.2	8.2	0.8302	1.3	25.3	64.9	0.146	9.1	8.4	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	Down	Invalid	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	Down	Invalid	Down	Down	Normal	199
11-Jun-05	0:00:00	Down	0.00	Down	Down	0.00	334.6	Down	Normal	Down	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	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	Down	Normal	85
	3:00:00	11.8	0.45	282	Down	0.00	338.2	14.8	Startup	17.9	6.7	13.2	0.8494	12.2	29.3	57.8	0.139	38.4	Invalid	17.5	34.5	Startup	98
	4:00:00	41.8	1.00	957	0.0	0.87	534.2	71.4	Startup	16.7	18.0	26.4	0.8751	71.8	13.3	15.1	0.034	32.5	Invalid	31.2	35.4	Startup	142
	5:00:00	47.1	1.00	1080	13.8	1.00	552.5	88.9	Startup	15.8	12.3	12.3	0.8462	46.8	1.8	1.8	0.004	4.3	23.1	28.1	28.1	Startup	208
	6:00:00	58.8	1.00	1293	111.1	1.00	562.1	115.4	Normal	14.1	2.8	2.4	0.0998	11.5	9.4	8.3	0.001	1.3	12.7	25.4	22.8	Normal	234
	7:00:00	57.8	1.00	1312	66.8	1.00	588.6	116.2	Normal	14.1	2.4	2.1	0.0977	10.1	0.1	0.1	0.000	0.0	1.9	24.2	21.1	Normal	206
	8:00:00	58.9	1.00	1326	75.9	1.00	577.5	120.3	Normal	14.1	2.5	2.2	0.0990	10.8	0.1	0.1	0.000	0.0	0.4	23.8	20.5	Normal	203
	9:00:00	66.8	1.00	1497	66.3	1.00	590.0	140.8	Normal	13.9	2.5	2.1	0.0977	11.4	0.1	0.1	0.000	0.0	0.0	22.3	18.8	Normal	205
	10:00:00	70.9	1.00	1668	87.8	1.00	606.8	164.2	Normal	13.9	2.7	2.3	0.0994	14.2	0.0	0.0	0.000	0.0	0.0	25.6	21.8	Normal	207
	11:00:00	62.9	1.00	1395	65.4	1.00	600.5	129.1	Normal	14.1	2.5	2.2	0.0990	11.1	0.0	0.0	0.000	0.0	0.0	21.4	18.8	Normal	214
	12:00:00	58.9	1.00	1295	55.8	1.00	567.8	117.7	Normal	14.2	2.5	2.2	0.0991	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	64.9	1.00	628.5	144.8	Normal	14.0	2.6	2.2	0.0992	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	2.8	2.2	0.0991	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	13.8	2.4	2.0	0.0974	11.1	0.0	0.0	0.000	0.0	0.0	23.6	19.9	Normal	231
	16:00:00	79.3	1.00	1724	84.8	1.00	647.8	187.5	Normal	13.9	2.7	2.3	0.0994	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	628.5	151.0	Normal	13.8	2.8	2.2	0.0979	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	2.8	2.2	0.0981	12.7	0.1	0.1	0.000	0.0	0.0	26.9	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	0.0983	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	1389	68.1	1.00	616.0	127.1	Normal	14.0	2.8	2.2	0.0992	11.5	0.1	0.1	0.000	0.0	0.0	24.8	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	0.0981	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	2.8	2.4	0.0998	10.8	5.4	5.0	0.011	13.3	4.4	22.8	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	0.0395	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	Invalid	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	Invalid	Down	Down	Normal	105
	2:00:00	Down	0.00	Down	Down	0.00	346.9	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	96
	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	334.8	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	116
	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	299.9	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	256.0	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	118
	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	Invalid	16.1	35.2	Startup	107
	4:00:00	33.0	1.00	736	Down	0.00	488.2	35.0	Startup	17.1	20.9	32.5	0.1193	87.8	34.1	52.9	0.118	86.8	Invalid	31.1	48.3	Startup	180
	5:00:00	36.7	1.00	826	0.0	0.07	550.5	56.8	Startup	16.5	23.8	36.8	0.1134	93.7	28.8	38.4	0.088	71.0	68.8	33.8	45.3	Startup	274
	6:00:00	45.9	1.00	1020	8.7	1.00	539.8	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	127.8	Normal	14.1	2.6	2.3	0.0063	11.4	0.0	0.0	0.000	0.0	26.7	21.0	16.2	Normal	240
	8:00:00	62.7	1.00	1374	87.7	1.00	601.9	127.8	Normal	14.1	2.5	2.2	0.0060	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	167.8	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	78.5	1.00	1745	84.2	1.00	649.5	170.8	Normal	13.9	2.8	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	81.0	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	87.3	1.00	652.8	173.1	Normal	13.9	2.8	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	236
	14:00:00	78.8	1.00	1790	104.1	1.00	654.3	172.4	Normal	13.9	2.8	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	1788	107.2	1.00	654.9	172.3	Normal	13.8	2.7	2.3	0.0084	15.0	0.0	0.0	0.000	0.0	0.0	29.3	24.7	Normal	236
	16:00:00	78.2	1.00	1787	101.5	1.00	654.7	172.7	Normal	13.9	2.8	2.2	0.0081	14.6	0.0	0.0	0.000	0.0	0.0	29.5	24.9	Normal	238
	17:00:00	78.2	1.00	1782	95.4	1.00	653.6	172.9	Normal	13.9	2.8	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	652.6	172.1	Normal	13.9	2.6	2.2	0.0081	14.4	0.0	0.0	0.000	0.0	0.0	25.9	21.8	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	1188	65.8	0.83	621.6	102.5	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	0.0842	10.2	23.9	54.3	0.121	19.2	8.2	29.8	48.1	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	Invalid	Down	Down	Normal	222
	23:00:00	Down	0.00	Down	Down	0.00	387.3	Down	Normal	Down	Down	Down	Down	Down	Down	Down	Down	Down	Invalid	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	369.8	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	369.0	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	8.8	Startup	18.2	11.8	25.8	0.0948	23.1	24.4	53.3	0.119	29.0	Invalid	18.4	35.8	Startup	107
	4:00:00	35.3	1.00	882	0.0	0.17	528.7	46.8	Startup	18.8	23.8	32.4	0.1190	85.5	31.8	43.4	0.097	77.8	Invalid	31.1	42.7	Startup	177
	5:00:00	40.9	1.00	824	0.0	1.00	559.8	67.8	Startup	15.8	18.7	22.8	0.0838	77.5	17.8	20.4	0.048	42.5	48.8	31.3	36.2	Startup	285
	6:00:00	45.3	1.00	1016	14.0	1.00	598.2	80.5	Startup	15.8	13.8	13.8	0.0500	50.8	4.3	4.3	0.010	10.2	43.5	28.4	28.4	Startup	276
	7:00:00	55.7	1.00	1239	87.4	1.00	626.8	106.4	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	80.4	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	85.9	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	27.8	22.9	Normal	229
	10:00:00	81.0	1.00	1788	98.6	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	1782	104.5	1.00	655.1	173.9	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	236
	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	78.3	1.00	1795	102.5	1.00	655.1	173.0	Normal	13.8	2.8	2.2	0.0078	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	2.8	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	78.8	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	169.9	Normal	13.8	2.6	2.2	0.0079	13.6	0.0	0.0	0.000	0.0	0.0	28.0	23.3	Normal	236
	18:00:00	63.0	1.00	1428	76.4	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	0.0078	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	14.8	3.8	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	Invalid	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	Invalid	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	Normal	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	1,026.05																
	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 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				1637.4	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	1,038.26	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	36.8				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	13.6	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	48.6	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	11461.8	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	116.4	1178.3	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	1,038.84	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	1,036.64	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	1485.8	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	1,075.83	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	1,076.10	1771.7	1.9	0.0	13.2	58.0	153.3	1133.9	10759.0	1794.9	1.9	0.1	13.0	46.1	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	1723.6	1.9	0.1	13.4	38.2	155.5	1134.5	10729.2
	5:00 PM	1,079.13	1626.3	1.9	0.0	13.3	61.6	163.0	1130.1	10634.1	1648.2	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	1,039.60	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	128.5	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	1466.1	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	10585.5	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	33.8	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				1637.4	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				1761.8	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	1,041.09	1643.0	1.9	0.0	13.7	43.5				1655.3	1.9	0.1	13.5	35.5			
	8:00 AM	1,036.26	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	36.8				1616.6	1.9	0.1	13.5	31.8			
	10:00 AM	1,028.97	1481.6	1.9	0.0	13.7	36.5				1490.8	1.9	0.1	13.5	31.5			
	11:00 AM	1,030.09	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	1478.3	1.9	0.0	13.8	36.8				1490.6	1.9	0.1	13.5	32.8			
	1:00 PM	1,034.26	1769.0	1.9	0.1	13.6	46.0	163.6	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	136.8	1136.9	10626.3	1548.3	1.9	0.1	13.5	33.8	139.5	1154.3	10656.7
	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	1126.6	10466.3
	4:00 PM	1,031.96	1761.0	1.9	0.1	13.6	48.6	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	1832.5	1.9	0.0	13.8	40.3	150.1	1123.7	10610.3	1841.2	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	146.4	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	1628.4	1.9	0.0	13.8	41.8	150.6	1122.3	10510.9	1636.1	1.9	0.1	13.6	33.5	151.0	1139.3	10548.8
	9:00 PM	1,037.38	1663.6	1.9	0.0	13.8	42.3	156.8	1113.5	10442.7	1669.7	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	1388.2	1.8	0.0	13.8	41.4	118.4	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	1,034.05	N/A	N/A	N/A	N/A	N/A	5.3	678.5	2767.0	1686.3	1.8	0.1	13.4	41.1	154.8	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	1,038.84	N/A	N/A	N/A	N/A	N/A	0.0	451.1	0.0	1498.0	1.9	0.1	13.5	31.1	129.5	1182.3	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	156.0	1131.8	10445.1
	6:00 AM	1,040.78	1451.2	3.5	0.0	13.7	47.4	129.0	1145.5	11089.4	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	1778.3	1.8	0.2	13.5	40.4	163.0	1125.3	10470.0
	9:00 AM	1,063.63	1588.5	1.9	0.0	13.7	40.3	144.1	1129.9	10827.7	1606.0	1.9	0.1	13.6	35.1	144.5	1146.8	10862.3
	10:00 AM	1,071.52	1675.3	1.9	0.0	13.7	43.7	151.8	1124.0	10720.8	1688.1	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	11281.0
	12:00 PM	1,075.63	1601.5	1.9	0.0	13.8	39.2	143.8	1132.3	10862.4	1611.8	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	1784.9	1.9	0.1	13.0	48.1	153.9	1142.9	10801.6
	2:00 PM	1,074.72	1749.9	1.9	0.0	13.5	55.5	158.4	1132.8	10648.3	1763.3	1.9	0.2	13.3	46.7	159.2	1138.0	10651.8
	3:00 PM	1,076.63	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	13.8	46.5	156.0	1123.6	10709.5	1723.8	1.9	0.1	13.4	38.2	156.5	1134.5	10729.2
	5:00 PM	1,079.13	1836.3	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	10869.8	1579.2	1.9	0.1	13.5	32.7	139.9	1153.3	10896.7
	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	1766.4	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	147.8	1123.0	10640.0	1647.6	1.8	0.1	13.5	35.5	148.1	1139.6	10656.9
	10:00 PM	1,076.84	1472.7	1.8	0.0	13.7	41.5	128.9	1148.5	11347.1	1488.0	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	1448.8	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	682.8	2918.3	1588.4	1.7	0.1	13.5	36.3	143.3	1146.3	10648.1
	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	1,052.76	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	1166.9	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	7246.1	1606.3	1.9	0.1	13.6	36.1	144.8	1144.8	10678.6
	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	13.6	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	1138.7	10734.7	1737.4	2.0	0.1	13.1	48.5	152.7	1161.6	10739.8
	9:00 AM	1,076.84	1957.0	1.9	0.0	12.7	75.3	165.8	1128.3	10585.5	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	13.628	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	10020.5	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	1046.8	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	1586.8	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	13.894	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	1852.5	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	13.869	65.20	174.1	1058.6	10985.7	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	1062.4	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	1853.8	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	13.606	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	45.51	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
5/9/06 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
5/9/06 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	1061	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	1.96	3.86	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	1.85	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 11:06	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	1.63	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
5/9/06 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~~ **1129.5**	1.7	11.8
	8-hour	3.7	~~479.5~~ **470.4**	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

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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

				(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	CA	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	ural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
LOAD LEVEL	BASE	BASE	PWR	80%	70%	60%	50%	40%	30%	20%	10%	FSNL
NET FUEL HEATING VALUE, Btu/lb_m (LHV)	19,522	19,522	19	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	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		41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0
AMBIENT WET BULB TEMPERATURE, °F	64.7	64.7		37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9	37.9
AMBIENT RELATIVE HUMIDITY, %	49.5	49.6		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	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		41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0
EVAPORATIVE COOLER STATUS / EFFECTIVENESS, %	OFF	85		OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
INLET PRESSURE LOSS, in. H_2O (Total)	4.3	4.5		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)	16.8	17.6		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)	13.7	14.3		11.8	10.2	8.7	7.3	6.4	5.9	5.3	4.8	4.3
INJECTION FLUID	—	—	St	—	—	—	—	—	—	—	—	—
INJECTION RATIO	—	—		—	—	—	—	—	—	—	—	—
FUEL FLOW, lb_m/hr	86,926	90,175	96	80,405	72,869	65,415	58,097	50,440	42,434	34,634	26,960	19,219
INJECTION RATE, lb_m/hr	—	—	135	—	—	—	—	—	—	—	—	—
HEAT INPUT, MMBtu/hr (LHV)	1,697	1,760	1	1,570	1,423	1,277	1,134	985	828	676	526	375
HEAT INPUT, MMBtu/hr (HHV)	1,881	1,951	2	1,739	1,576	1,415	1,257	1,091	918	749	583	416
EXHAUST TEMPERATURE, °F	1,108	1,100	1	1,078	1,078	1,078	1,078	1,026	918	812	705	596
EXHAUST FLOW, lb_m/hr	3,807,504	3,910,963	4,052	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	354	358		360	355	350	346	365	401	434	471	506
EXHAUST GAS COMPOSITION (% BY VOLUME):												
OXYGEN	12.52	12.38	1	12.79	12.96	13.16	13.40	14.04	15.09	16.12	17.14	18.18
CARBON DIOXIDE	3.82	3.85		3.78	3.70	3.61	3.50	3.19	2.71	2.23	1.75	1.26
WATER	8.71	9.15	1	7.73	7.59	7.41	7.20	6.63	5.70	4.80	3.89	2.98
NITROGEN	74.08	73.76	6	74.82	74.88	74.95	75.03	75.25	75.61	75.97	76.32	76.68
ARGON	0.87	0.86		0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.89	0.90
MOLECULAR WEIGHT	28.36	28.31	2	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 lo
- 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},
- 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 information is not intended to be used for evaluation of plant design and/or performance relative to contractual commitments. Impact Statement are strictly the customer's responsibility. Siemens is available to review permit application data upon requ

ATTACHMENT DR17-1

Table 3-1

Combined Impacts – CTG Commissioning and Startups/Shutdowns with Existing Equipment

Pollutant/Averaging Period	Combined Impacts Both CTGs ($\mu g/m^3$)	Combined Impacts Both CTGs, Units 4 and 5, Existing Peaking Gas Turbine ($\mu g/m^3$)
	CTG Commissioning	
NO_2 - 1-hour	127.3	----
CO - 1-hour	3323.8	3328.7
CO - 8-hour	1363.6	1364.8
	CTG Startups/Shutdowns	
NO_2 - 1-hour	87.4	-----
CO - 1-hour	1129.5	1133.6
CO - 8-hour	470.4	482.5

Cultural Resources (28 – 33)

Background

On page 5.3-17 of the Application for Certification (AFC), there is a reference to four historical societies that were contacted for information regarding historical resources in the project vicinity. Section 5.3.3.5.6 states that a summary of contacts is included in Appendix 5.3A; however, staff cannot identify any information regarding contacts with historical societies in that appendix.

Data Request

28. Please provide copies of correspondence or summaries of telephone conversations with local historical and/or archaeological societies that might have knowledge of historical or archaeological resources in the project area.

Response: The requested summary is provided as Attachment DR28-1.

Background

Page 5.3-16 of the AFC states that storage tanks Nos. 5, 6, and 7 on the Carlsbad project site are metal tanks that sit in deep containment pits with sloping concrete walls forming berms. Page 2-2 states that Cabrillo Power I LLC is currently removing the existing storage tanks and completing allowed general remediation of a portion of the storage tank area as part of ongoing operations and maintenance.

Data Request

29. Please provide a discussion of the fate of the cement berms that enclose tanks 5, 6, and 7, and include information regarding whether the area will be filled and graded, including the estimated depth of the fill or depth of the grading.

Response: The exterior berm (soil covered by concrete) that encloses Tanks 5, 6 and 7 will remain intact as part of the CECP, with the exception of the realignment of access roads into the bermed area for construction and operational support. The intermediate lateral berms (soil covered by concrete) located between Tanks 5 and 6, and Tanks 6 and 7 will be removed as identified in AFC Section 2.2.15, Project Construction, the paragraph beginning "The extent of the intermediate berm removal needed to prepare the CECP site is depicted in Figure 2.2-9..." The work is currently being proposed to be performed as part of a tank demolition project that is being permitted through the City of Carlsbad and the California Coastal Commission and which will precede the CECP.

As part of the CECP construction, mechanical grading will be conducted at the plant site and is not anticipated to exceed 3 feet below current ground surface. A recent geotechnical report was provided in the AFC as Appendix 5.4A (Majorien 2006). This report characterized the general area as comprising a layer of artificial fill between 3 and 9 feet deep.

Background

Page 5.3-13 of the AFC states that prior geotechnical evaluations within the plant site identify 10 feet of fill in the project area. Some of the archaeological reports identify archaeological sites that could not be completely evaluated because portions of the sites were located below existing pipes and structures. Appendix 5.4A includes EIR information produced by geotechnical borings that were conducted for the proposed Regional Seawater Desalination Project at Encina. The geotechnical report identified fill at various levels, and on page 8 describes different locations where the depth of fill varies from three to nine feet.

Data Request

30. If additional geotechnical borings are to be completed for this project, please have the borings inspected for cultural resources by an archaeologist and provide the information.

Response: Future geotechnical borings that have the potential to impact native soils will be monitored by a qualified archaeologist. Attachment DR30-1 provides the Applicant's proposed Conditions of Certification for cultural resources that include monitoring by a qualified archaeologist during ground disturbing activities.

31. Please explain whether tanks 5, 6, and 7 sit on fill or on native soil and the depth of the fill or soil.

Response: Tanks 5, 6 and 7 are located on fill material. The recent geotechnical report, provided as AFC Appendix 5.4A, characterized the general area as comprising a layer of artificial fill between 3 and 9 feet deep.

32. Please provide a discussion of the estimated depth of ground disturbance needed for power plant and linear facilities construction.

Response: The ground-disturbing activities associated with surface preparation of the plant site (grading and re-compaction) and placement of linear facilities are expected to impact no more than the first 3 feet of soil, characterized previously as artificial fill.

At the plant site, piles will be driven to support the foundation of the plant to an approximate depth of 50 feet below ground surface. Boring may precede or accompany pile driving. Consistent with the proposed archaeological monitoring measures described in AFC Section 5.3.5.3, a qualified archaeologist will monitor all boring activity that has the potential to impact native soils. Attachment DR30-1 provides the Applicant's proposed Conditions of Certification for cultural resources.

Background

Section 5.3.3.5 states that the area of potential effect (APE) for the project was determined in advance of field surveys in cooperation with Beverly Bastian of the Energy Commission on July 17, 2007. Ms. Bastian remembers, and her notes of the conversation support that the APE under discussion was an APE for built environment resources. Since the APE for built environment and archaeological resources is likely to be different, staff needs to know exactly how the project is defining the archaeological APE.

Data Request

33. Please identify the boundaries of the archaeological APE.

Response: As described in AFC Section 5.3.2.5.3, the APE surveyed by the archaeologist was up to a 200-foot buffer around the project area and stopped at the ATSF/BNSF railroad right-of-way (ROW). In addition, a 50-foot buffer on the east side of the railroad following the reclaimed water line alignment south from the plant site to Cannon Road was surveyed.

ATTACHMENT DR28-1

CARLSBAD ENERGY CENTER PROJECT CONSULTATION RECORD WITHLOCAL HISTORICAL SOCIETIES		
Historical Society / Organization	**Date & Time**	**Comments Summary**
Carlsbad Historical Society 258 Beech Street Carlsbad, Ca	**7/14/07** **10:30 AM**	Left voice message. No response. Society open Friday/Saturday 10 AM – 4 PM
San Diego County's Local Register of Historical Resources	**7/13/07**	This list was reviewed and no resources fall within one-mile of the Project.
San Diego Historical Society and Museum PO Box 81825 San Diego, CA 92138 (619) 232-6203	**7/13/07** **3:330 PM**	Referred to the Carlsbad Historical Society (760-434-9189).

ATTACHMENT DR30-1

CALIFORNIA ENERGY COMMISSION – FINAL DECISION, FEBRUARY 2005
EL SEGUNDO POWER REDEVELOPMENT PROJECT
Conditions of Certification

Cultural Resources

DESIGNATED CULTURAL RESOURCES SPECIALIST

CUL-1 Prior to the start of ground disturbance, the project owner shall submit the resume of the proposed Cultural Resources Specialist (CRS), and one alternate CRS, if an alternate is proposed, to the CPM for review and approval. The CRS will be responsible for implementation of all cultural resources conditions of certification and may obtain qualified cultural resource monitors (CRMs) to monitor as necessary on the project.

The resume for the CRS and alternate, shall include information that demonstrates that the minimum qualifications specified in the U.S. Secretary of Interior Guidelines, as published by the CFR 36, CFR Part 61 are met. In addition, the CRS shall have the following qualifications:

a. The technical specialty of the CRS shall be appropriate to the needs of the project and shall include, a background in anthropology, archaeology, history, architectural history or a related field;
b. At least three years of archaeological or historic, as appropriate, resource mitigation and field experience in California; and

The resume shall include the names and phone numbers of contacts familiar with the work of the CRS on referenced projects and demonstrate that the CRS has the appropriate education and experience to accomplish the cultural resource tasks that must be addressed during ground disturbance, grading, construction and operation. In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed CRS or alternate has the appropriate training and background to effectively implement the conditions of certification.

CRMs shall meet the following qualifications:

a. A BS or BA degree in anthropology, archaeology, historic archaeology or a related field and one year experience monitoring in California; or
b. An AS or AA in anthropology, archaeology, historic archaeology or a related field and four years experience monitoring in California; or

c. Enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historic archaeology or a related field and two years of monitoring experience in California.

The project owner shall ensure that the CRS completes any monitoring, mitigation and curation activities necessary; fulfills all the requirements of these conditions of certification; ensures that the CRS obtains technical specialists, and CRMs, if needed; and that the CRS evaluates any cultural resources that are newly discovered or that may be affected in an unanticipated manner for eligibility to the California Register of Historic Resources (CRHR). 45 days prior to the start of ground disturbance. At least 10 days prior to a termination or release of the CRS, the project owner shall submit the resume of the proposed replacement CRS. At least 20 days prior to ground disturbance, the CRS shall submit written notification identifying anticipated CRMs for the project stating they meet the minimum qualifications required by this condition. If additional CRMs are needed later, the CRS shall submit written notice one week prior to any new CRMs beginning work.

PROJECT MAPS SHOWING GROUND DISTURBANCE

CUL-2: Prior to the start of ground disturbance, the project owner shall provide the CRS and the CPM with maps and drawings showing the footprint of the power plant and all linear facilities. Maps will include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1" = 200') for plotting individual artifacts. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM.

If the footprint of the power plant or linear facilities changes, the project owner shall provide maps and drawings reflecting these changes, to the CRS and the CPM for approval. Maps shall identify all areas of the project where ground disturbance is anticipated.

If construction of the project will proceed in phases, maps and drawings, not previously submitted, shall be submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

At a minimum, the CRS shall consult weekly with the project construction manager to confirm area(s) to be worked during the next week, until ground disturbance is completed.

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification: The project owner shall submit the subject maps and drawings at least 40 days prior to the start of ground disturbance.

If there are changes to any project related footprint, revised maps and drawings shall be provided at least 15 days prior to start of ground disturbance for those changes.

If project construction is phased, the project owner shall submit the subject maps and drawings 15 days prior to each phase.
A current schedule of anticipated project activity shall be provided to the CRS on a weekly basis during ground disturbance and also provided in each Monthly Compliance Report (MCR).

The project owner shall provide written notice of any changes to scheduling of construction phases within 5 days of identifying the changes. A copy of the current schedule of anticipated project activities shall be submitted in each MCR.

CULTURAL RESOURCES MONITORING AND MITIGATION PLAN
CUL- 3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by the CRS, to the CPM for approval. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Copies of the CRMMP shall reside with the CRS, alternate CRS, each monitor, and the project owner's on-site manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures.

1. The following statement shall be added to the Introduction: Any discussion, summary, or paraphrasing of the conditions in this CRMMP is intended as general guidance and as an aid to the user in understanding the conditions and their implementation. If there appears to be a discrepancy between the conditions and the way in which they have been summarized described, or interpreted in the CRMMP, the conditions, as written in the Final Decision, supersede any interpretation of the Conditions in the CRMMP. The cultural resources conditions of certification are attached as an appendix to this CRMMP.

2. A proposed general research design that includes a discussion of research questions and testable hypotheses applicable to the project area. A refined research design will be prepared for any resource where data recovery is required.

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during ground disturbance, construction, and post-construction analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities; and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A discussion of the inclusion of Native American observers or monitors, the procedures to be used to select them, and their role and responsibilities.

6. A discussion of all avoidance measures such as flagging or fencing, to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during construction and/or operation, and identification of areas where these measures are to be implemented. The discussion shall address how these measures will be implemented prior to the start of construction and how long they will be needed to protect the resources from project-related effects.

7. A discussion of the requirement that all cultural resources encountered will be recorded on a DPR form 523 and mapped (may include photos). In addition, all archaeological materials collected as a result of the archaeological investigations (survey, testing, data recovery) shall be curated in accordance with The State Historical Resources Commission's "Guidelines for the Curation of Archaeological Collections," into a retrievable storage collection in a public repository or museum. The public repository or museum must meet the standards and requirements for the curation of cultural resources set forth at Title 36 of the Federal Code of Regulations, Part 79.

8. A discussion of any requirements, specifications, or funding needed for curation of the materials to be delivered for curation and how requirements, specifications and funding will be met. The name and phone number of the contact person at the institution. Include a statement in the discussion of requirements that the project owner will pay all curation fees and that any agreements concerning curation will be retained and available for audit for the life of the project.

9. A discussion of the availability and the designated specialist's access to equipment and supplies necessary for site mapping, photographing, and recovering any cultural resource materials encountered during construction.

10. A discussion of the proposed Cultural Resource Report (CRR) which shall be prepared according to Archaeological Resource Management Report (ARMR) Guidelines.

Verification: The project owner shall submit the subject CRMMP at least 30 days prior to the start of ground disturbance. Per ARMR Guidelines the author's name shall appear on the title page of the CRMMP. Ground disturbance activities may not commence until the CRMMP is approved. At least 30 days prior to ground disturbance, a letter shall be provided to the CPM indicating that the project owner will pay curation fees for any

materials collected as a result of the archaeological investigations (survey, testing, data recovery).

CULTURAL RESOURCES REPORT

CUL-4 The project owner shall submit the Cultural Resources Report (CRR) to the CPM for approval. The CRR shall report on all field activities including dates, times and locations, findings, samplings and analysis. All survey reports, DPR 523 forms and additional research reports not previously submitted to the California Historic Resource Information System (CHRIS) shall be included as an appendix to the CRR.

Verification: The project owner shall submit the subject CRR within 90 days after completion of ground disturbance (including landscaping). Within 10 days after CPM approval, the project owner shall provide documentation to the CPM that copies of the CRR have been provided to the curating institution (if archaeological materials were collected), the State Historic Preservation Officer (SHPO) and the CHRIS.

WORKER ENVIRONMENTAL AWARENESS PROGRAM

CUL-5 Worker Environmental Awareness Program (WEAP) shall be provided, on a weekly basis, to all new employees starting prior to and for the duration of, ground disturbance.

The training may be presented in the form of a video. The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Samples or visuals of artifacts that might be found in the project vicinity;
3. Information that the CRS, alternate CRS, and CRMs have the authority to halt construction to the degree necessary, as determined by the CRS, in the event of a discovery or unanticipated impact to a cultural resource;
4. Instruction that employees are to halt work on their own in the vicinity of a potential cultural resources find, and shall contact their supervisor and the CRS or CRM; redirection of work will be determined by the construction supervisor and the CRS;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. An acknowledgement form signed by each worker indicating that they have received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification: The project owner shall provide in the Monthly Compliance Report the WEAP Certification of Completion form of persons who have completed the training in the prior month and a running total of all persons who have completed training to date.

CULTURAL RESOURCES MONITORING

CUL-6: The CRS, alternate CRS, or monitors shall monitor ground disturbance full time in the vicinity of the project site, linear facilities and ground disturbance at laydown areas or other ancillary areas to ensure there are no impacts to undiscovered resources and to ensure that known resources are not impacted in an unanticipated manner. In the event that the CRS determines that full-time monitoring is not necessary in certain locations, a letter or e-mail providing a detailed justification for the decision to reduce the level of monitoring shall be provided to the CPM for review and approval prior to any reduction in monitoring.

CRMs shall keep a daily log of any monitoring or cultural resource activities and the CRS shall prepare a weekly summary report on the progress or status of cultural resources-related activities. The CRS may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

The CRS shall notify the project owner and the CPM, by telephone or e-mail, of any incidents of non-compliance with any cultural resources conditions of certification within 24 hours of becoming aware of the situation. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the conditions of certification. Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these conditions of certification.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Informational lists of concerned Native Americans and Guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that will be monitored.

Verification:

1. During the ground disturbance phases of the project, if the CRS wishes to reduce the level of monitoring occurring at the project, a letter identifying the area(s) where the CRS recommends the reduction and justifying the reductions in monitoring shall be submitted to the CPM for review and approval.
2. During the ground disturbance phases of the project, the project owner shall include in the MCR to the CPM copies of the weekly summary reports prepared by the CRS regarding project-related cultural resources monitoring. Copies of daily logs shall be retained onsite and made available for audit by the CPM.
3. Within 24 hours of recognition of a non-compliance issue, the CRS shall notify the CPM by telephone of the problem and of steps being taken to resolve the problem. The telephone call shall be followed by an e-mail or fax detailing the non-compliance issue and the measures necessary to achieve resolution of the issue. Daily logs shall include forms detailing any instances of non-compliance with conditions of certification. In the event of a non-compliance issue, a report written no sooner than

two weeks after resolution of the issue that describes the issue, resolution of the issue and the effectiveness or the resolution measures, shall be provided in the next MCR.

4. One week prior to ground disturbance in areas where there is a potential to discover Native American artifacts, the project owner shall send notification to the CPM identifying the person(s) retained to conduct Native American monitoring. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM who will initiate a resolution process.

DESIGNATED CULTURAL RESOURCE SPECIALIST AUTHORITY

CUL-7 The CRS, alternate CRS and the CRMs shall have the authority to halt construction if previously unknown cultural resource sites or materials are encountered, or if known resources may be impacted in a previously unanticipated manner. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor.

If such resources are found or impacts can be anticipated, the halting or redirection of construction shall remain in effect until all of the following have occurred:

1. the CRS has notified the project owner, and the CPM has been notified within 24 hours of the find description and the work stoppage.;
2. The CRS, the project owner, and the CPM have conferred and determined what, if any, data recovery or other mitigation is needed;
3. Any necessary data recovery and mitigation has been completed.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM with a letter confirming that the CRS, alternate CRS and CRMs have the authority to halt construction activities in the vicinity of a cultural resource find, and that the CRS or project owner will notify the CPM immediately (no later than the following morning of the incident or Monday morning in the case of a weekend) of any halt of construction activities, including the circumstance and proposed mitigation measures. The project owner shall provide the CRS with a copy of the letter granting the authority to halt.

WATER PIPELINE REALIGNMENT

CUL-8 The route for the water lines shall extend down Grand Avenue to Eucalyptus St. to El Segundo Blvd, which is within the water pipeline study area, bordered by El Segundo Blvd., Loma Vista St., Grand Ave. and Eucalyptus St. (Applicant has conducted a cultural resources assessment in the pipeline study area and within the area defined as the proposed project). If the water lines and associated pipelines are to be located anywhere but in an area originally defined as part of the proposed project, a cultural resource assessment shall be conducted prior to any ground disturbance. The cultural resource assessment shall consist of a records search and a pedestrian survey. This approach gives equal emphasis to

prehistoric and historic resources and an evaluation of significance. A Native American monitor from a group with historic ties to the affected area shall be retained as part of the cultural resources team during any surveys or subsurface investigation.

Verification: Forty days prior to the start of any ground disturbance or project site preparation at the newly identified location of the waterlines and associated pipelines, the project owner shall submit the following for approval by the CPM: (1) the results of the records search and the results of the survey; (2) an evaluation, including site records, of all cultural resources within or adjacent to the project Area of Potential Effects; and (3) the information shall also include the name and tribal affiliation of the Native American monitor.

Power Plant Efficiency (34)

Background

Section 2.2.8 of the AFC states that the plant's air-cooled condenser system will be designed to normally operate at a pressure of about 17 psig (pounds-force pre square inch gage). Figure 2.2-5 of the AFC indicates that all pressures are absolute, or psia. Staff needs clarification about the units used in the AFC.

Data Request

34. Please clarify which one of the above units is correct.

Response: The heat balance AFC Figure 2.2-5 is from the equipment supplier and is correct. The reference in Section 2.2.8 should be revised to psia.

Public Health (35)

Background

An applicant's health risk assessment should be both transparent and verifiable to reviewers. Staff has spent some time reviewing the modeling files provided by the applicant and is unable to find all of the information needed to quantitatively verify the risk results.

Data Request

35. Please provide the following information on sources and buildings at this project site:

    - Stack parameters and locations in Universal Transverse Mercator (UTM) coordinates (2 turbines and the firewater pump).
    - Information on project buildings and tanks used in the building downwash analysis (locations in UTM coordinates and dimensions).

Response: The stack parameters for the gas turbines and fire water pump engine are located in the following AERMOD input file on the enclosed modeling file CD (labeled "CECP Modeling Files"): zipped folder AER_2003.zip, file "encn0339.ADI." The UTM coordinates for the same emission sources and buildings are contained in the file "enc1_wtier5.bpi," which is located in the zipped file "BPIP_Fumig.zip" on the enclosed modeling CD. Building dimensions are presented in AFC Table 5.1D-1.

Socioeconomics (36)

Background

The applicant states on page 5.10-19, Section 5.10.4.3.5, that of the $245 to $315 million in materials and supplies required for construction that "the estimated value of materials and supplies that will be purchased locally (within San Diego County) is $30 million." However, the applicant assumes on pages 5.10-19, Single Phase Construction, and 5.10-20, Phased Construction, that all of the sales will be made in Carlsbad.

Data Request

36. Given the relatively small size of the city of Carlsbad, please clarify whether the $30 million local materials and supplies construction budget would be spent within the city or over a much larger geographic area.

Response: As stated in AFC Section 5.10.4.1, for this project, the County of San Diego is considered the region of influence. San Diego County was also used for the IMPLAN modeling in Section 5.10.4.3.4. Although it cannot be determined at this time where spending will occur, most local spending is projected to occur within San Diego County, i.e., within both the cities and unincorporated areas of the county. The statement on page 5.10-19, Single Phase Construction, and page 5.10-20, Phased Construction, that "[a]ssuming all local sales are made in Carlsbad" was just an assumption to determine the maximum sales tax revenue that could go to the City of Carlsbad. Therefore, some sales will likely occur within Carlsbad but most local spending will likely occur outside the city. Hence, the revenue received by the City of Carlsbad from sales tax will likely be less than the maximum amount provided in the AFC text.

Soil and Water Resources (37 – 51)

Background

In a letter dated July 6, 2007, the applicant for the proposed Carlsbad Energy Center Project (CECP) requested that the City of Carlsbad provide a "Will Serve" letter for the supply of reclaimed and potable water and for the City to provide the interconnection for sewer discharge.

The city's Planning Department, by letter dated October 24, 2007, provided Energy Commission staff with a list of concerns regarding the Application for Certification (AFC) for the project.

Issue No. 47 of the city's letter states: *The City does not have adequate recycled water production capacity to satisfy the process water demands of the CECP in the peak summer months.*

Issue No. 48 states: *The waste water (sewer) needs to consist of two components; domestic and industrial waste. The City has adequate capacity and treatment capabilities for all domestic needs identified in the AFC. The industrial waste, as described in the AFC would be transmitted via a dedicated pipeline to the ocean outfall system located at the Encina Water Pollution Control Facility (EWPCF).*

Staff needs the "Will Serve" letters from the city for the long-term delivery of recycled and potable water for CECP and for the acceptance of domestic and industrial wastewater to complete its analysis.

Data Request

37. Please provide a "Will Serve" letter from the city of Carlsbad, which commits the City to the long-term delivery (30 – 35 years) of 516 acre-feet per year of recycled water with a peak delivery rate of 945 gallons per minute.

Response: The Applicant is continuing to work and coordinate with the staff of the City of Carlsbad to arrange for an agreement with the City to provide the long-term delivery of the CCR Title 22 reclaimed water volume and peak flow rate required by the CECP. The Applicant and City staff are discussing various methods to provide the reclaimed water volume and peak flow rate required by the project. The Applicant will provide a copy of the "Will Serve Letter" from the City of Carlsbad when it is available.

38. Please discuss the applicant's plans for addressing the city's Issue No. 47 regarding inadequacy of reclaimed water supply for meeting CECP needs during peak summer months.

Response: The Applicant and City staff are discussing various methods to provide CCR Title 22 reclaimed water volume and peak flow rate required by the project during peak summer months.

39. Please explain the discrepancy between the city's letter of October 24, 2007, and the AFC Supplement Record of Conversation Attachment WR-3A with the City Engineer stating that there is adequate reclaimed water.

Response: AFC Supplement Record of Conversation Attachment WR-3A accurately summarizes the discussion a member of the Applicant's project team had with a member of the City of Carlsbad's technical staff regarding the availability of adequate volumes and peak flow rate to provide the CCR Title 22 reclaimed water required by the project., including during peak summer months. While the Applicant cannot speak for the City regarding the City's position stated in Issue No. 47 of the City's letter of October 24, 2007, it appears to the Applicant that there may be a difference of opinion between the City's technical staff and the City's policy staff.

Published information indicates that the current demand for reclaimed water is approximately 1.7 million gallons per day (mgd). Per the City web site, in 1997 the peak supply available was at 2.75 mgd with a current or near future capacity of up to 8.0mgd. Please see response 41 below.

As noted in Data Responses 37 and 38 above, the Applicant is continuing to work and coordinate with the staff of the City of Carlsbad to arrange for an agreement with the City to provide the long-term delivery of the CCR Title 22 reclaimed water volume and peak flow rate required by the CECP. The Applicant and City staff are discussing various methods to provide the reclaimed water volume and peak flow rate required by the project.

40. Please provide a table of the current recycled water customers served by the city of Carlsbad Water Recycling Facility (CWRF), and list their contractual delivery amounts from the CWRF.

Response: A list of the current recycled water customers is provided below. The City of Carlsbad has no contracts with any of its reclaimed water users.

Aalto Scientific
Agua Hedionda Lagoon Foundation
Allen Development of Southern Calif.
Ashbrook Development
Aviara FSRC Association
Aviara Premier Collection
Aviara Seven HOA
Bay Collection
Blackmore Family Trust
BOI Pacific Ridge
Bressi Ranch HOA
Buffini And Company
Calavera Hills II HOA
Cantamar Carlsbad HOA
Carlsbad Canterbury HOA
Carlsbad Ocean Terraces
Affirmed Housing Group
Aldea at Aviara
Archstone Communities
Asymtek
Aviara Master Association
Aviara Resort Association
Avocet
Black Rail Ridge HOA
Bob Baker
Bressi Gardenlane
Bridge Housing
C B Investment Properties
Calavera Hills Master Association
Carlsbad Business Park
Carlsbad Oaks Business Park
Carlsbad Parkside HOA

Carlsbad Ranch
Carlsbad Research Center
Carlsbad Shore Pointe HOA
Carlsbad Technology, Inc.
Carlsbad Unified School District
Cascada at Rancho Carrillo
Chelsea Investment Corporation
Cherry Tree Walk HOA
City Of Carlsbad
City Of Carlsbad Faraday
City Of Carlsbad Library
City Of Carlsbad Parks
City Of Carlsbad Sanitation
Costco Wholesale Corporation
CPG Carlsbad Holdings
Crestone Group Baking Company
Daybreak Church
DEI
Dove Family Housing
Emerald Lake Corporate Center
Four Seasons Resort
Gemological Institute
Graham Webb International
Grand Pacific Resort
Greyhawk Business Center Association
H G Fenton
Hanover Beach Colony Association
Harris Yut
Helen Kim
Heron Bay/Spyglass Hills HOA
Interior Specialist
Invitrogen
Isis Pharmaceuticals
Isla Mar at Aviara HOA
Island at Carlsbad Food Court
Islands Restaurant
Kelly Corporate Center Ii
Kemper Sports Management
Kinder Care
KSL La Costa Resort Corporation
La Costa Greens Community Association
La Terraza Associates
Lanikai Partners II
Laurel Tree Apartments
Legoland Estates
Lennar Communities
Lionshead Investment
Mar Brisas HOA
Mariners Point HOA
McMillin Homes
Morgan-Alton
Morning Ridge HOA
Morrow Development
Muller Center Point
Mystic Point HOA
National Association Of Music Merchants
Opus West Corporation
Pacific Vista Las Flores
Palomar Forum Masters Association
Palomar Lowe
Palomar Oaks Pointe
Pat and Oscars Restaurant
Pinnick
Plaza Paseo Real Estate Associates
Poinsettia Cove Fieldstone
Poinsettia Cove HOA
Pulse-Link
Rancho Carrillo HOA
Rancho Carrillo Master Association
Realty Associates Fund VII
Rio San Diego Plaza II Master LLC
Saint Croix Capital Corporation
Salk Owners Association
Saltaire HOA
San Diego Gas & Electric
San Marcos Unified School District
Sea Cliff HOA
Seabright Carlsbad
Seaside Estates Community Association
Seaside Heights HOA
Sports Giant
SSR Western Multifamily
State Department Of Transportation
Standard Pacific Homes
Sunrise Assisted Living
T H D C Enterprises
Taylor Made Golf
Tech Contractors
Terraces at Sunny Creek HOA
Terraces at Sunny Creek LLC
The Tradition Apartment Homes
Tramonto HOA
United States Postal Service
Valencia - Rancho Carrillo HOA

Viadana HOA
Warmington Homes
Zimmer Dental
Viasat
Waters End HOA

41. Please provide a discussion of the recycled water supply reliability based on current and future supply and demand projections for recycled water from the CWRF.

Response: The following is taken from page 18 of the City of Carlsbad's 2005 Urban Water Management Plan section on recycled water.

The District's 1997 Recycled Water Master Plan Update identified a recommended expansion of the recycled water system that will increase peak supply from 2.75mgd to 8.0 mgd. This expansion is referred to as Phase II and, as described in the plan, includes: constructing a new 4 mgd water recycling facility near the existing Encina Water Pollution Control Facility and expanding the Meadowlark facility by 1 mgd: constructing 24 miles of 12 to 24-inchdistribution and transmission pipelines: and constructing new recycled water pumping stations. Improvements to an existing earthen dam storage reservoir, referred to as the Mahr Reservoir, for recycled water storage were also recommended.

Since 1993, the CMWD has been constructing pipelines and requiring developers to install recycled water facilities in anticipation of the Phase II program. Thus, many existing potable water irrigation systems are accepting recycled water with little or no modification. Many of the Phase II users are located adjacent to existing recycled water pipelines.

In order to fully implement Phase II expansion, CMWD has:

- Completed all regulatory requirements that affect recycled water production, storage, distribution, and end use.
- Addressed all institutional requirements that could have constrained the phased expansion of the system.
- Completed all internal requirements imposed by the expansion, including adequate staffing for design and construction review and coordination, and adequate system monitoring to ensure ongoing refinement of preliminary design assumptions.
- Completed construction for most critical and/or longest-lead facilities such as the 4.0 mgd Carlsbad Water Recycling Facility in compliance with Bureau of Reclamation and State Water Resources Control Board funding requirements.
- Completed constructing pipelines.
- Completed three of four pumping stations.
- Began constructing the improvements to Mahr Reservoir and the Supervisory Control and Data Acquisition system.

Most of the Phase II system expansion was completed in 2005 and 2006. The District is presently working on connecting new customers such as developers and retrofitting existing irrigation sites to use recycled water.

42. Please provide a "Will Serve" letter from the city of Carlsbad, stating that the City will accept CECP's domestic wastewater at an average discharge rate of 12 gallons per minute.

Response: The Applicant is continuing to work and coordinate with the staff of the City of Carlsbad to arrange for an agreement with the City to accept the project's domestic wastewater at an average discharge rate of 12 gallons per minute. The Applicant will provide a copy of the "Will Serve Letter" from the City of Carlsbad when it is available.

43. Please list and discuss any conditions the city may have for domestic wastewater quantity and quality limits, hookup requirements and fees, and ownership of all infrastructure required to transmit the CECP's domestic wastewater to the City's wastewater treatment plant.

Response: Per the last City of Carlsbad Sewer Master Plan Update dated March 2003 the wastewater trunk line (labeled VC 13) that will serve the power plant has a projected ultimate flow that exceeds the current 42-inch pipe capacity. The City plans on building a new 54-inch-diameter pipeline to replace the existing 42-inch line along the power plant to meet ultimate flow requirements. The City's current Capital Improvement Program shows funding for that construction in 2008-2009. Sufficient capacity in the new pipeline will be owned by the City of Carlsbad. Sewer laterals from the power plant to the trunk line will be owned by the property owner.

The City may require that this new sewer line be in place prior to wastewater flows exceeding the current pipeline capacity. Use, ownership and maintenance of the sewer lines are covered in the Carlsbad Municipal Code (CMC) Section 13.04. Sewer connections and capacity permits and fees including industrial wastewater are covered under CMC 13.10 and CMC 13.16. (See Attachment DR43-1)

There is a joint powers agreement covering the ownership of the EWPCF and ocean outfall. Carlsbad is a member of that joint powers authority.

44. Please provide a "Will Serve" letter from the city of Carlsbad, stating that the city will accept CECP's industrial wastewater at an average discharge rate of 107.2 gallons per minute.

Response: The Applicant and City staff are discussing various methods for the City to accept the project's industrial wastewater stream. The Applicant will provide a copy of the "Will Serve Letter" from the City of Carlsbad when it is available.

45. Please list and discuss any conditions the city may have for quantity and quality limits for industrial wastewater, hookup requirements and fees, and ownership of all infrastructure required to transmit the CECP's industrial wastewater to the ocean outfall system located at the EWPCF.

Response: As discussed in Data Response 43 above, the Applicant and the City staff are discussing various methods for the City to accept the project's industrial wastewater stream. These discussions will address and resolve conditions the City may have regarding quantity and quality limits, hookup requirements and fees, and infrastructure ownership. The "Will Serve" letter will set forth the agreed upon discharge method and conditions related to the discharge of the project's industrial wastewater stream. The Applicant will provide a copy of the "Will Serve Letter" from the City when it is available.

Background

The CECP proposes to use California Code of Regulations (CCR) Title 22 recycled water as the primary source of process water for the CECP as well as the source for landscape irrigation water. The California Code of Regulations has a number of treatment standards and use restrictions for recycled water under the provisions of Title 22 recycled water.

Data Request

46. Please define the level of Title 22 treatment (disinfected tertiary, disinfected secondary-2.2, or disinfected secondary-23) of all recycled water sources proposed for use at the CECP.

Response: The CECP would use disinfected tertiary reclaimed water. That is the level of treatment provided by the Carlsbad Water Reclamation Facility (WRF).

47. Please provide a discussion of the permits and oversight requirements of the San Diego Regional Water Quality Control Board (SDRWQCB), Department of Health Services (DHS), and the city of Carlsbad for the supply and use of recycled water at the CECP.

Response: Reclaimed water will be provided by the City of Carlsbad; specific terms and conditions regarding the User Agreement have not been negotiated. It is expected, however, that the CECP will require reclaimed water of a specified quantity and quality. The City will require payment for the quantity of water specified by the CECP, and it is expected that the City will control the possibility of cross-connections between potable and reclaimed water systems.

Pursuant to a Memorandum of Agreement, the California Regional Water Quality Control Boards regulate recycled water systems with technical guidance and criteria provided by the California Department of Public Health (formerly DHS). Under this system, the Carlsbad WRF is regulated by the RWQCB - San Diego Region. The Carlsbad WRF operates pursuant to a Master Reclamation Permit from the RWQCB - San Diego Region (Order No. 2001-352). Under a Master Reclamation Permit, there are no specific oversight requirements between the regulatory agencies and the end users. Therefore, there will be no regulatory relationship between the CECP and the RWQCB - San Diego Region.

48. Please discuss whether a board hearing will be required per the provisions of Water Code Section 13523 et seq.

Response: The Master Reclamation Permit for the Carlsbad WRF was adopted pursuant to Water Code Section 13523. No hearing is required for individual end users such as the CECP.

49. Please provide the names and telephone numbers of the SDRWQCB and DHS personnel who are responsible for the proposed recycled water permitting and use.

Response: As described above, the CECP will not be required to work directly with the RWQCB - San Diego Region or the Department of Public Health.

Background

Due to the proximity of the proposed CECP to sensitive aquatic resources, the CECP would need to comply with all federal and state stormwater discharge requirements. Pursuant to the Clean Water Act, a Municipal Storm Water NPDES Permit (No. CAS0108758) was issued to San Diego County and 18 cities including the city of Carlsbad. The city's municipal permit requires the development and implementation of stormwater regulations addressing stormwater pollution in development and construction of private and public projects. In order for the CECP to meet the city's municipal permit requirements, proper integration of the CECP site design that identifies specific source and treatment control best management practices (BMPs) is essential for compliance with federal and state stormwater pollution standards.

Data Request

50. Please provide a completed Stormwater BMP Applicability Checklist that meets the city's municipal permit standards.

Response: The completed Stormwater BMP Applicability Checklist is attached (Attachment DR50-1). The Stormwater BMP Applicability Checklist was referred to during the preparation of the proposed Construction SWPPP (AFC Appendix 5.15C) and proposed Industrial SWPPP (AFC Appendix 5.15D). These SWPPPs are intended to serve as the Preliminary Storm Water Management Plans for the CECP. These documents include the appropriate BMPs based on the Stormwater BMP Applicability Checklist.

51. Per the city's municipal permit requirements, please provide the Preliminary Storm Water Management Plan for the CECP site and linear facilities (based on the CECP's priority as determined by the Stormwater BMP Applicability Checklist). Include existing and proposed drainage patterns based on the CECP's design plans and preliminary hydrology calculations.

Response: As discussed in Data Response 50 above, the proposed Construction SWPPP (AFC Appendix 5.15C) and proposed Industrial SWPPP (AFC Appendix 5.15D) are intended to serve as the Preliminary Storm Water Management Plans for the CECP. These documents include the appropriate BMPs based on the Stormwater BMP

Applicability Checklist, and also include information on existing and proposed drainage patterns. Preliminary hydrology calculations were provided with the AFC (Appendix 5.15B).

Title 13 SEWERS*

ATTACHMENT DR43-1

Chapter 13.04 GENERAL REGULATIONS*

* Prior ordinance history: Ords. 5032, 7023.

13.04.010 Definitions.

A. For the purposes of this chapter, the following words and phrases shall have the meanings respectively ascribed to them by this section:
1. "Department" means the public works department of the city.
2. "District" means the city of Carlsbad unless otherwise identified.
3. "Garbage" means the animal and vegetable waste from the handling, preparation, cooking, and dispensing of food.
4. "Grease" means any material which is extractable from an acidified sample of a waste by hexane or other designated solvent and as determined by the appropriate procedure in standard methods. "Grease" includes fats and oils.
5. "Grease interceptor" means a pretreatment device designed and installed to separate fats, oils, and grease from wastewater.
6. "Industrial waste" means solid, liquid or gaseous substances discharged or flowing from an industrial, manufacturing or commercial premises resulting from manufacturing, processing, treating, recovery or development of natural or artificial resources of whatever nature.
7. "Industrial wastewater" means all water-carried wastes and wastewater of the community excluding domestic wastewater and including all wastewater from any industrial production, manufacturing, processing, commercial, agricultural or other operation. These may also include wastes of human origin similar to domestic wastewater.
8. "Joint sewer system" means the sewer system constructed jointly by the Vista Sanitation District, the city and the Buena Sanitation District pursuant to that certain contract entitled "Basic Agreement between Vista Sanitation District and the City of Carlsbad for the Acquisition and Construction of a Joint Sewer System" (County Contract No. 1858-2129E) and all amendments and supplements thereto and as such sewer system is specifically delineated on that certain map entitled "Map of Joint Sewer System—City of Carlsbad, Vista Sanitation District and Buena Sanitation District" on file in the office of the clerk of the board of supervisors of the Buena Sanitation District as Document No. 381247.
9. "Operator" means the Encina Administrative Agency.
10. "Owner" includes a holder in fee, life tenant, executor, administrator, trustee, guardian or other fiduciary, lessee or licensee holding under any government lease or license of real property.
11. "Person" means any person, firm, company, association, corporation, political subdivision, municipal

corporation, district, the state, the United States of America or any department or agency of any thereof.
12. "pH" means the reciprocal of the logarithm of the hydrogen ion concentration. It indicates the intensity of acidity and alkalinity on a pH scale running from zero to fourteen. A pH value of 7.0, the midpoint of the scale, represents neutrality. Values above 7.0 indicate alkalinity and those below 7.0 indicate acidity.
13. "Premises" means any lot, piece or parcel of land, building or establishment.
14. "Public works director" means the director of public works of the city or his designee.
15. "Sanitary sewer overflow (SSO)" means and includes any overflow, spill, release, discharge or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs include:
a. Overflows or releases of untreated or partially treated wastewater that reach waters of the United States:
b. Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and
c. Wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publicly owned portion of a sanitary sewer system.
16. "Sewage" means the waterborne wastes derived from ordinary human living processes and of such character as to permit satisfactory disposal, without special treatment, into the public sewer, a private sewer, or by means of household septic tank systems and individual household aerobic units.
17. Sewer, Building or House. "Building or house sewer," also known as the "lateral," or the "sewer lateral" means a pipe or conduit carrying sanitary sewage and/or industrial wastes from a building to the public sewer or a common sewer.
18. Sewer, Main. "Sewer main" means any public sewer used to collect and convey sewage or industrial wastes to a publicly owned treatment works (POTW).
19. Sewer, Private. "Private sewer" refers to a privately owned sewer, which is not directly controlled by the city.
20. Sewer, Public. "Public sewer" means a publicly owned treatment works (POTW), which is owned in this instance by Encina Joint Powers and its member agencies. This definition includes the sewer main and any sewers that convey wastewater to the POTW plant, but does not include pipes, sewers or other conveyances not connected to the facility providing treatment. "Public sewer" also includes any sewers that convey wastewater to the POTW from persons outside the cities of Carlsbad and Vista, the Vallecitos Water District, the Leucadia Wastewater District, the Buena Sanitation District and Encinitas Sanitary District, who are, by contract or agreement with said cities and/or districts, users of the Encina Water Pollution Control Facility.
21. "Sewer system" or "sanitary sewer system" means all construction and appurtenant equipment utilized in the collection, transportation, pumping, treatment and final disposal of sewage within the district.
22. "Slug" means any discharge of water, sewage or industrial wastes which in concentration of any given constituent or in quantity of flow exceeds for any period of duration longer than fifteen minutes more than five times the average twenty-four-hour concentration of flows during normal operation.
23. "Standard methods" means the current edition of Standard Methods for the Examination of Water and Wastewater as published by the American Public Health Association, and Water Pollution Control Federation.
24. "Suspended solids" or "SS" means solids that either float on the surface of, or are in suspension in water, sewage or other liquids; and which are largely removable by laboratory filtering and as determined by the appropriate procedure in standard methods.
25. "Toxic substances" means any substance whether gaseous, liquid or solid, which when discharged to the sewer system in sufficient quantities may tend to interfere with any sewage treatment process, or to constitute a hazard to human beings or animals, or to inhibit aquatic life or create a hazard to recreation in the receiving waters of the effluent from the sewage treatment plant.
26. "Wastewater" means any liquid waste of any kind, whether treated or not, and whether animal, mineral or vegetable including sewage, agricultural, industrial and thermal wastes, which are discharged into or permitted to enter a public sewer. (Ord. NS-851 § 1, 2007: Ord. NS-129 § 1, 1990: Ord. 7060 § 1 (part), 1980)

13.04.020 Unsanitary deposits.

It is unlawful for any person to place, deposit or permit to be deposited in an unsanitary manner upon public or private property within the city or in any area under the jurisdiction of the city, any human or animal excrement, garbage or other objectionable wastes. (Ord. 7060 § 1 (part), 1980)

13.04.030 Use of public sewers required.

Every lot that has sanitary facilities requiring sewage disposal which is accessible to a public sewer and is not connected shall be connected to the public sewer within ninety days after the owner or person legally responsible has been notified to do so by the public works director. (Ord. NS-851 § 2, 2007: Ord. 7060 § 1 (part), 1980)

13.04.035 Sewage discharge prohibited.

A. Any sanitary sewer overflow is prohibited.
(Ord. NS-851 § 3, 2007)

13.04.040 Sewer connection permit required.

It is unlawful for any person to place, discharge or dispose of any material, solid or liquid, into the sewer system, or any part thereof, without first obtaining a permit from the city pursuant to Chapter 13.10, and without having first paid all fees required by this title; and no substance shall be placed, discharged or disposed of in the sewer system except substances of waste materials originating on the premises to which a sewer connection permit has been issued. (Ord. 7060 § 1 (part), 1980)

13.04.045 Responsibility for maintenance.

A. Maintenance of all sewer mains dedicated to and accepted by the city shall be the responsibility of the city.
B. Maintenance of all privately-owned sewer mains, and all lateral lines, equipment and appurtenances connected to the city's sewer mains shall be the responsibility of the property owner or parcel occupant/user. The property owner or occupant/user is responsible for the cleaning and removal of blockages in the sewer lateral from the property being served to the sewer main. The property owner or occupant/user is responsible for the maintenance, repair, and replacement of the sewer lateral from the sewer main to and including the building.
C. The city hereby grants a revocable license to any property owner who has obtained a sewer connection permit pursuant to Chapter 13.10, or who, prior to the effective date of Chapter 13.10, has legally connected his or her sewer lateral to the sewer main, to retain his or her current sewer lateral placement within the city's right-of-way.
D. Property owners must comply with Chapter 11.16 of this code, (permits for work or encroachments in public places), and any amendments thereto, prior to performing any work in, or encroaching upon, the city's right-of-way. (Ord. NS-851 § 4, 2007)

13.04.050 Restrictions relating to use of public sewers.

A. No person shall discharge or cause to be discharged any stormwater, surface water, groundwater, unpolluted industrial process water, roof runoff, subsurface drainage, or any waters from an uncontaminated cooling system, swimming pool, decorative fountain or pond, into any public sewer or any private sewer which is connected to the public sewer without written permission in conformance with adopted regulations.
B. No person shall enter, obstruct, uncover or tamper with any portion of the public sewer, or connect to it, or dispose anything into any sewer and/or sewer manhole without the written permission of the public works director.
C. No person or party shall remove or demolish any building or structures with plumbing fixtures connected directly or indirectly to the public sewer without first notifying the public works director of such intention. All openings in or leading to the public sewer line or lines caused by such work shall be sealed watertight and inspected by the public works director before being backfilled.
D. No person shall fill or backfill over, or cause to cover, or obstruct access to, any sewer manhole.
E. No person shall erect any improvements, structures, or buildings over public sewers without the written permission of the public works director.
F. Except as hereinafter provided in this section, no person shall discharge or cause to be discharged any of the following described substances, waters or wastes into any public sewers:
1. Liquid or vapor having a temperature higher than one hundred forty degrees Fahrenheit;
2. Water or waste which may contain more than two hundred mg/l concentration of fats, oils, or grease or more than thirteen pounds of such substances per day after pretreatment by a grease interceptor, whichever is less, or containing substances which may solidify or become viscous at temperatures between thirty-two degrees and one hundred fifty degrees Fahrenheit;

3. Gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid or gas;
4. Toxic, noxious or malodorous liquid, solid, or gas deemed a public hazard and nuisance;
5. Garbage that has not been properly shredded to a size of one-fourth inch or less so that all particles will be carried freely under normal flow conditions in the public sewers;
6. Ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch manure, paper substances or normally dry, solid wastes capable of causing obstruction to the flow in or damage to sewers or other interference with the proper operation of the sewerage works;
7. Water or wastes having a pH lower than 5.5 or higher than 9.5 or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the sewerage works;
8. Water or wastes containing any substance in sufficient quantity to discolor, injure, disrupt or interfere with the normal operation of any sewage treatment process, constitute a hazard to human or animal life, create a public nuisance, or significantly lower the quality of the receiving waters;
9. Water or wastes containing suspended solids of such character or quantity that unusual attention or expense is required to handle such materials at a sewage treatment plant;
10. Any unusual volume of flow or concentration of wastes constituting "slugs" as defined in Section 13.04.010(22);
11. Radioactive wastes or isotopes of such half-life or concentration that may exceed limits established by the public works director in compliance with applicable state or federal regulations;
12. Water added for the purpose of diluting wastes which would otherwise exceed applicable maximum concentration limitations;
13. Water or wastes containing substances which are not amenable to treatment or reduction by the treatment processes employed, or are amenable to treatment only to such degree that:
a. The resulting effluent cannot meet the waste discharge requirements of the regional water quality control board or other agencies having jurisdiction over the quality and protection of the receiving waters, or
b. The resulting sludge cannot meet limits for the chosen disposal method.
G. No person shall discharge or cause to be discharged any fats and greases to the sewer system if their concentration and physical dispersion results in separation and adherence to sewer structures and appurtenances. If there is evidence of adherence of such materials to said structures, or if such materials cause blockage in the sewer system, then the wastewater carrying such materials must be effectively pretreated by a process or device to effect removal from the flow before its discharge to the sewer system. Grease, oil and sand interceptors shall be provided when deemed necessary by the public works director for the proper handling of liquid wastes containing grease in excessive amounts, and flammable materials, sand and other harmful ingredients. All interceptors shall be of a type and capacity acceptable to the public works director and shall be located as to be readily accessible for cleaning and inspection:
1. Grease and oil interceptors shall be constructed of impervious materials capable of withstanding abrupt and extreme changes in temperature. They shall be of substantial construction, watertight, and equipped with easily removable covers which when bolted in place shall be gastight and watertight;
2. All grease, oil, and sand interceptors shall be maintained in continuously efficient operation at all times by the owner at his expense. In the maintaining of these interceptors, the owner shall be responsible for the proper removal and disposal by appropriate means of the captured material and shall maintain records of the dates, amounts, and means of disposal, which are subject to review by the public works director.
H. Any person who discharges or causes to be discharged into the public sewers any water or wastes having more than three hundred mg/l of suspended solids shall be obligated to pay a surcharge, occasioned by the extent to which such water or waste contains an excess over the foregoing limitation of concentration.
I. Where preliminary treatment facilities are provided for any wastewater as a condition of its acceptance, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.
J. When required by the public works director, the owner of any property served by a building sewer carrying industrial wastewater shall install monitoring and recording equipment, and a suitable control manhole in the building sewer to facilitate observation, sampling and measurement of the wastes. Such manhole shall be readily accessible and safely located, and shall be constructed in accordance with plans approved by the public works director. The manhole shall be installed and maintained by the owner at his expense.
K. All measurements, tests, and analyses of the characteristics of water and wastewater to which reference is made in subsections F, G, and H of this section shall be determined in accordance with the latest edition of the American Public Health Association's Standard Methods for Examination of Water, Sewage and Industrial Wastes and shall be made at the control manhole provided for in subsection J of this section, or upon suitable samples taken at said control manhole. If no special manhole is available, the sampling location shall be determined by the public works director. (Ord. NS-851 § 5, 2007: Ord. NS-129 § 2, 1990: Ord. 7069, 1986; Ord. 7065 § 1, 1983; Ord. 7062 § 1, 1982; Ord. 7060 § 1 (part),

1980)

13.04.070 Damaging sewage works.

No unauthorized person shall maliciously, wilfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is a part of the municipal sewage works. (Ord. 7060 § 1 (part), 1980)

13.04.080 Violations of chapter.

(a) Any person found to be violating any provision of this chapter, except Section 13.04.070, shall be served by the city with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations.
(b) Any person who continues any violation beyond the above time, or who violates the provisions of Section 13.04.070, is guilty of a misdemeanor.
(c) Any person violating any of the provisions of this chapter is liable to the city for any expense, loss or damage occasioned the city by reason of such violation. (Ord. 7060 § 1 (part), 1980)

13.04.090 Public health, safety and welfare violations.

In addition to the other civil and criminal penalties provided herein, any condition caused or permitted to exist in violation of any of the provisions of this chapter that is a threat to the public health, safety, and welfare may be declared and deemed a public nuisance, which may be summarily abated and/or restored as directed by the enforcement official in accordance with the procedures identified in Chapter 6.16. A civil action to abate, enjoin or otherwise compel the cessation of such nuisance may also be taken by the city, if necessary. (Ord. NS-851 § 6, 2007)

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Chapter 13.10 SEWER CONNECTION AND CAPACITY PERMITS AND FEES

13.10.010 Sewer permit required.

(a) Concurrently with the issuance of a valid building permit for a new structure or with the issuance of a move-on permit for a mobile home, upon application and payment of the required fees, a sewer permit may be issued by the city engineer authorizing connection of the structure for which the building permit has been issued or the mobile home for which the move-on permit has been issued to the sewer system. A sewer permit shall be required for any structure which is altered, remodeled or expanded where such alteration, remodeling or expansion results in an increase in the equivalent dwelling units of sewage generated from such structure. At the time of issuance of a valid building permit or plumbing permit for such alteration, remodeling or expansion, upon application and payment of the required fee, a sewer permit may be issued by the city engineer, authorizing the connection of the structure for which the building permit has been issued to the sewer system. If the structure being altered, remodeled or expanded is already connected to the city sewer system, and a new connection is not required, the sewer permit shall authorize the use of the sewer system by the altered, remodeled or expanded structure.
(b) It is unlawful for any person to connect to or use the city sewer system without first obtaining a valid sewer permit which is in full force and effect at the time of such connection or use. It is unlawful for any person to alter, remodel or expand the use of a structure without first obtaining a valid building permit or plumbing permit.
(c) Every sewer permit issued pursuant to subsection (a) of this section shall expire by limitation and become null and void if the building permit or plumbing permit for the structure to which the connection is to be made, or for which the sewer system will be used, or the move-on permit for the mobile home to be connected, expires by limitation or otherwise becomes null and void. If a permit has expired, then before the connection for such structure or mobile home can be made, or the sewer system used, a new sewer permit shall be first obtained, and the fee therefor shall be one-half of the required fee for the original permit for each equivalent dwelling unit unless one year has passed since the expiration, in which case the fee shall be the same as a new permit.
(d) Permits for the connection of an existing structure to the sewer system may be issued by the city engineer at any time upon proper application. Every sewer permit issued pursuant to this subsection shall expire by limitation and become null and void if work on the connection authorized by such permit is not completed within one hundred twenty days from the date of issuance of such permit. (Ord. 7060 § 1 (part), 1980)

13.10.020 Equivalent dwelling units.

(a) An equivalent dwelling unit is a unit of measure for the sewage generated from particular buildings, structures or uses. One equivalent dwelling unit is equal to an approximation of the amount of sewage generated by an average single-family residence.
(b) The city engineer shall be responsible for determining the number of equivalent dwelling units for various buildings, structures or uses in accordance with the provisions of this section. For proposed new construction, he shall review the building plans and ascertain the use of the proposed structure and then determine the number of equivalent dwelling units required by an application of the tables in subsection (c) of this section. For an existing structure and use, he shall apply subsection (c) to that structure and use. For the alteration, remodeling or expansion of an existing structure or use, he shall determine the number of equivalent dwelling units being used by the existing structure or use by applying subsection (c). He shall then determine, in the same manner as new construction, the number of equivalent dwelling units required after completion of the alteration, remodeling or expansion. The equivalent dwelling units in such cases shall be the amount of the increase in such units, if any.
(c) Table 13.10.020(c) shall be used to determine equivalent dwelling units.

TABLE 13.10.020(c)

Type of Building, Structure or Use	Equivalent Dwelling Units
(1) Each space of a trailer court or mobilehome park	1.00
(2) Each duplex	2.00
(3) Each separate apartment in an apartment house	1.00
(4) Each housing accommodation designed for occupancy by a single person or one family, irrespective of the number actually occupying such accommodation	1.00
(5) Each room of a lodginghouse, boardinghouse, hotel, motel or other multiple dwelling designed for sleeping accommodations for one or more individuals	
Without cooking facilities	0.60
With cooking facilities	1.00
(6) Churches, theaters and auditoriums, per each unit of seating capacity (a unit being one hundred fifty persons or any fraction thereof)	1.33
(7) Restaurants	
No seating	2.67
Seating (Exception: Seats allowed in incidental outdoor dining areas as defined by Section 21.04.188.1 and seats allowed in outdoor cafes or sidewalk cafes as defined by the Village Master Plan and Design Manual do not count toward generation of sewer impact fees.)	2.67 plus 1.00 per each 7 seats or fraction thereof
Delicatessen or fast food, using only disposable tableware:	
No seating	2.67
Seating (Exception: Seats allowed in incidental outdoor dining areas as defined by Section 21.04.188.1 and seats allowed in outdoor cafes or sidewalk cafes as defined by the Village Master Plan and Design Manual do not count toward generation of sewer impact fees.)	2.76 plus 1.00 per each 21 seats or fraction thereof
(8) Automobile service stations:	
Not more than four gasoline pumps	2.00
More than four gasoline pumps	3.00
(9) Self-service laundries, per each washer	.75

(10) Office space in industrial or commercial establishments not listed above and warehouses	Divide the gross floor area of the building in square feet by 1800
(11) Schools:	
Elementary schools	
For each sixty pupils or fraction thereof	1.00
Junior high schools	
For each fifty pupils or fraction thereof	1.00
High schools	
For each thirty pupils or fraction thereof	1.00
(12) In the case of all commercial, industrial and business establishments not included in subdivisions 1 through 10, inclusive, of this subsection, the number of equivalent dwelling units shall be determined in each case by the city engineer and shall be based upon his estimate of the volume and type of wastewater to be discharged into the sewer. The provisions of Chapter 13.16 shall apply to all cases under this subsection and an industrial waste permit shall be required. Any such permit, issued for any use hereunder, shall include a specific volume of sewage authorized for such use. If said amount is exceeded, it shall be grounds for revocation of the permit	
(13) Theme park (LEGOLAND California) per acre	17.00

(d) If the number of equivalent dwelling units, determined by the application of subsection (c) of this section, results in a fraction, the fees required by this code for such fraction shall be in proportion thereto.
(e) The city engineer's determinations under this section may be appealed to the city council, whose decision shall be final.
(f) The city council may, by resolution, prescribe any regulations they consider necessary for the proper application of this section. Such regulations may include but are not limited to a determination of the number of gallons of sewage equaling one equivalent dwelling unit may vary for a satellite sewage treatment plant when such variation is justified based on the flow characteristics of the drainage basin served by such plant or other factors which the council finds necessitate the difference.
(g) If LEGOLAND California develops an attraction area into a use that is not consistent with current theme park uses and/or requires a specific plan amendment, the city engineer shall recommend a method for calculating equivalent dwelling units to the city council. (Ord. NS-849 § 1, 2007; Ord. NS-423 § 1, 1997; Ord. NS-421 § 1, 1997; Ord. 7061 § 1, 1981; Ord. 7060 § 1 (part), 1980)

13.10.030 Sewer capacity fee--Encina Treatment Plant.

Except as provided, every person who wishes to use the city sewer system and the Encina Treatment Plant shall pay to the city prior to the issuance of a sewer permit, a sewer capacity fee per equivalent dwelling unit. The amount of the sewer capacity fee shall be as set from time to time by a resolution of the city council.
The sewer capacity fee shall be adjusted annually by a resolution of the city council by the percentage change in the Engineering News Record Los Angeles Construction Cost Index with the base index in effect in December 2003.
All sewer capacity fees shall be placed in the sewer construction fund and shall be used to pay for capital improvements of such system. (Ord. NS-682 § 1, 2003: Ord. NS-137 § 1, 1991; Ord. NS-12 § 1, 1988; Ord. 7060 § 1 (part), 1980)

13.10.040 Pumping plant capital contribution fee.

Whenever any person applies for a sewer permit and the sewage from the applicant's property must be

pumped to a treatment plant by an intermediary public pumping plant, and such person, or his predecessor in interest, has not contributed to the cost of the construction of such intermediary pumping plant, then such person shall pay to the city a pumping plant capital contribution fee for each existing or proposed equivalent dwelling unit that is to be served by such connection.
The pumping plant capital contribution fee shall be established by resolution by the city council. (Ord. 7060 § 1 (part), 1980)

13.10.050 Sewer main fees.

In addition to the fees required by this chapter, an applicant for a sewer permit shall also pay any applicable sewer main extension fees pursuant to Chapter 13.08. (Ord. 7060 § 1 (part), 1980)

13.10.060 Sewer capacity--Lake Calavera Hills Satellite Sewage Treatment Plant.

(a) The city council, by resolution, may establish a special sewer service area for the Lake Calavera Hills Satellite Sewage Treatment Plant and establish a sewer capacity fee which shall be paid by each person, other than the developer or his successors or assigns, proposing to connect a structure within such area to the Lake Calavera Plant prior to the issuance of a sewer permit. The fee, less five percent for administrative costs, shall be used to reimburse Lake Calavera Hills for the costs of constructing the plant.
The developer may in writing waive reimbursement for any structure using capacity in the plant. The fee required by this section shall not be collected when such a waiver has been made.
(b) The fee established by this section shall be deemed to satisfy Section 13.10.030 which shall not apply to property within the special sewer service area. (Ord. 7060 § 1 (part), 1980)

13.10.070 Lake Calavera Hills capital contribution fee.

The city council may, by resolution, levy a fee for each connection to the Lake Calavera Hills Satellite Sewage Treatment Plant to pay for capital improvements within the special sewer service area or elsewhere but benefiting such area. Such fee shall be in addition to the capacity fee required by Section 13.10.060 and all other fees required by this title. All such fees shall be placed in the joint sewer construction fund established by Section 13.10.030 and shall be used to pay for capital improvements of the system within the special service areas or elsewhere, but benefiting the special service area. (Ord. 7060 § 1 (part), 1980)

13.10.080 Sewer benefit area fees.

Except as provided, every person who wishes to use the city's South Agua Hedionda Interceptor Sewer shall pay to the city, prior to the issuance of a sewer permit, a sewer benefit area fee of one thousand six hundred fifteen dollars per equivalent dwelling unit for sewer benefit area C; one thousand six hundred eighteen dollars per equivalent dwelling unit for sewer benefit area D; two thousand three hundred eighty-six dollars per equivalent dwelling unit for sewer benefit area E; and two thousand three hundred ninety-nine dollars per equivalent dwelling unit for sewer benefit area F. *The fee established by this section shall apply to building permits issued thirty days following adoption of this section for residential developments, and commercial and industrial buildings.*
The sewer benefit area fees shall be adjusted annually effective July 1 , according to the Engineering News Record Los Angeles Construction Cost Index with a base year index reported on April 1 of each year with a base year index of 7500. (Ord. NS-642 § 1, 2002)

13.10.090 Sewer benefit area fees--Area H.

Except as provided, every person who wishes to use the city's sewer facilities in sewer benefit area H shall pay to the city, prior to the issuance of a building permit, a sewer benefit area fee of eight hundred eight dollars per equivalent dwelling unit for sewer benefit area H. *The fee established by this section shall apply to building permits issued thirty days following adoption of the ordinance codified in this section for residential developments, and commercial and industrial buildings.*
The sewer benefit area fees shall be adjusted annually effective September 1, by the annual change to the Engineering News Record Los Angeles Construction Cost Index with a base year index of April 1, 2004. (Ord. NS-699 § 1, 2004)

Chapter 13.16 DISCHARGE OF INDUSTRIAL WASTE

13.16.010 Short title.

This chapter shall be known and may be cited as the industrial waste discharge ordinance. (Ord. 7035 § 1)

13.16.030 Establishment of rules and regulations.

The engineer is authorized and empowered to adopt such rules and regulations as may be deemed reasonably necessary to protect the sewer system and the joint sewer system, to control and regulate the proper use thereof and to provide for the issuance of permits; provided, however, that the terms and provisions of such rules and regulations shall be promulgated in a manner best directed to result in the uniform control and use of the joint sewer system by the parties to the basic agreement referred to in Section 13.04.010, or any amendments or supplements thereto, and provided further that such rules and regulations shall not become effective until approved by the city council, and a copy of such rules and regulations is filed with the city clerk. The more restrictive regulations shall apply in the event of any inconsistencies between joint sewer system regulations approved by city council and other regulations adopted by the city. (Ord. NS-129 § 4, 1990: Ord. 7035 § 19)

13.16.040 Permit required.

No person shall connect to or otherwise discharge, or cause to be discharged into the sewer system of the district or the joint sewer system, any industrial waste unless such person has theretofore filed with the engineering department of the city an application for an industrial waste discharge permit and the

engineer has issued such a permit; provided, however, no such permit shall be required of any person who has heretofore connected to the sewer system and is discharging industrial waste into such system unless the engineer determines that such discharge does not meet the industrial waste discharge standards established by this article or the rules or regulations adopted as herein provided, in which case a permit shall be required. (Ord. 7035 § 17)

13.16.050 Issuance of permit.

Industrial waste permits shall be co-issued by the city and the Encina Water Pollution Control Facility according to this code and Encina Water Pollution Control Facility regulations approved by the city council and filed with the city clerk.
No permit shall be issued to any person to discharge industrial waste into the sewer system of the district or the joint sewer system if such discharge will be a hazard or danger to the health or safety of any person or to the property of any person or if such discharge will result in a danger to the capacity, construction, use or proper performance or utilization of the sewer system or joint sewer system or be otherwise detrimental or injurious to such systems or either of them, and unless the applicant has complied with all state, federal and local laws and with all the provisions of this article and with all the applicable rules and regulations adopted as provided for this chapter. (Ord. NS-129 § 5, 1990: Ord. 7035 § 18)

13.16.051 Pretreatment plans required.

In the event the engineer determines that pretreatment is required to make the waste acceptable, the applicant shall be so notified and shall submit suitable engineering plans and specifications showing in detail the proposed pretreatment facilities and pretreatment operational procedures which shall be included within and become a part of the original application. A permit shall not be issued until such plans, specifications and operational procedures have been reviewed and approved by the engineer. (Ord. 7065 § 2 (part), 1983)

13.16.052 Self-monitoring and reporting.

All industrial users shall be subject to self-monitoring and reporting requirements. The requirements for each applicable user shall be determined by the engineer and included in the user's discharge permit. (Ord. 7065 § 2 (part), 1983)

13.16.053 Public access to information.

Information and data provided by an industrial user identifying the nature and frequency of a discharge shall be available to the public without restriction. Any information or data which is submitted or which may be furnished by a user in connection with required periodic reports shall also be available to the public unless the user or other interested person specifically identifies and is able to demonstrate to the satisfaction of the engineer that the disclosure of such information or a particular part thereof to the general public would divulge methods or processes entitled to protection as trade secrets. (Ord. 7065 § 2 (part), 1983)

13.16.054 Revisions to permits.

The engineer shall be empowered to revise discharge permit requirements to comply with evolving federal law. Permit revisions or modifications shall not be inconsistent with applicable federal pretreatment standards. (Ord. 7065 § 2 (part), 1983)

13.16.060 Permit expiration, revocation or suspension.

Any permit issued in accordance with the provisions of this chapter shall be valid for a period specified on the permit, or if no term is specified, for one year, and is not transferable unless such permit is revoked or suspended as provided in this title and in the rules and regulations adopted pursuant thereto. (Ord. NS-129 § 6, 1990: Ord. 7065 § 3, 1983: Ord. 7035 § 20)

13.16.070 Violation--Disconnection of facilities--Reconnection charge.

The engineer may revoke or suspend the permit issued to any person in the event of a violation by the permittee of any provision of any applicable state, federal or local law or this article or of any of the rules and regulations adopted in the manner provided for herein. The engineer may disconnect from the public sewer any connection sewer, main line sewer or other facility which is constructed, connected or used without a permit, or constructed, connected or used contrary to any of the provisions of any applicable state, federal or local law or this chapter or the rules and regulations adopted as provided for in this chapter. When a premises has been disconnected, it shall not be reconnected until the violation for which it was disconnected has ceased or been remedied and a reasonable charge for such disconnection and reconnection, as established by the engineer, has been paid. (Ord. 7035 § 22)

13.16.080 Notice of intention to disconnect premises.

The engineer shall give not less than five days' notice of intention to disconnect the premises or to suspend or revoke a permit, stating the reasons therefor, and may grant a reasonable time for elimination of the violation; provided, however, that if the engineer determines that the danger is imminent and such action is necessary for the immediate protection of the health, safety or welfare of persons or property or for the protection of the sewer system or the joint sewer system, any premises may be disconnected and service terminated concurrently with the giving of such notice. Notice shall be given to the occupant of the premises, if any, and to the record owner of the property as shown upon the last equalized assessment roll of the county by United States mail, registered or certified, return receipt requested, postage prepaid or by posting such notice on the premises. (Ord. 7035 § 23)

13.16.090 Enforcement.

The engineer is charged with the duty of enforcing the provisions of this chapter and the rules and regulations adopted as provided in this chapter.
The engineer and the operator and their duly authorized agents and employees are authorized and shall be permitted to enter upon all properties at all reasonable times for the purpose of inspection, observation, measurement, sampling, testing or other reasons to assure the enforcement and proper application of all the provisions of this article and the rules and regulations adopted by the engineer as provided in this chapter. (Ord. 7035 §§ 21, 26)

13.16.100 Liability of person for damage to system.

Any person violating any provision of this chapter or any rule or regulation adopted as herein provided shall be liable for all damage to the sewer system or joint sewer system incurred as a result of such violation and for any increase in the cost of maintenance or repair resulting from such violation. (Ord. 7035 § 25)

<< previous | next >>

ATTACHMENT DR50-1

[redacted]

Project Address	Assessors Parcel Number(s):	Project # (city use only):
4600 Carlsbad Boulevard	210 010 4300 & 210 010 4100	

Complete Sections 1 and 2 of the following checklist to determine your project's permanent and construction storm water best management practices requirements. This form must be completed and submitted with your permit application.

Section 1. Permanent Storm Water BMP Requirements:
If any answers to Part A are answered "Yes," your project is subject to the "Priority Project Permanent Storm Water BMP Requirements," and "Standard Permanent Storm Water BMP Requirements" in Section III, "Permanent Storm Water BMP Selection Procedure" in the Storm Water Standards manual.

If all answers to Part A are "No," and any answers to Part B are "Yes," your project is only subject to the "Standard Permanent Storm Water BMP Requirements". If every question in Part A and B is answered "No," your project is exempt from permanent storm water requirements.

Part A: Determine Priority Project Permanent Storm Water BMP Requirements.

Does the project meet the definition of one or more of the priority project categories?*	Yes	No
1. Detached residential development of 10 or more units.	☐	☑
2. Attached residential development of 10 or more units.	☐	☑
3. Commercial development greater than 100,000 square feet.	☑	☐
4. Automotive repair shop.	☐	☑
5. Restaurant.	☐	☑
6. Steep hillside development greater than 5,000 square feet.	☐	☑
7. Project discharging to receiving waters within Environmentally Sensitive Areas.	☑	☐
8. Parking lots greater than or equal to 5,000 ft^2 or with at least 15 parking spaces, and potentially exposed to urban runoff.	☐	☑
9. Streets, roads, highways, and freeways which would create a new paved surface that is 5,000 square feet or greater	☐	☑
* Refer to the definitions section in the Storm Water Standards for expanded definitions of the priority project categories.		
Limited Exclusion: Trenching and resurfacing work associated with utility projects are not considered priority projects. Parking lots, buildings and other structures associated with utility projects are priority projects if one or more of the criteria in Part A is met. If all answers to Part A are "No", continue to Part B.		

Part B: Determine Standard Permanent Storm Water Requirements.

Does the project propose:	Yes	No
1. New impervious areas, such as rooftops, roads, parking lots, driveways, paths and sidewalks?	☐	☑
2. New pervious landscape areas and irrigation systems?	☐	☑
3. Permanent structures within 100 feet of any natural water body?	☐	☑
4. Trash storage areas?	☐	☑
5. Liquid or solid material loading and unloading areas?	☑	☐
6. Vehicle or equipment fueling, washing, or maintenance areas?	☑	☐
7. Require a General NPDES Permit for Storm Water Discharges Associated with Industrial Activities (Except construction)?*	☑	☐
8. Commercial or industrial waste handling or storage, excluding typical office or household waste?	☑	☐
9. Any grading or ground disturbance during construction?	☑	☐
10. Any new storm drains, or alteration to existing storm drains?	☐	☑
*To find out if your project is required to obtain an individual General NPDES Permit for Storm Water Discharges Associated with Industrial Activities, visit the State Water Resources Control Board web site at, www.swrcb.ca.gov/stormwtr/industrial.html		

Section 2. Construction Storm Water BMP Requirements:

If the answer to question 1 of Part C is answered "Yes," your project is subject to Section IV, "Construction Storm Water BMP Performance Standards," and must prepare a Storm Water Pollution Prevention Plan (SWPPP). If the answer to question 1 is "No," but the answer to any of the remaining questions is "Yes," your project is subject to Section IV, "Construction Storm Water BMP Performance Standards," and must prepare a Water Pollution Control Plan (WPCP). If every question in Part C is answered "No," your project is exempt from any construction storm water BMP requirements. If any of the answers to the questions in Part C are "Yes," complete the construction site prioritization in Part D, below.

Part C: Determine Construction Phase Storm Water Requirements.

Would the project meet any of these criteria during construction?	Yes	No
1. Is the project subject to California's statewide General NPDES Permit for Storm Water Discharges Associated With Construction Activities?	☑	☐
2. Does the project propose grading or soil disturbance?	☑	☐
3. Would storm water or urban runoff have the potential to contact any portion of the construction area, including washing and staging areas?	☑	☐
4. Would the project use any construction materials that could negatively affect water quality if discharged from the site (such as, paints, solvents, concrete, and stucco)?	☐	☑

Part D: Determine Construction Site Priority

In accordance with the Municipal Permit, each construction site with construction storm water BMP requirements must be designated with a priority: high, medium or low. This prioritization must be completed with this form, noted on the plans, and included in the SWPPP or WPCP. Indicate the project's priority in one of the check boxes using the criteria below, and existing and surrounding conditions of the project, the type of activities necessary to complete the construction and any other extenuating circumstances that may pose a threat to water quality. The City reserves the right to adjust the priority of the projects both before and during construction. [Note: The construction priority does NOT change construction BMP requirements that apply to projects; all construction BMP requirements must be identified on a case-by-case basis. The construction priority does affect the frequency of inspections that will be conducted by City staff. See Section IV.1 for more details on construction BMP requirements.]

☑ ***A) High Priority***

1) Projects where the site is 50 acres or more and grading will occur during the rainy season
2) Projects 1 acre or more.
3) Projects 1 acre or more within or directly adjacent to or discharging directly to a coastal lagoon or other receiving water within an environmentally sensitive area
4) Projects, active or inactive, adjacent or tributary to sensitive water bodies

☐ ***B) Medium Priority***

5) Capital Improvement Projects where grading occurs, however a Storm Water Pollution Prevention Plan (SWPPP) is not required under the State General Construction Permit (i.e., water and sewer replacement projects, intersection and street re-alignments, widening, comfort stations, etc.)
6) Permit projects in the public right-of-way where grading occurs, such as installation of sidewalk, substantial retaining walls, curb and gutter for an entire street frontage, etc. , however SWPPPs are not required.
7) Permit projects on private property where grading permits are required, however, Notice Of Intents (NOIs) and SWPPPs are not required.

☐ ***C) Low Priority***

8) Capital Projects where minimal to no grading occurs, such as signal light and loop installations, street light installations, etc.
9) Permit projects in the public right-of-way where minimal to no grading occurs, such as pedestrian ramps, driveway additions, small retaining walls, etc.
10) Permit projects on private property where grading permits are not required, such as small retaining walls, single-family homes, small tenant improvements, etc.

Owner/Agent/Engineer Name (Please Print):	**Title:**
Tim Hemig/NRG - Owner Representative	Project Manager
Signature:	**Date:**

Transmission System Engineering (52 –60)

Background

The description of the proposed 230 kV and 138 kV interconnecting transmission lines between the new generating units' generator step-up (GSU) transformers and existing 230 kV and 138 kV Encina Switchyards are incomplete as provided in the revised AFC (AFC, section 3.1, Page 3-1, Figures TSE1a-1 to TSE1a-4).

Data Request

52. Please provide the type and size of the overhead conductors and terminating cables for the new interconnecting 230 kV and 138 kV transmission lines between the new generating units' GSU transformers and existing 230 kV and 138 kV Encina switchyards.

Response: Overhead conductor size, as shown in AFC Figure TSE1c-7, is 1-1272 kcmil ACSR per phase for the 230 kV transmission line and 2-1272 kcmil ACSR per phase for the 138 kV transmission line. The 230 kV terminating cable has been preliminarily sized to be 2500 kcmil per phase and it is shown on the revised Figure TSE1c-9R1 (which replaces Figure TSE1c-9 of the AFC). This cable runs from the terminating pole just outside SDG&E 230 kV switchyard to the riser structure inside SDG&E 230 kV switchyard.

Background

The AFC provided the System Impact Study (SIS) agreement, plan and proof of payment, but did not include a complete SIS report (AFC, section 3.2.3).

Data Request

53. Submit a complete SIS report prepared by SDG&E and/or CAISO for interconnection of the project's 540.4 MW net output based on 2010 summer peak and 2011-2012 winter conditions (scheduled on-line dates of the CECP units). The study should include a power flow, short circuit, transient stability, post-transient voltage and reactive power deficiency analyses (as stated in the study plan).

Response: The Interconnection System Impact Study, Generation Interconnection, NRG West, Encina Repower - 138 kV, dated October 9, 2007 is provided as Attachment DR53-1. Due to its size, five hard copies are being provided to the CEC. Electronic copies will be provided to the parties upon request. This SIS was prepared by CAISO in conjunction with SDG&E.

Based on an early concept for the CECP, a SIS report for the 230 kV interconnection for 300 MW of new generation (six LM6000 generators) into SDG&E 230 kV switchyard was prepared by CAISO in conjunction with SDG&E. Subsequent to completion of the SIS, the CECP was revised to include 280 MW of new generation

capacity into the SDG&E 230 kV switchyard using two Siemens Rapid Response Combined-Cycle units over one transmission line connected to the 230 kV switchyard as defined and analyzed in the AFC. CAISO, in conjunction with SDG&E, is currently preparing an amended SIS for the interconnection to the 230 kV switchyard of the Siemens generator. Upon completion of the amended SIS by CAISO, the Applicant will submit five copies of the amended SIS to the CEC.

An agreement with SDG&E to prepare a Detailed Facilities Study, requested by the Applicant, will provide the facilities changes required inside the existing 230 kV and 138 kV switchyards. This Facilities Study will consider changes as proposed in this AFC, which considers the interconnection of one unit (composed of one CTG and one STG generator) each into the SDG&E 230 kV and 138 kV switchyards. Each unit has only one transmission line connection to each switchyard.

54. Please work with SDG&E and CAISO on ensuring all major assumptions are listed in the report's base cases, including major path flows, major generators including queue generation and loads in the area systems.

Response: See the attached SIS report for the 138 kV interconnection (Attachment DR53-1) referenced above in Data Response 53. As discussed in Data Response 53, CAISO, in conjunction with SDG&E, is currently preparing an amended SIS for the interconnection to the 230 kV switchyard of the Siemens generator. Upon completion of the amended SIS by CAISO, the Applicant will submit five copies of the amended 230 kV SIS to the CEC.

55. Please identify the reliability and planning criteria utilized to determine the reliability criteria violations.

Response: See Sections 3, 4 & 5 of the attached SIS report for the 138 kV interconnection (Attachment DR53-1). The Western Electricity Coordinating Council (WECC) and North American Electric Reliability Council (NERC) planning -criteria, were used to evaluate the system impact. As discussed in Data Response 53, CAISO, in conjunction with SDG&E, is currently preparing an amended SIS for the interconnection to the 230 kV switchyard of the Siemens generator. Upon completion of the amended SIS by CAISO, the Applicant will submit five copies of the amended 230 kV SIS to the CEC.

56. If the SIS identifies any reliability criteria violations, identify the specific mitigation measure that will be used to mitigate each reliability criteria violation. If the SIS identifies more than one mitigation measure for a particular criteria violation, specify which measure will be used.

Response: See Sections 1, 6 and 7 of the attached SIS report for the 138 kV system (Attachment DR53-1). As discussed in Data Response 53, CAISO, in conjunction with SDG&E, is currently preparing an amended SIS for the interconnection to the 230 kV switchyard of the Siemens generator. Upon completion of the amended SIS by CAISO, the Applicant will submit five copies of the amended 230 kV SIS to the CEC.

57. Provide power flow diagrams with and without the CECP for base cases. Power flow diagrams should also be provided for all overloads or voltage criteria violations under normal system (N-0) or contingency (N-1 & N-2) conditions

Response: See the attached SIS report for the 138 kV system (Attachment DR53-1). As discussed in Data Response 53, CAISO, in conjunction with SDG&E, is currently preparing an amended SIS for the interconnection to the 230 kV switchyard of the Siemens generator. Upon completion of the amended SIS by CAISO, the Applicant will submit five copies of the amended 230 kV SIS to the CEC.

58. Provide electronic copies of *.sav,*.drw. *.dyd and *.swt GE PSLF files and EPCL contingency files in a CD (if available).

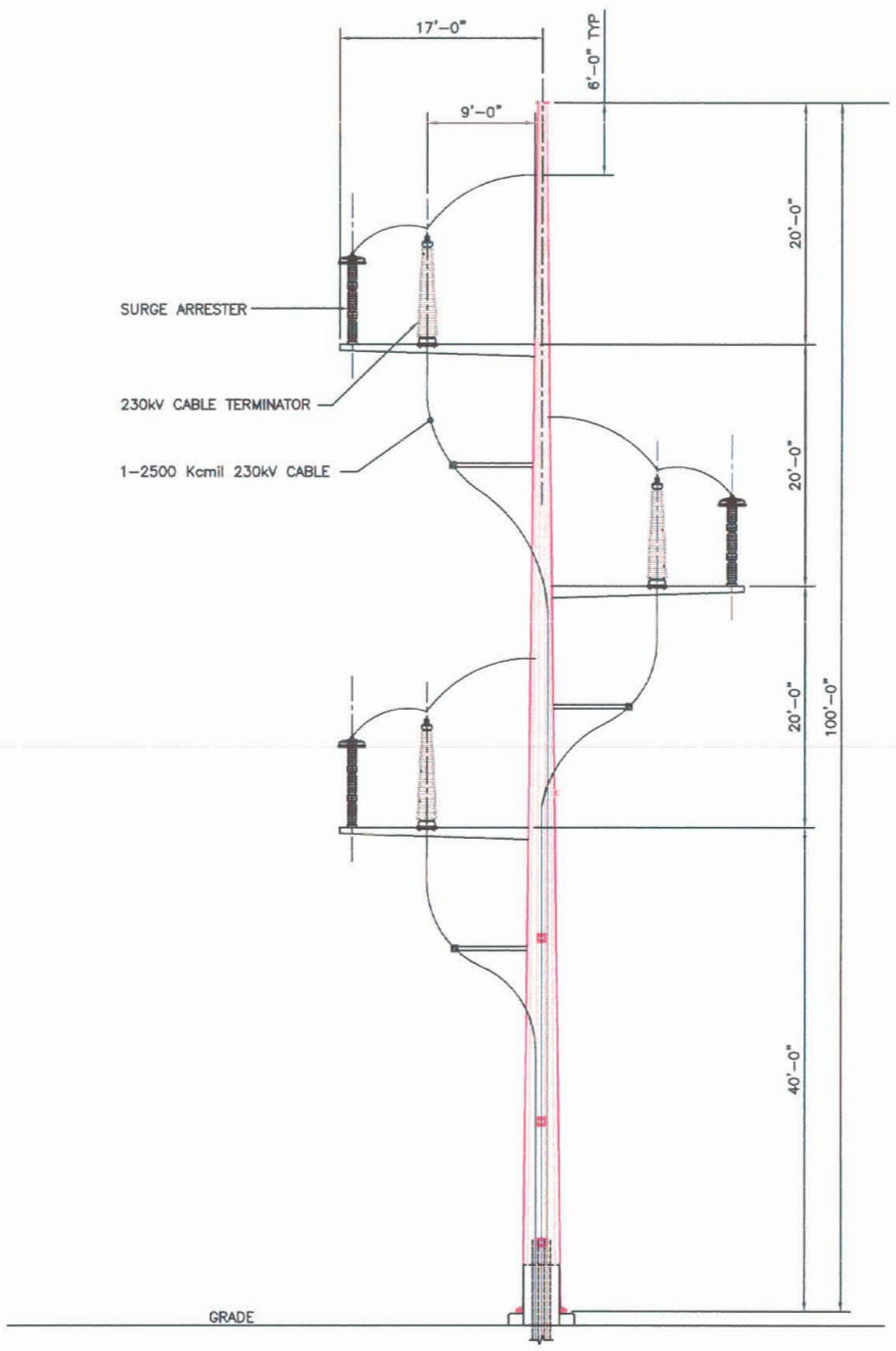
Response: The files for the 138 kV interconnection are included on the five CD-ROMs being provided to CEC Staff. They are included in the folder labeled "DR58-1, TSE Files." Electronic copies will be provided to the parties upon request.

59. Provide a complete Facility Study report if it is available.

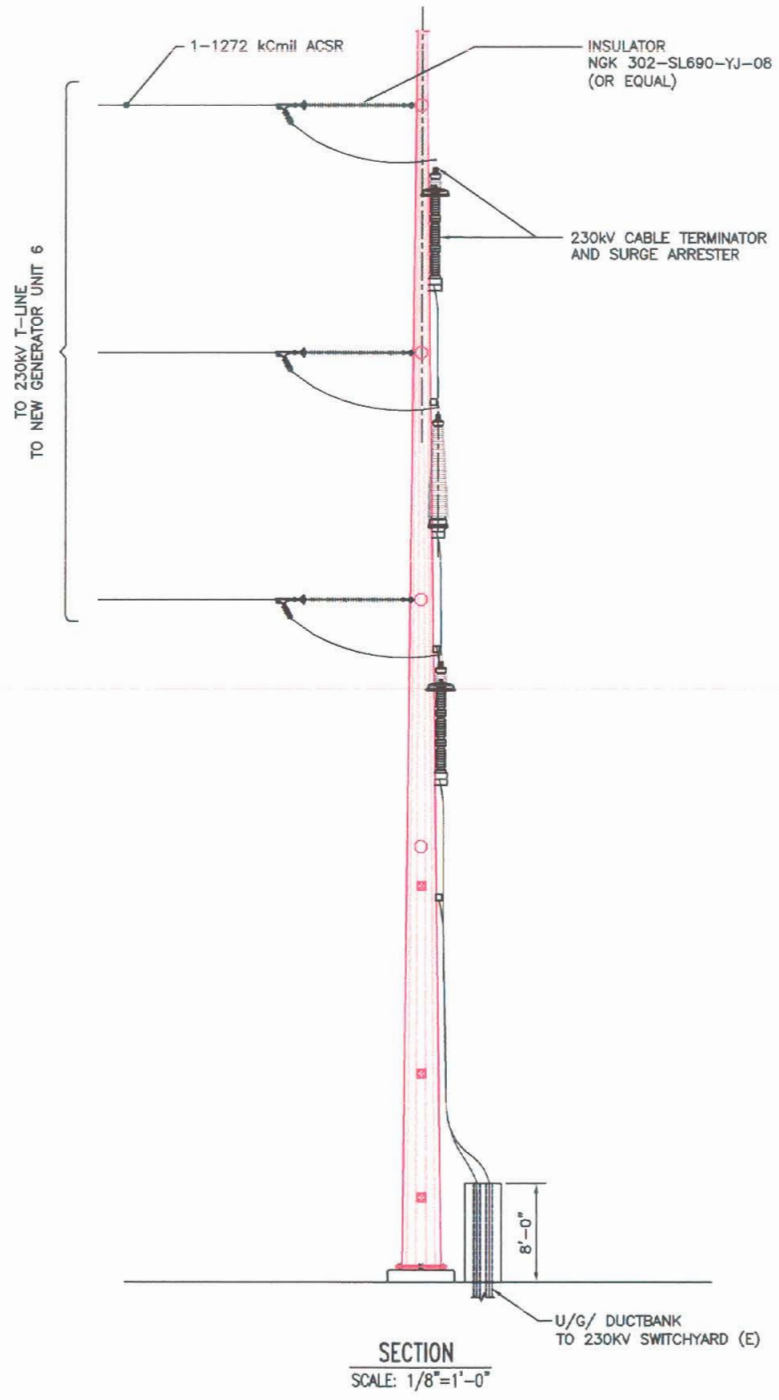
Response: SDG&E and the CAISO are performing System Facilities Studies for both the 138 kV and 230 kV interconnections. They will be provided upon completion; hopefully, within 90 days.

60. Provide an environmental analysis to meet CEQA requirements for an indirect project impact reconductoring activity that will be required to interconnect the CECP.

Response: As discussed in Section 5 of the AFC, the points of first electrical interconnection for the CECP are the existing SDG&E 230 kV and 138 kV substations that are located on the Encina Power Station. These interconnections and their potential impacts are addressed in the Section 5 of the AFC, as well as in other applicable sections of the AFC. Based on the System Impact Studies conducted by SDG&E and CAISO for the CECP project, there are no system upgrades or reconductoring required for the offsite transmission lines from the existing SDG&E 230kv and 138kV substations located on the Encina Power Station. Therefore, there are no offsite indirect project impacts associated with the interconnection of the CECP and there is no requirement to provide an environmental analysis to meet CEQA requirements for indirect project impacts as the interconnections to the existing SDG&E 230 kV and 138 kV substations are within the jurisdiction of the CEC and the impacts of these interconnections are addressed in the AFC.



ELEVATION
SCALE: 1/8"=1'-0"



SECTION
SCALE: 1/8"=1'-0"

NOTE:

EQUIPMENT CONFIGURATION & RATINGS ARE PRELIMINARY.

LEGEND:
(E) – EXISTING

FIGURE TSE1C-9_R1
12/4/07

230kV CABLE POLE
FIGURE TSE1c-9 R1

ENCINA POWER STATON
230kV CABLE POLE
FIGURE TSE1c-9R1

Visual Resources (61 – 71)

Background

In order to assess the visual effects of the project, a clearer understanding of the heights and configuration of the facility components is needed. The AFC project description did not include scaled elevations of the facility.

Data Request

61. Please provide scaled elevations of the proposed facility from two axes.

Response: The requested scaled elevations of the proposed CECP facility from two axes are provided as Figure DR61-1.

Background

Similarly, in order to understand both the ultimate height and visibility of project components, and potential project development impacts on existing vegetation, it is necessary to understand both existing and proposed site grading. The relationship between the existing trees and other vegetation and the proposed limits of grading for laydown Area "A" and for spoil berms needs clarification for staff to complete its analysis.

Data Request

62. Please provide a site survey in Computer-Aided Design (CAD) form showing existing grades on site.

Response: The requested AutoCAD file for the site topographic survey are provided on five CD-ROMS enclosed with this submittal. The drawing contained on that file is presented as Figure DR62-1. Electronic copies of the AutoCAD file will be provided to other parties upon request.

63. Please provide proposed site grading plans in CAD form, including indication of proposed limits of work, and an inventory of the trees and shrubs that would be removed.

Response: The requested AutoCAD files of the proposed site grading plan are provided on five CD-ROMS enclosed with this submittal. Electronic copies of the AutoCAD file will be provided to other parties upon request. The drawing contained on that file is presented as Figure DR63-1.

64. Please overlay the grading limits for Laydown Area A (per Figure 2.2-10) on an accurate site survey depicting existing tree canopy and/or an aerial photo of the site.

Response: Figure DR64-1 provides an overlay of the grading limits of Laydown Area A on an aerial photograph of the site. As shown on the figure, the grading limits for

Laydown Area A do not encroach upon the vegetated, perimeter berm that borders the project site on the north and east, and no existing trees on the vegetated perimeter berm will be affected by the grading limits. It is the trees on the vegetated, perimeter berm that provide visual screening of the CECP.

The short line of trees and brush that is located within Laydown Area A (see Figure DR64-1) will be removed as part of the project, however, these trees do not provide visual screening for the CECP.

65. Please provide an overlay of proposed grading for construction of spoil berms on an accurate site survey showing existing tree canopies and/or an aerial photo of the site.

Response: Figure DR65-1 provides the overlay of the limits for the construction of the spoil berms located on the western perimeter of the CECP site on an aerial photograph of the site. As shown on the figure, the limits for the spoil berm do not result in the removal of trees. The vegetation that can be seen on the aerial within the limits of the spoil berm are isolated shrubs not trees. The height of the spoil berms range from 8 to 11 feet above the existing grade and exceeds the height of the isolated shrubs that will be removed.

66. Please discuss the feasibility of lowering the proposed finished grade of the project to reduce visual prominence of the facility.

Response: As shown on AFC Figure 1.2-1 CECP Site Plan, the available footprint for the CECP at the existing grade of the tank farm is already significantly constrained. Lowering the finished grade below the elevation to be established after the demolition of Tanks 5, 6 and 7 and any required remediation is not feasible because: 1) lowering the elevation any further would decrease the available footprint for the CECP power block, support structures and equipment arrangement, as the slope of the perimeter berm would need to be extended deeper to match a lower finished grade, and a reduction in the available footprint would prevent sufficient fire code access and entry to the lowered areas; and 2) lowering the elevation any further may adversely affect equipment performance such as the air-cooled condensers by having the equipment being too deep within a confined area.

Background

A letter from the city of Carlsbad dated October 24, 2007 on the CECP cites visual concerns connected to several cumulative projects, including the Caltrans proposed I-5 widening; the proposed adjacent desalination plant; and an anticipated public use/viewing area within the Encina facility boundaries connected to development of the desalination project.

Data Request

67. Please provide a detailed discussion of these potential cumulative visual impact scenarios based on currently available information, particularly:

    a. Anticipated loss of existing vegetation/visual screening due to Caltrans I-5 widening;

Response: Referring to Photo 29 (see AFC page 5.13-5 and Figure 5.13-5g), the AFC states that "From this [nearby] area along northbound I-5, mature trees on the eastern side of the Project site as well as tall median shrubs on the freeway partially screen the site." Photo 28 (see AFC page 5.13-5 and Figure 5.13-5g) indicates that as seen from southbound I-5, the CECP site is largely screened by existing mature trees on the northern edge of the Project site.

Figure DR67a-1 presents four additional photographs taken from the I-5 corridor that provide a more extensive depiction of these visual conditions and the extent of screening provided by existing mature vegetation and topography. Photos S-1 and S-2 portray views toward the Project from the northbound travel corridor. Photos S-3 and S-4 provide close-range views toward the CECP site from southbound I-5. Figure DR67a-2 depicts the photo viewpoint locations. As shown in the photos, the existing landform and vegetation pattern substantially screens the CECP site and the Project from the I-5 corridor and locations further east. The existing landscaped berm situated at the CECP site's northern and eastern edge is approximately 75 wide at its narrowest, and up to approximately 25 feet above the highway. A total of 294 trees are located in this area. The great majority of these trees are on the CECP site; whereas, only 41 of the trees lie within the Caltrans right-of-way (see the tree assessment report, Attachment DR70-1, prepared by an arborist in Data Response 70).

Caltrans plans to widen the I-5 corridor adjacent to the CECP site by up to four lanes in both travel direction. Caltrans is currently reviewing several widening options. Based on currently available information, the degree of change that might occur to the existing vegetation and topographic pattern, as a result of widening the I-5 corridor, is a matter of speculation as specific option has not been selected by Caltrans. One of the widening options may involve the removal of mature vegetation within the Caltrans right-of-way as well as removal of mature vegetation on the CECP project site's eastern property boundary. Other alternative I-5 widening options may involve the removal of a portion of the existing vegetation and berm that are situated along the east edge of the CECP site (Johnson, 2006). Generally, for most options, it is expected that the area located within the Caltrans ROW would be the most likely area affected by the I-5 widening project. As noted previously, only a small portion of the mature vegetation that provides visual screening in the vicinity of the CECP site lies within the existing Caltrans ROW. With respect to public views of the CECP as seen from a nearby segment of the I-5 corridor and from some locations further to the east, a reduced level of screening could occur if an I-5 widening option that would involve removal of mature vegetation and portions of the berm on the eastern CECP property boundary, outside the Caltrans right-of-way, were to be implemented.

A CEQA/NEPA environmental review of the Caltrans I-5 widening project has yet to be implemented, but it is expected that it will include a detailed visual impact analysis of the I-5 widening alternatives. The City of Carlsbad, in a June 15, 2006 memorandum from the Deputy City Transportation Engineering (see Attachment DR67a-1) summarized the key goals and objectives of the City regarding the I-

5 widening project. In that memorandum, the City stated its major environmental goals and objectives as (Johnson, 2006):

- "Respect existing visual resources and minimize negative impacts.
- Minimize ROW expansion
- Maximize the visual experience for freeway users.
- Minimize grading."

Based on these City environmental goals and objectives for the I-5 widening project and in accordance with the requirements of CEQA, NEPA and the Federal Highways Administration, it is expected that the detailed visual analysis of the I-5 widening project will include a detailed, site-specific analysis of potential visual impacts of the potential loss of the vegetative perimeter berm along the eastern CECP property boundary as a result of Caltrans proposed I-5 widening project, as well as other areas along the I-5 corridor. To reduce the potential visual effects associated with any vegetation removal that would be required for the I-5 widening project, the visual impact study conducted by Caltrans in the EIR/EIS for the I-5 widening project should also include specific visual resource mitigation measures such as preservation of significant existing visual screening, such as the preservation of the trees and vegetation on the perimeter vegetative berm along the eastern and northern boundary of the CECP site. As necessary, the mitigation measures for the Caltrans I-5 widening project should include additional tree planting and revegetation, slope recontouring and/or terraced landscaping. Carlsbad Energy Center LLC will coordinate and cooperate with the City of Carlsbad during the I-5 widening project environmental review process to provide input to Caltrans regarding feasible and effective aesthetic mitigation with respect to preserving the visual screening of the CECP site, and as necessary the planting of new landscaping on the perimeter vegetative berm on the eastern and northern boundary of the CECP site. Cabrillo Power I LLC is also willing to participate in the development of the I-5 widening options to determine the feasibility of the installation and maintenance of new landscaping for screening on the CECP site.

b. Potential direct and cumulative visual impacts from the CECP combined with the proposed desalination plant, to the anticipated public use area/viewpoint within the existing Encina facility property (city comment 36).

Response: The proposed Desalination Project does not include public access to the Encina Power Station, nor does the Desalination Project anticipate or propose a public use area/viewpoint within the existing Encina Power Station. The AFC states, "The City of Carlsbad Desalination Plant is planned to be built immediately adjacent to the Project on a portion of the existing Encina Power Station that would be leased from the site. While the desalination plant adds another utility structure to the already developed Encina Power Station site, the desalination structure is expected to be relatively low profile and not particularly noticeable"(AFC page 5.13-18). The proposed Desalination Plant, at a maximum height of 35 feet, would be similar in height to the existing Tank No. 1 that it would replace. Tank No. 1, partially screened

by existing vegetation, is the southern most of the three tanks in the center on the photograph and simulation on AFC Figure 5.13-6.

While the proposed Desalination Plant will not look the same as the Tank No. 1, it will have relatively the same mass and height as Tank No. 1, and its general visual character will be similar with respect to the existing view of Tank No. 1 from Carlsbad Boulevard. Therefore, the cumulative visual character of the Desalination Plant and the CECP is approximated by the visual simulation provided in KOP 1 on AFC Figure 5.13-6, which shows existing Tank No. 1 and the CECP from a viewpoint on Carlsbad Boulevard.

The Precise Development Plan for the Carlsbad Desalination Project (PDP-002) requires that the developer of the Desalination Plant construct a decorative screen wall, or fence, and where feasible, install landscaping and irrigation along the entire Carlsbad Boulevard along the frontage of the Encina Power Station. It is expected that with the installation of this landscaping as part of the Desalination Project that the visual impacts from the Desalination Plant will be less than significant. See also Data Response 67.c., below.

c. **Please provide a new visual simulation depicting the CECP as it would be seen from the proposed public use area for the Encina facility, per city of Carlsbad comment 36.**

Response: As discussed in Data Response 67.b. above, there is no anticipated or proposed public use area or viewpoint within the existing Encina Power Station as part of the proposed Desalination Project. While the future redevelopment of the Encina Power Station in accordance with the goals and objectives of the South Carlsbad Coastal Redevelopment Plan is likely to occur upon the retirement and demolition of Units 1 through 5 of the Encina Power Station, it is speculative as to type of redevelopment that will occur and speculative as to the public uses and public viewpoints that might be developed. Therefore, a specific proposed or anticipated public use area/viewpoint on the existing Encina Power Station has not been identified.

Notwithstanding this lack of anticipated or proposed public use area or viewpoint, to be responsive to the Data Request, the visual simulation in Figure DR67c-1 depicts a "before" and "after" view of the CECP as seen from an internal Encina Power Station road located about 150 feet east of the existing Encina Power Station's administration building (refer to Figure DR67a-2 for the location of this photo viewpoint). The tank shown on the left side of the photograph and simulation on Figure DR67c-1 is Tank No. 1 that, as discussed in Data Response 67b above, would be replaced by the proposed Desalination Plant. As discussed in Data Response 67b, while the proposed Desalination Plant will not look the same as the Tank No. 1, it will have relatively the same mass and height as Tank No. 1. Therefore, the visual simulation provided on Figure DR67c-1 is representative of the view from this internal Encina Power Station vantage point after construction of the proposed Desalination Project and the CECP. As shown on simulation on Figure 67c-1, indicates that from this internal Encina Power Station vantage point, existing Tank No. 1 and the intervening topography and mature vegetation will largely screen the lower elements of the CECP. Taller elements of the CECP, including the 100-foot-tall

stacks and 88-foot-tall HRSGs will be partially visible beyond the existing mature trees that are found just west of the railroad corridor that bisects the Encina Power Station property. Because access to the Encina Power Station is and will continue to specifically restricted for public safety and security reasons, the view presented in Figure DR67c-1 is not and will not be seen by the public. Therefore, the existing view and visual simulation represent views experienced by NRG employees and official visitors only.

Background

The city of Carlsbad has also expressed concern about potential visual impacts of the project on rail passengers. In addition, the project site includes a designated segment of the Coastal Rail Trail (CRT).

Data Request

68. Please provide a new visual simulation of the project from the adjoining railroad right-of-way, representative of views of rail passengers and future CRT users.

Response: : As discussed in the AFC Visual Resources Section (pages 5.13-5, 5.13-6, 5.13-7) The Atchison Topeka Santa Fe railroad corridor, a designated City of Carlsbad General Plan Scenic Corridor, bisects the Encina Power Station site and runs adjacent to the CECP site to the west. Trains on this corridor include the Amtrak Pacific Surfliner which runs 10 passenger trains a day between San Luis Obispo and San Diego (Amtrak, 2007). In addition, the commuter rail Coaster that runs from Oceanside to San Diego operates 11 weekday trains and 4 trains on Saturday.

The Citywide Trails Map (see Figure DR68-1) calls for the development of a Coastal Rail Trail (CRT) in this area. While Figure DR68-1 shows the currently designated Coastal Rail Trail along the east side of the railroad right-of way, it is important to noted that this is a preliminary designated route only and that, in accordance with Precise Development Plan-002 (PDP-002), prior to occupancy of the Desalination Plant, an easement for the Coastal Rail Trail be dedicated within the PDP boundary that is mutually acceptable to the City of Carlsbad and the land owner (i.e., Cabrillo Power I LLC) or its successor. Cabrillo Power I LLC will work with the City of Carlsbad to determine the best location for the CRT in the vicinity of the Encina Power Station; however, it may not necessarily be along the railroad right-of-way.

Photo 31 in AFC Figure 5.13-5g shows a view from the rail corridor depicting the northbound direction of travel looking north toward the Project site. As shown in this photograph, existing topography and mature vegetation provide partial visual screening of the Project site (seen at the right-hand side of the image); however, the trees are not continuous on the west and south perimeter of the Project site and brief views of the project site are available. When seen from the railroad corridor, the site appears within the context of an existing power plant facility.

Photo 30 (Figure 5.13-5g) is a view from the Atchison Topeka Santa Fe railroad corridor showing the southbound travel perspective. As seen in the photograph, an

existing berm and mature trees surrounding the north and west of the site partially screen views of the Project site, including the exiting tanks.

The following discussion provides additional information regarding the visual and physical conditions found along the rail corridor. At present, with the exception of rail passengers aboard moving trains, public access is prohibited in the railroad corridor adjacent to the CECP site. This analysis considers both current public views and future public views that may be available from the railroad corridor area and future public view if the CRT is eventually located within the railroad corridor through the Encina Power Station

To assist in the analyses of the view from rail passengers as Amtrak and Coastal commuter trains travel this stretch of the rail line through the Encina Power Station, Figure DR68-2 shows a typical east-west cross section along the railroad corridor in the location of the new CECP stack. The section drawing illustrates the approximate track elevation of a typical passenger train, including the existing berms, vegetation, and tank structures, as well as proposed berm and CECP grading. This figure also shows the general physical relationship between the rail corridor and both existing and proposed facilities at this location. Consistent with the existing setting, Figure DR68-2 shows that the rail tracks lie at an elevation well below the existing grade of the CECP site in this area. A new berm to be installed as part of the CECP will increase the grade separation between the Project and the rail corridor. The proposed new berm will further screen potential views of the CECP from the rail corridor.

Figure DR68-3 presents four photographs taken along the rail corridor near the CECP site. Photo S-5, a close range view looking south toward the CECP site from the Agua Hedionda Lagoon Bridge and Photo S-6, a view taken in the rail corridor adjacent to the CECP site shows the embankments along both sides of the railroad tracks in this area. Photos S-7 and S-8 are views toward the CECP site from near the top of the embankment looking east across the railroad tracks toward existing Tank No. 6. The upper portion of a passing train appears near the center of Photo S-8 below the tank edge. The cross section drawing and supplemental photographs demonstrate that the combination of the embankment and existing vegetation provides a considerable amount of screening along the rail corridor near the CECP site.

a) Rail Passenger Views

Both Amtrak's Surfliner route and the Coaster commuter route use the Atchison Topeka Santa Fe railroad corridor situated adjacent to, and west of, the CECP site.

As discussed above, Amtrak operates 10 passenger trains per day on the Surfliner route between San Diego and San Luis Obispo. This route travels through many highly industrial and blighted areas, including many areas in the Santa Barbara, Ventura, Los Angeles, Orange, and San Diego counties, as well as areas of unobstructed open views, and in coastal area ocean views that can be seen from the

west side of the trains. The CECP site lies between the Oceanside and Solana Beach stations. In addition, the Coaster, a commuter train running between Oceanside and San Diego runs 11 weekday trains and 4 trains on Saturdays. The CECP site lies between the Carlsbad Village and the Carlsbad Poinsettia stations on this line.

Figure DR68-4 includes an elevation drawing that shows the typical eye level for a passenger seated on the upper train deck. This drawing indicates that eye level is approximately 11 feet above grade for passengers seated on the upper train deck. Figure DR68-4 also presents a plan diagram of the horizontal cone of vision typically experienced by rail passengers. As shown on the diagram, train passenger views are generally oriented perpendicular to the path of travel (as opposed to an auto where the roadway traveler experiences a wider cone of vision through front windshield as well as side windows).

The overall duration of train passenger views at the CECP site is expected to be less than 30 seconds; however, passenger views of the taller CECP components such as the stacks will last less than 15 seconds. Factors that affect view duration estimates include the following: the length of the overall project site is approximately 2,400 feet (just under one-half mile); and the length of the project area occupied by taller components including the stacks and HRSGs is about 1,000 feet. Typical passenger train speeds are estimated at approximately 56 miles per hour (mph) and 40 mph for the Amtrak Surfliner and Coaster, respectively. Because the speed limit for passenger trains is 90 mph along the route, actual speeds of trains passing the CECP site could be higher than estimated (Sisson 2003). Travel speed estimates are based upon average scheduled departure and arrival times from the two nearest stations for each route. For Amtrak, the Oceanside and Solana Beach stations are approximately 15.5 miles apart and the average departure and arrival between stations is 16.5 minutes (Amtrak, 2007). For the Coaster, the Carlsbad Village and Carlsbad Poinsettia stations are approximately 4.25 miles apart and the average time between stations is 6.4 minutes (SANDAG, 2007).

Depending upon the time of year, between two and eight scheduled trains pass the CECP site either before or after daylight hours, which means that passengers on these trains will not see the CECP site. In addition, it should be noted that because rail passengers seated on the lower level (including on the western side of the train facing the scenic coastline) will not see the project. Therefore, only views of train passengers who are seated on the east side, upper decks of the train coaches will include the brief view of the CECP site. These passengers will experience a brief glimpse of the top portions of taller CECP features including stacks and HRSGS and these features will be partially screened by existing trees, shrubs and the new berm. Views from the lower decks of the train will generally be screened by the existing embankment, existing vegetation and the CECP berm. The Figure DR68-2 cross section drawing illustrates the rail corridor and train in relation to the location and

height of the CECP stack, proposed and existing berms, and an existing fuel oil tank on the Encina Power Station site.

Representative Train Passenger Visual Simulation

Figures DR68-5a and DR68-5b present a "before" and "after" view of the CECP from the approximate eye-level of passengers on the upper deck of a bi-level passenger rail car such as the Superliner or Coaster coaches. The photograph, taken from the upper edge of the embankment located along the western side of the tracks, a comparable view that is seen by train passengers who are seated on the upper train deck (refer to Figure DR67a-2 for photo viewpoint location and Figure DR68-4 for approximate eye level). It should be noted that for safety reasons, the viewpoint of the "before" and "after" view is from the top of the western embankment overlooking the railroad track and is approximately 20 feet from the railroad tracks. Therefore, the screening effect of the eastern embankment and the vegetation and CECP berm on the east embankment of the railroad track from this viewpoint is less than the actual screening effect of these features as viewed from the upper deck of a bi-level passenger rail car.

Figure DR66-5a is a visual simulation that depicts the CECP project without landscaping on the project's spoils berm, and Figure DR68-5b shows the project with proposed landscaping, which will include the planting of tall shrubs on the new berm. The shrubs are shown at approximately 5 to 12 feet in height. In this location, the shrubs will be situated below overhead transmission lines. Trees and taller shrubs will be planted in other places along the berm where there are no overhead transmission lines

As shown Figure DR68-5, in the simulation image, the lower elements of the CECP will be screened by existing embankment, trees, shrubs, and the new CECP berm. Passengers on the upper train level will have a brief glimpse of portions of the taller CECP elements including the stacks and HRSGs. For train passengers seated on the lower level decks, intervening vegetation and topography will largely screen views of the CECP site. As demonstrated by Figure DR68-5b, new landscaping will further screen train passenger views of the CECP elements.

b) Future Coastal Rail Trail Users

Pedestrian public access is currently prohibited along the rail corridor; however, a future coastal rail-trail is planned in the vicinity of the Encina Power Station and the CECP site. Specific design plans for a trail in this area are not currently available. Figure DR68-1 presents a schematic diagram of the Coastal Rail Trail alignment. It shows the future trail on the eastern side of the tracks within the railroad right-of-way. However, please note that the precise location of the trail within the vicinity of the Encina Power Station and the CECP site has not been determined at this time. Consistent with the requirements of PDP-002, a mutually acceptable alignment for the Coastal Rail trail will be developed in consultation between the City of Carlsbad

and Cabrillo Power I LLC. As noted above, a trail location along the railroad corridor has been presented for the purposes of this analysis only and does not necessarily reflect the location of the future Coastal Rail Trail easement.

Should the Coastal Rail Trail be developed along the railroad corridor, given the speed of passing trains, it is assumed that when constructed, the new trail will be physically separated from the railroad by fencing for safety purposes. Future users of the planned Coastal Rail Trail located within the railroad corridor will have views toward the CECP site. Assuming an estimated average walking time of 20 minutes per mile, hikers on the trail could have views within one-half mile distance of the overall CECP site for approximately 10 minutes. Trail views of the portion of the CECP area occupied by taller components including the stacks and HRSGs could last for 5 minutes or less. View duration for bicyclists using the trail would be shorter. It is expected that as seen from the future trail at distance greater than a half mile, existing structures, topography and mature trees provide considerable screening of views toward the site. Since trail users will also have the opportunity to look to the west, in addition to the east, portions of this trail in the vicinity of the Encina Power Station and the CECP site would also include views towards the coast.

Future Coastal Rail-Trail Visual Simulation

Figure DR68-6 depicts a "before" and "after" view from a location along the planned, future coastal rail trail just south of the Agua Hedionda Lagoon Bridge (refer to Figure DR67a-2 for the location of photo viewpoint.) The simulation image demonstrates that existing mature trees and shrubs as well as the proposed berm will screen lower elements of the CECP. The berm and vegetation will provide partial screening for taller elements such as stacks and HRSGs. When trail users see the CECP site at distances closer than the simulation vantage point, it is expected that vegetation and topography adjacent to the trail will provide increased levels of screening. It should be noted because specific trail design data is not currently available, the simulation image does not portray design elements of the trail itself which may include pavement surfacing, bridge widening, fencing between the trail and the railroad track, and additional landscaping.

References for Data Responses 67 and 68:

City of Carlsbad. *2000. Agua Hedionda Lagoon to Cannon Road: Coastal Rail Trail.* Plans prepared by Transtech.

Johnson, Robert T., Jr. 2006. "Interstate Highway 5 Widening." Memo to Citizens' Committee to Study the Flower Fields and Strawberry Fields Area from Deputy City Engineer, Transportation. June 15, 2006. Online at: http://ci.carlsbad.ca.us/chall/ccinfopdf/interstatehwy5widening.pdf

SANDAG (San Diego Association of Governments). *Traffic Transit and Travel Info Website.* Transit511.sd.org Site visited December 3, 2007.

Sisson, Paul. 2003. "Transit District Takes a Closer Look at Carlsbad Train Bridge." *North County Times*. Nov. 9, 2003. Online at: http://www.nctimes.com/articles/2003/11/10/news/coastal/11_9_0321_14_36.txt.

Stevenson, Tyler R. 2007. *Arborist Assessment - Encina Power Station*. Dudek International Society of Arboriculture. December 7, 2007.

Background

The city of Carlsbad has recommended that new transmission lines be placed underground. Furthermore, proposed new transmission lines would closely parallel the edge of the railroad right-of-way, making them a prominent feature to rail passengers and future CRT users.

Data Request

69. Please provide a discussion of the feasibility and visual benefit of undergrounding proposed transmission lines.

Response:

Feasibility of Routing Underground Transmission Lines

Routing the two transmission lines underground from the two CECP generating units to the existing 230 kV and 138 kV SDG&E switchyards would present many obstacles. Some of the key obstacles are:

- The existing plant facility through which the projects transmission lines will transverse already has various underground utilities, including extensive fuel lines, service power, drainage pipes, drainage ditches, water and sewer lines, etc., as well as at grade pipe runs that would need to be crossed over or under by underground transmission lines.
- The new CECP units will require additional utilities to be added including new gas lines, and new sewer, water, and communicate lines.
- These two CECP transmission lines would have to be routed under the existing railroad track.

Visual Benefit of Undergrounding Proposed Transmission Lines

Since it is not feasible to underground the lines, there is no need to address the visual benefits of undergrounding the transmission lines.

Background

The city of Carlsbad also requested an (arborist's) assessment of health and probable longevity of existing trees bounding the CECP site.

Data Request

70. Please prepare an arborist's assessment of existing trees surrounding the project site and provide copies to Energy Commission staff and the city of Carlsbad.

Response: The requested arborist assessment of the existing trees surrounding the CECP site is included as Attachment DR70-1. This assessment considered the health and longevity of the existing trees bounding the CECP site.

Background

The AFC does not identify whether CECP stacks or other prominent parts of the facility would require night lighting. Staff needs this information for completing its visual resource analysis.

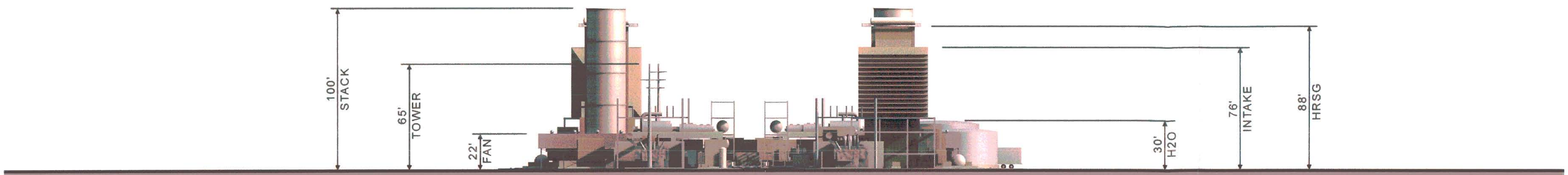
Data Request

71. Please describe any stack or other prominent night lighting that may be required of the CECP.

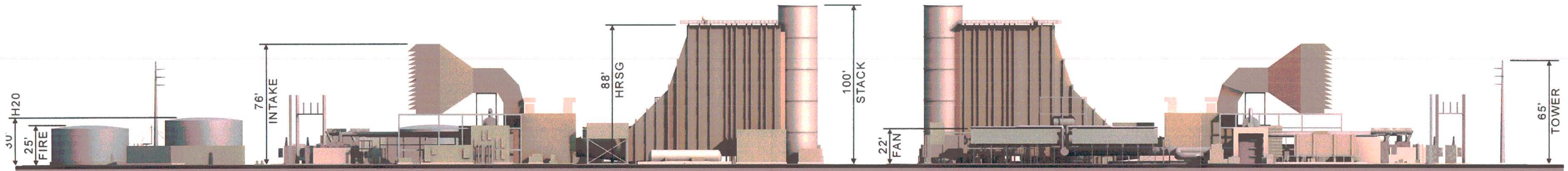
Response: As discussed in Section 5.13.3.2.3 (Visual Resources - lighting) of the AFC:

"Operation of the CECP will require onsite nighttime lighting for safety and security. Nighttime lighting will be designed to meet security, operation and maintenance, and safety requirements. The lighting will be directed downward and will be down-shielded or capped to reduce glare and light trespass. For areas where lighting is not required for normal operation, safety or security, switched lighting circuits or motion detectors will be provided, thus allowing these areas to remain unilluminated (dark) at most times, minimizing the amount of lighting or glare potentially visible offsite."

The only lighting on the CECP stack would be air navigation lights,(should such lighting be required by the FAA.



SIDE ELEVATION 1



FRONT ELEVATION 2

0 50 100 150

FIGURE DR61-1
POWER BLOCK
SCALED ELEVATIONS
CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CALIFORNIA

CH2MHILL

EY072007001SAC Figure_61-1.ai 12/11/2007 afint

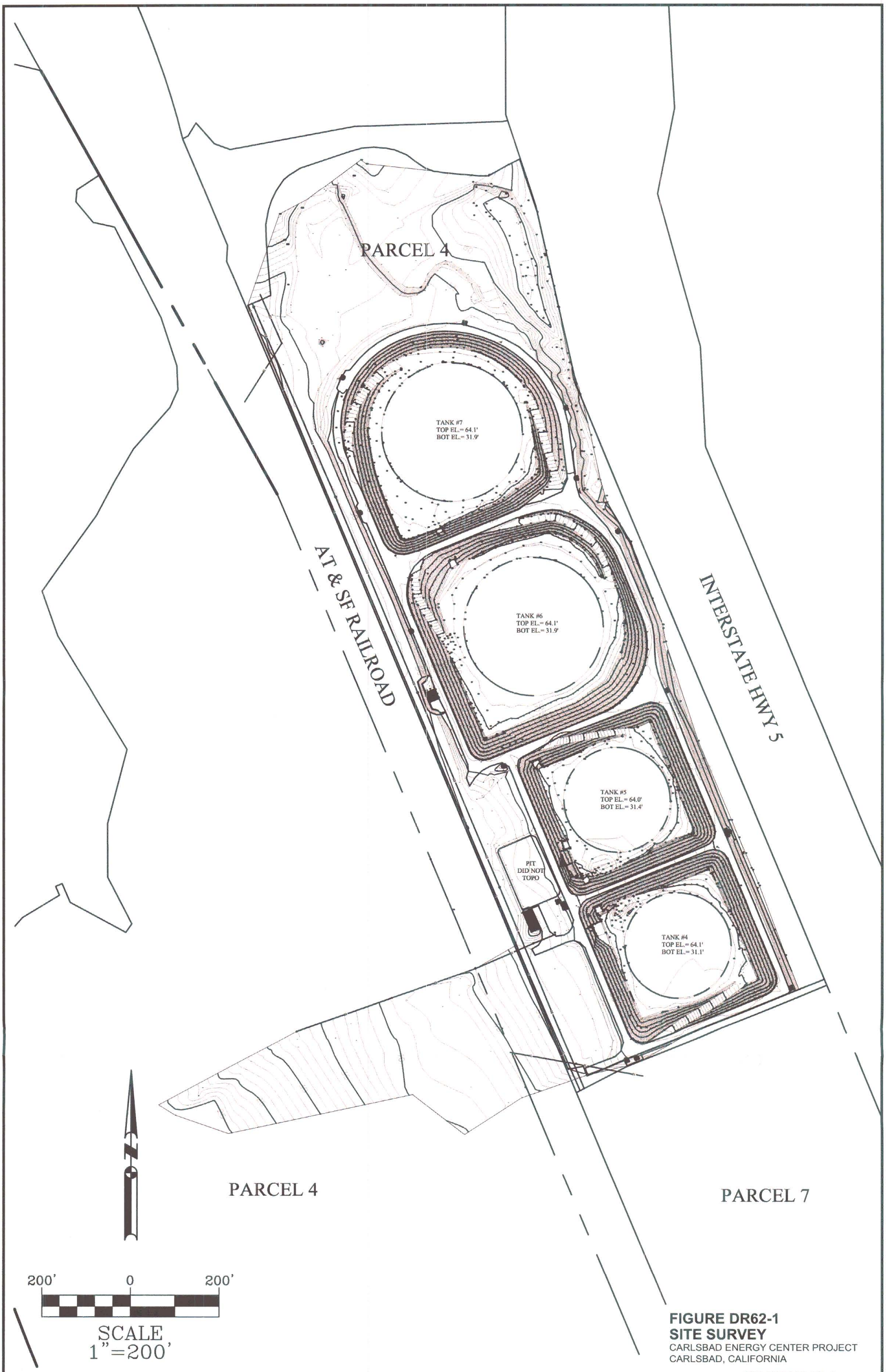
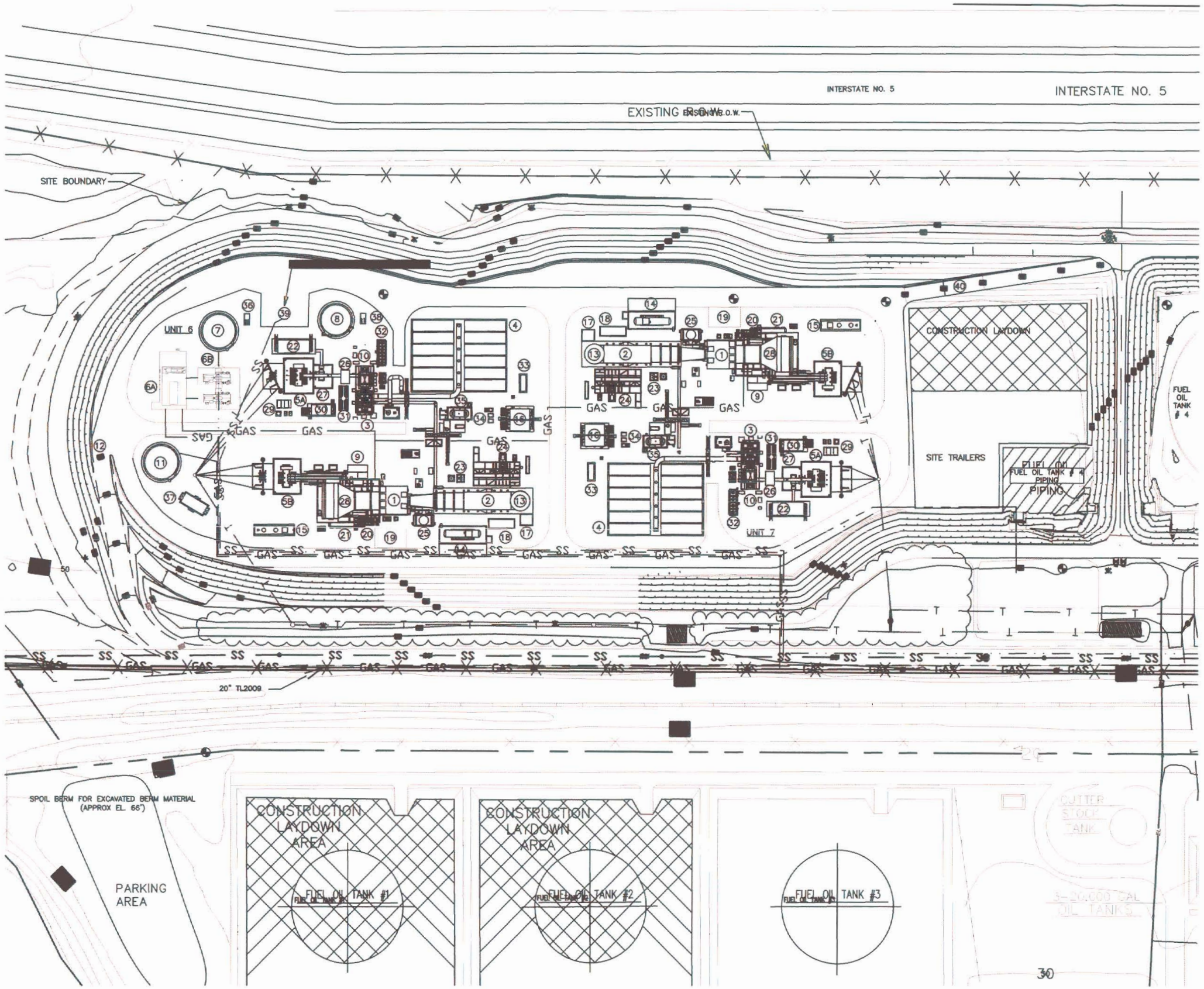


FIGURE DR62-1
SITE SURVEY
CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CALIFORNIA

CH2MHILL

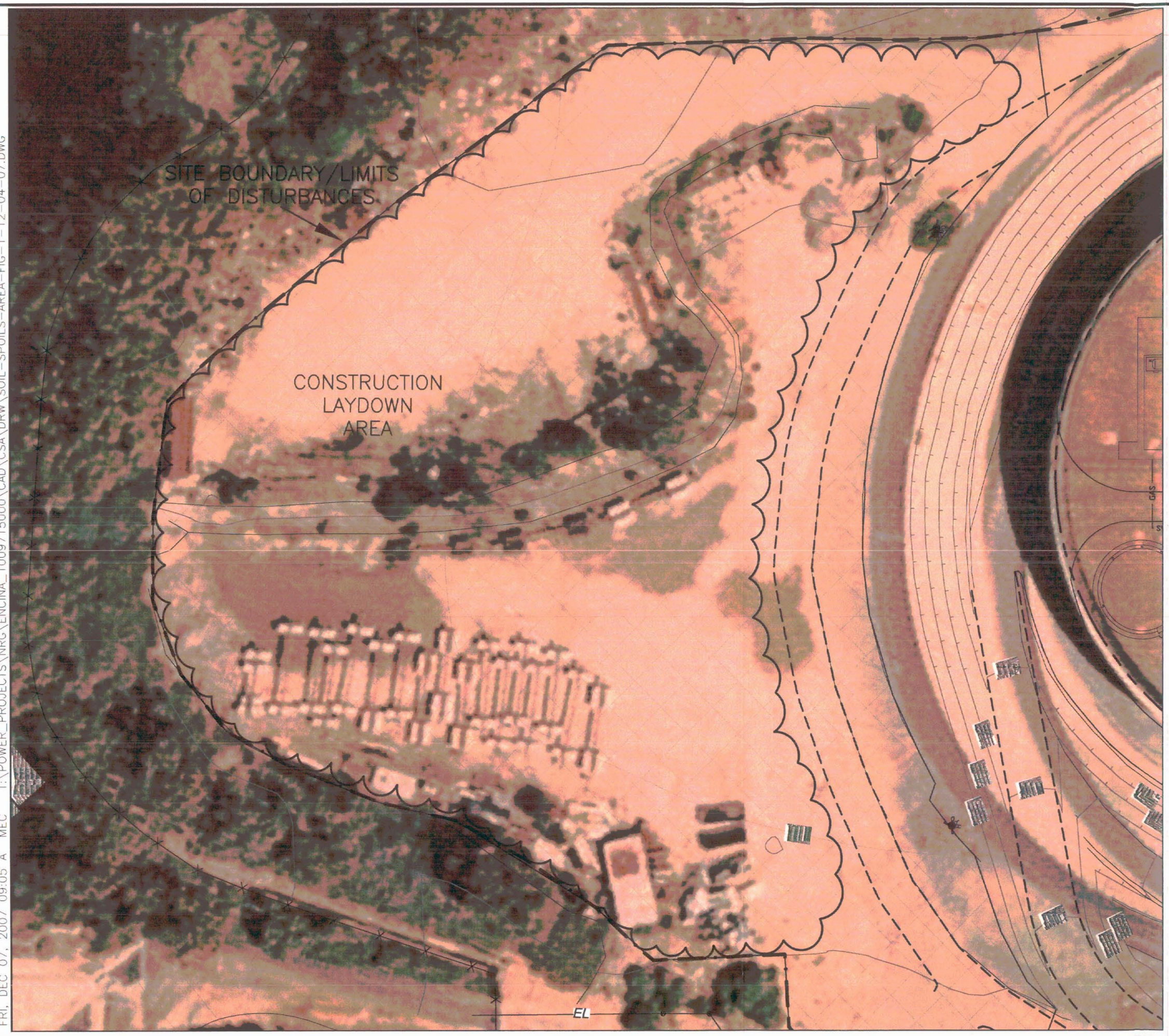
EY072007001SAC Figure_DR62-1.ai 12/3/07 afint



Not to scale.

FIGURE DR63-1
SITE GRADING PLAN
CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CALIFORNIA

CH2MHILL



LEGEND

- PROPERTY BOUNDARY
- SITE BOUNDARY/LIMITS OF DISTURBANCES
- EXISTING CONTOURS
- ASPHALT ROADS AND PARKING AREAS
- GUARD RAILS
- SPOIL AREA FOR EXCAVATED BERM MATERIAL

UTILITY LIST

- CITY WATER LINE
- FUEL GAS — GAS — GAS —
- RECLAIM WATER
- SANITARY SEWER — SS — SS —
- TRAINSMISSION LINES — T — T — T — T —

PLANT NORTH

ELEVATIONS SHOWN ARE MEAN SEA LEVEL DATUM U.S.G.S. EQUAL ZERO
DESIGN HIGHEST TIDE ELEVATIONS +. 5.0'

0 25' 50'

APPROXIMATE SCALE: 1" = 50'

FIGURE DR64-1

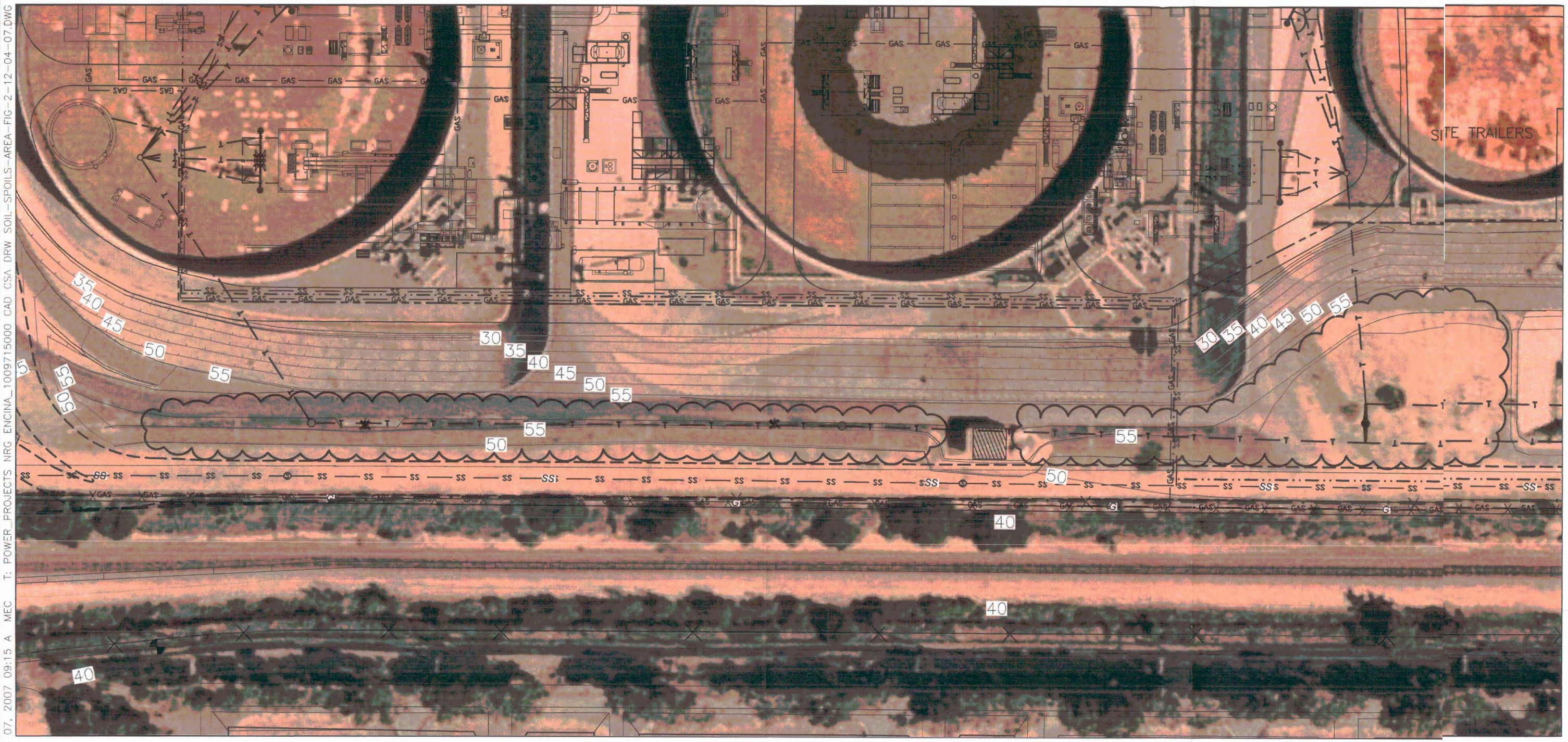
GRADING LIMITS LAYDOWN AREA A

CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CALIFORNIA

CH2MHILL

FRI, DEC 07, 2007 09:05 A MEC T:\POWER_PROJECTS\NRG\ENCINA_100971

EY072007001SAC Figure_64-1.ai 12/11/2007 afint



LEGEND

- PROPERTY BOUNDARY
- SITE BOUNDARY
- EXISTING CONTOURS
- ASPHALT ROADS AND PARKING AREAS
- GUARD RAILS
- SPOIL AREA FOR EXCAVATED BERM MATERIAL

UTILITY LIST

- CITY WATER LINE
- FUEL GAS (GAS — GAS)
- RECLAIM WATER
- SANITARY SEWER (SS — SS)
- TRAINSMISSION LINES

PLANT NORTH

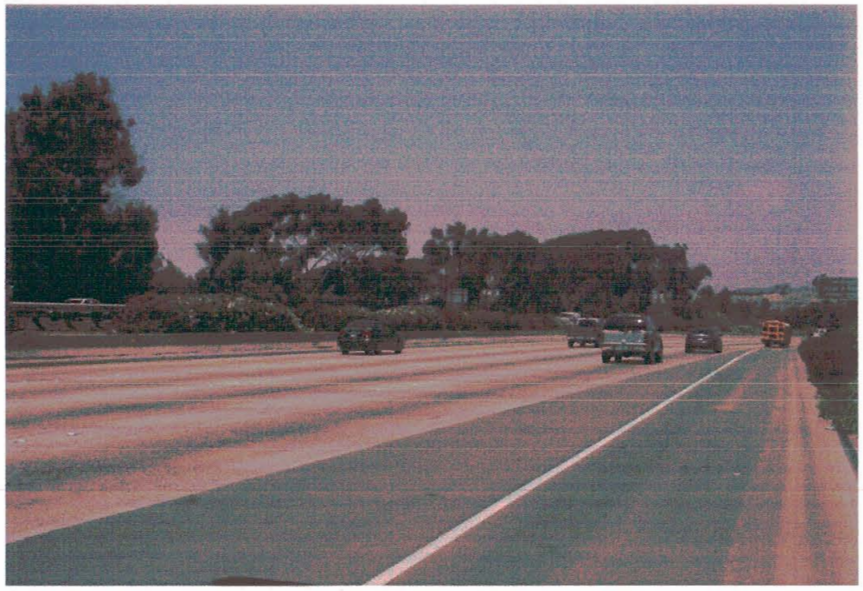
ELEVATIONS SHOWN ARE MEAN SEA LEVEL
DATUM U.S.G.S. EQUAL ZERO
DESIGN HIGHEST TIDE ELEVATIONS + 5.0'

0 35' 70'

APPROXIMATE SCALE: 1" = 70'

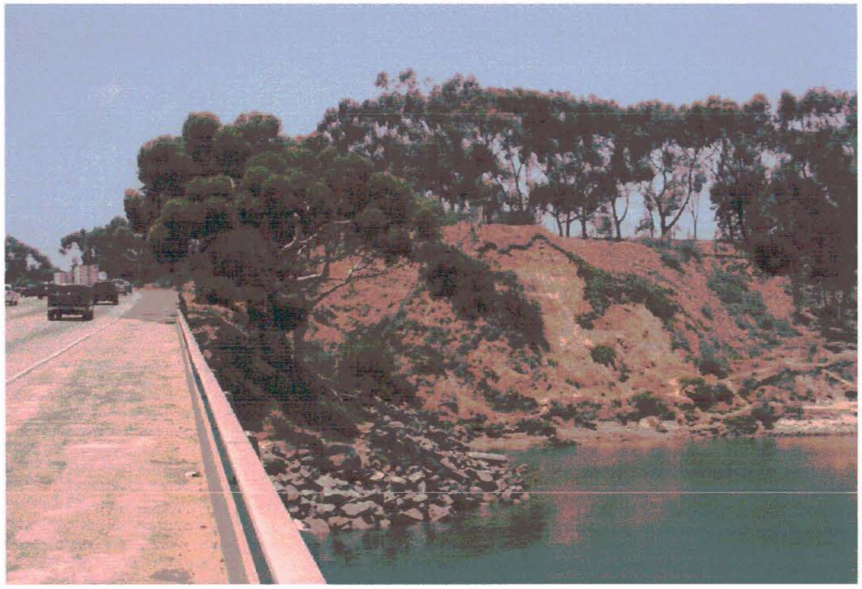
FIGURE DR65-1
GRADING LIMITS
SPOILS BERM AREA
CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CALIFORNIA

CH2MHILL



S-1. Interstate 5 northbound looking northwest

S-2. Interstate 5 northbound looking west



S-3. Interstate 5 southbound looking south

S-4. Interstate 5 southbound near edge of western berm looking south

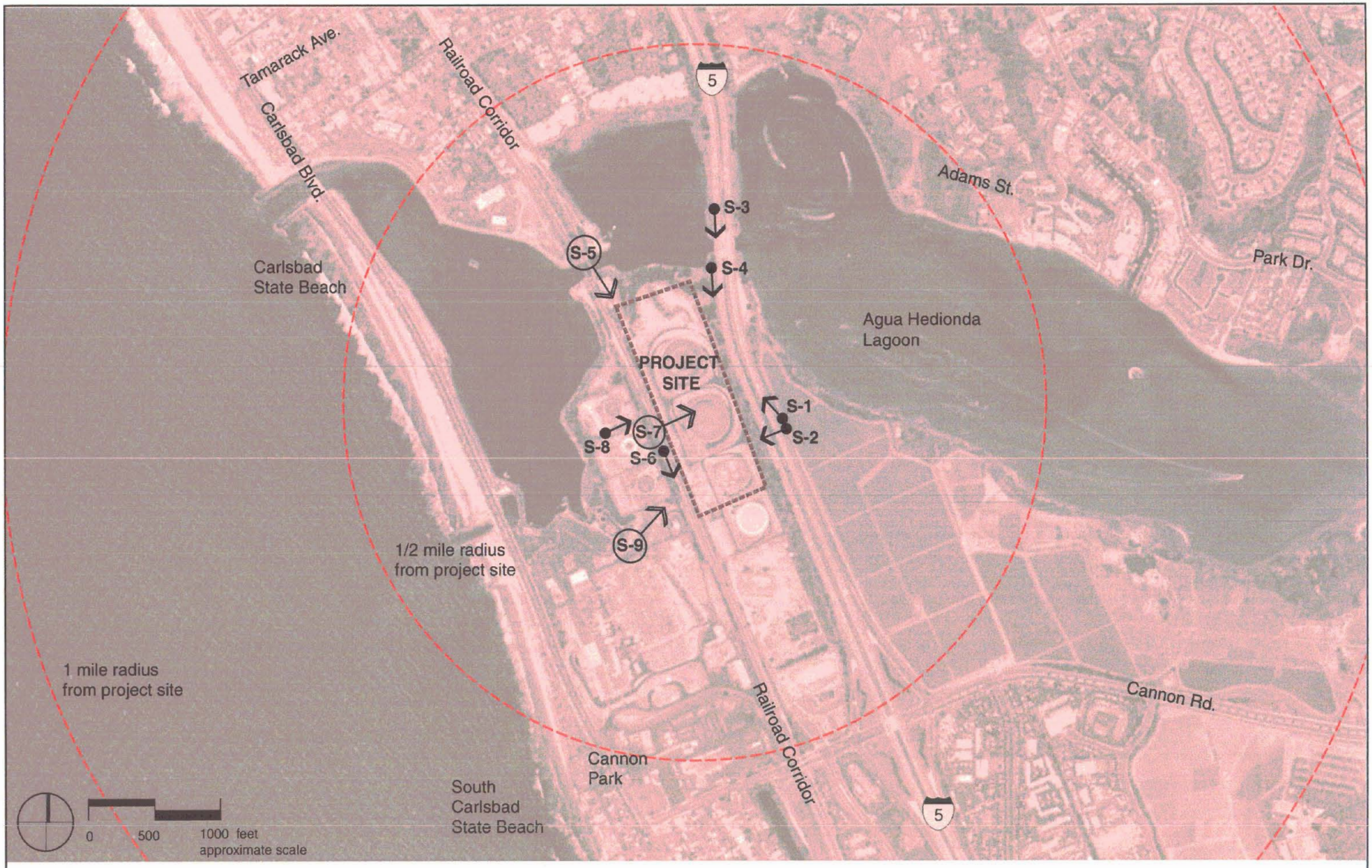
Refer to DR67a-2 for photo viewpoint locations

FIGURE DR67a-1
VIEWS FROM I-5
CARLSBAD ENERGY CENTER PROJECT

ENVIRONMENTAL VISION

CH2MHILL

120807



This figure shows viewpoint locations for 9 new photos presented in Data Response 67 & 68. These photos supplement a set of 31 photos presented in the AFC (Figures 5.13-4 and 5.13-5). This map is an enlarged portion of the AFC Figure 5.13-3 basemap.

S-7 → Supplemental Simulation Viewpoint

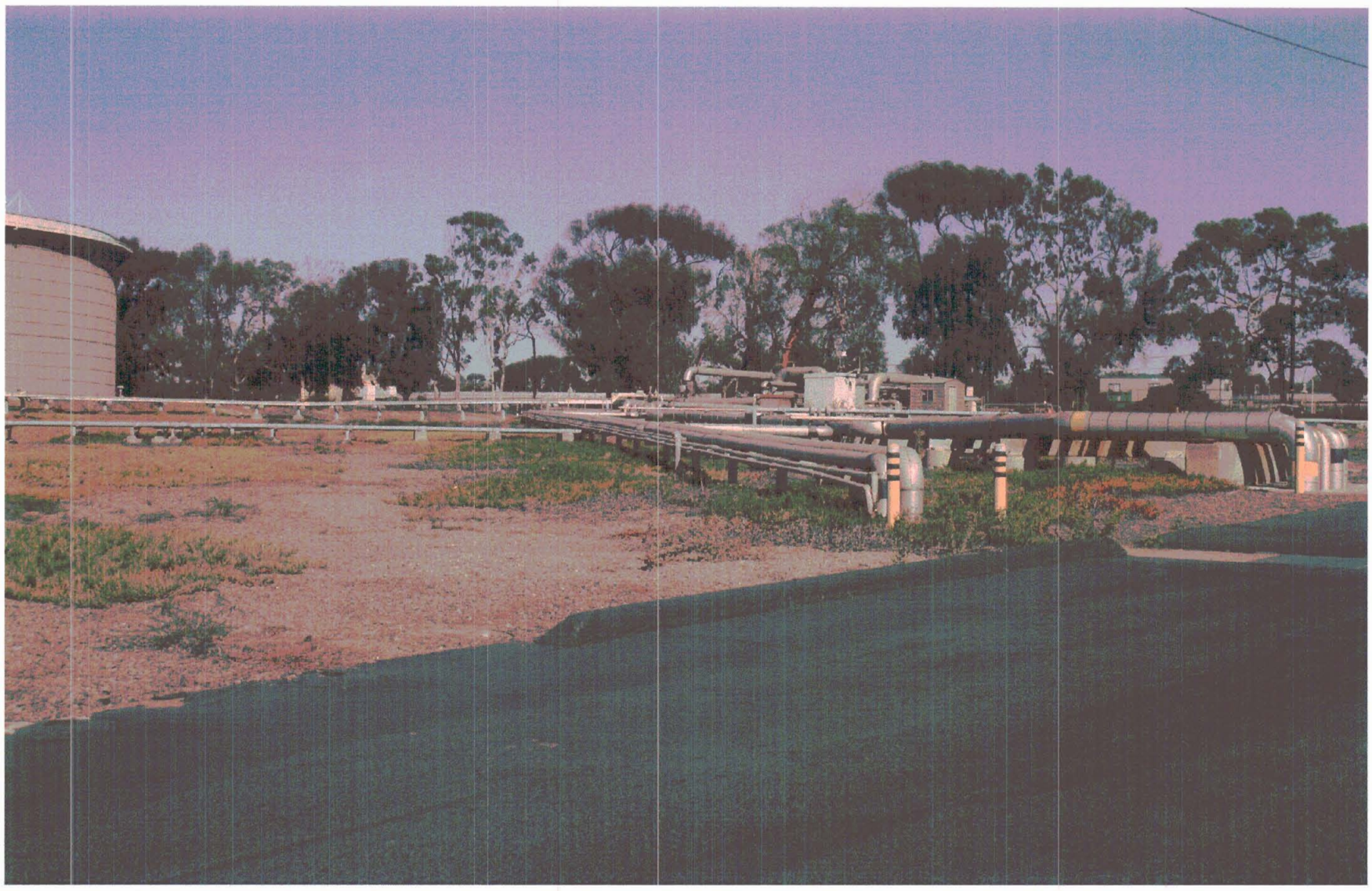
S-1 → Photo Viewpoint

FIGURE DR67a-2
PHOTO VIEWPOINT LOCATIONS
CARLSBAD ENERGY CENTER PROJECT

ENVIRONMENTAL VISION

CH2MHILL

121107

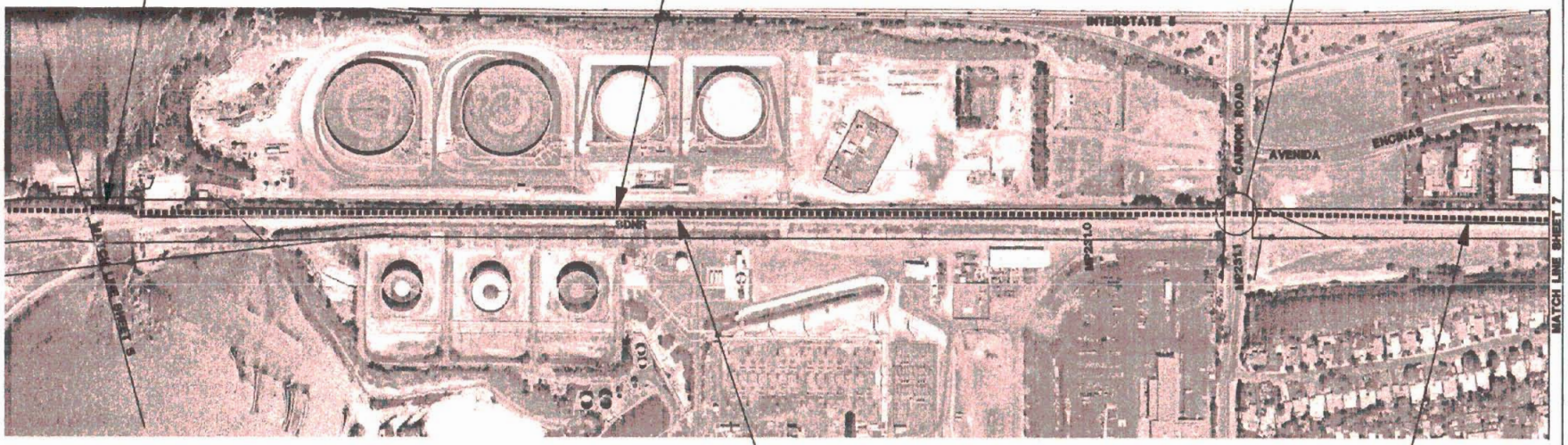


Existing View from Encina Power Plant Site

Visual Simulation of Proposed Project

For viewpoint location refer to
Figure DR67a-2 Viewpoint S-9

FIGURE DR67c-1
ENCINA POWER PLANT SITE
INTERNAL ROADWAY
EXISTING VIEW AND VISUAL SIMULATION
CARSLBAD ENERGY CENTER PROJECT



LEGEND:

DESCRIPTION	SYMBOL
CLASS I BIKE PATH	
CLASS II BIKE LANES	
CLASS III BIKE ROUTE	
PEDESTRIAN TRAIL	
PEDESTRIAN TRAIL (UNIMPROVED)	
AT GRADE CROSSING	⊠
OVER CROSSING	□
BRIDGE	

REVISIONS	DATE	SCALE
		HORIZONTAL AS SHOWN
		VERTICAL AS SHOWN

COASTAL RAIL TRAIL

PLANS PREPARED BY:
TRANSTECH
624 BREA CANYON ROAD
WALNUT, CA 91789
(909) 595-8599

CITY OF CARLSBAD

AGUA HEDIONDA LAGOON TO CANNON ROAD
COASTAL RAIL TRAIL

376-9

SHEET 6 OF 48

SOURCE: City of Carlsbad

ENVIRONMENTAL VISION

FIGURE DR68-1
PRELIMINARY DESIGNATED ROUTE
COASTAL RAIL TRAIL

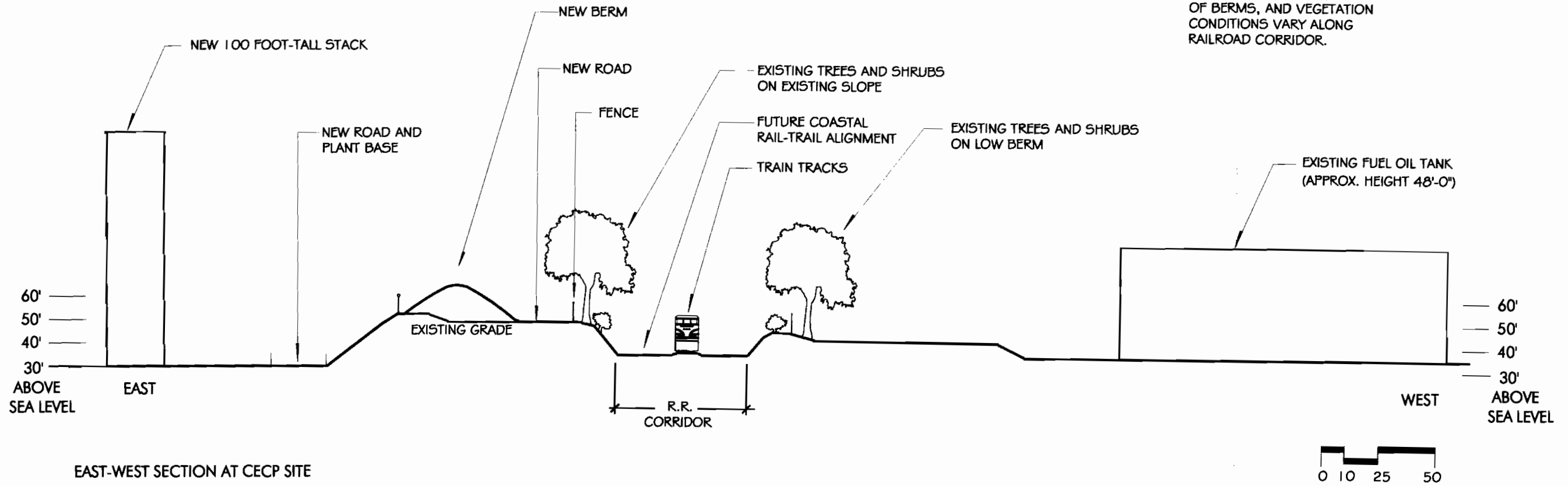
CARLSBAD ENERGY CENTER PROJECT
CARLSBAD, CA

CH2MHILL

EY072007001SAC Figure_DR68-1.ai 12/17/2007 afint

NOTES: 1) EXISTING TOPOGRAPHIC ELEVATIONS ARE APPROXIMATE AND ARE BASED UPON ENGINEERING DRAWINGS AND FIELD OBSERVATIONS.

2) GRADE OF SLOPES, HEIGHT OF OF BERMS, AND VEGETATION CONDITIONS VARY ALONG RAILROAD CORRIDOR.

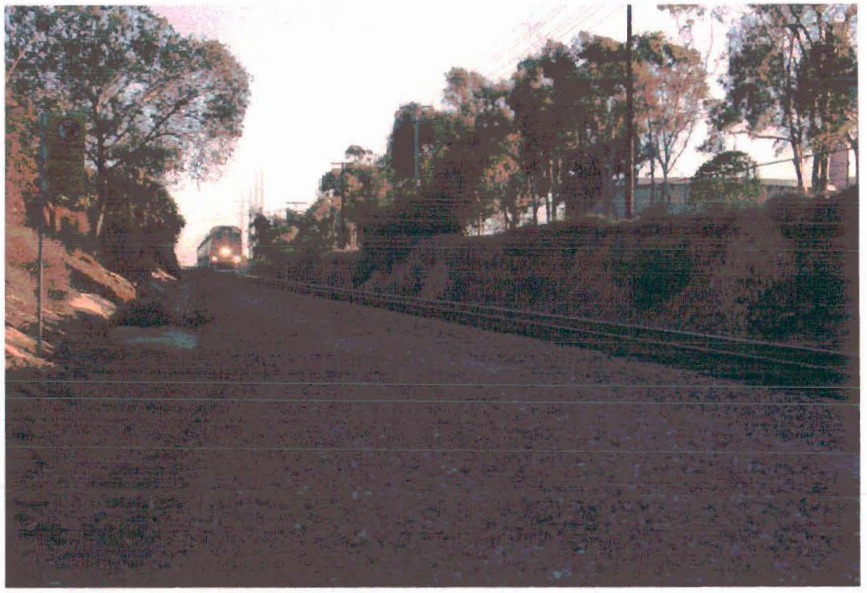


EAST-WEST SECTION AT CECP SITE

ENVIRONMENTAL VISION
12-11-2007

FIGURE DR68-2
TYPICAL CROSS-SECTION AT RAILROAD CORRIDOR
CARLSBAD ENERGY CENTER PROJECT

S-5. Railroad corridor near Agua Hedionda Lagoon bridge looking south*



S-6. Railroad corridor adjacent to site looking south

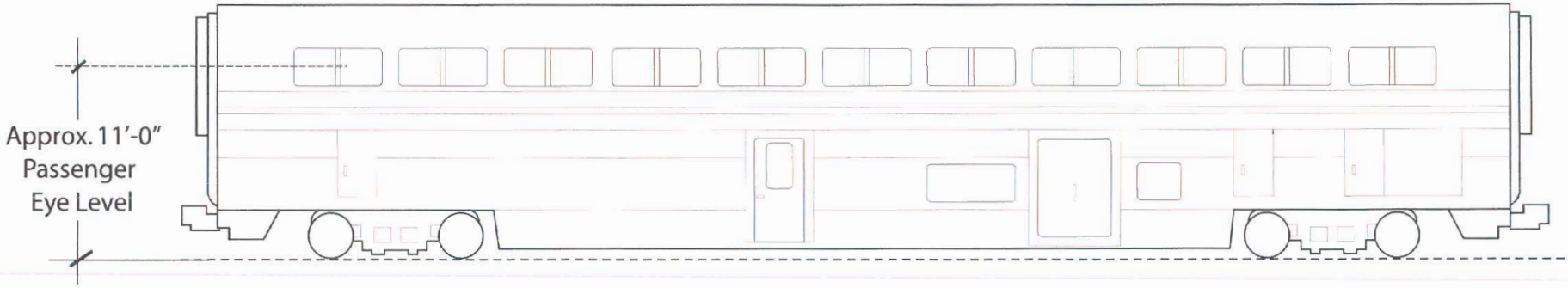
S-7. Railroad corridor from edge of embankment looking east at site*

S-8. Encina Power Station property looking east at train and CECP site

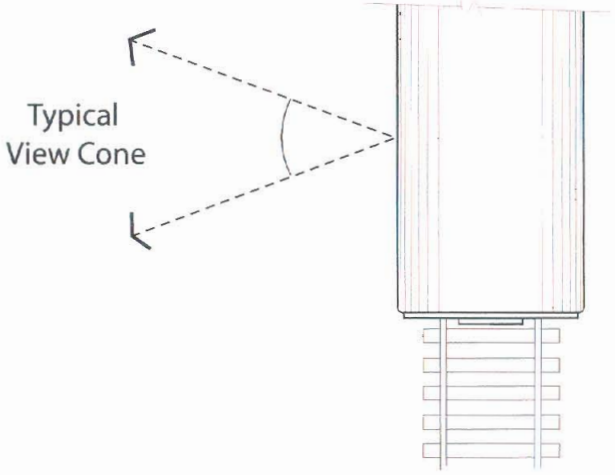
*Supplemental Visual Simulation

Refer to DR67a-2 for photo viewpoint locations

FIGURE DR68-3
REPRESENTATIVE VIEWS AT RAILROAD CORRIDOR
CARLSBAD ENERGY CENTER PROJECT



SIDE ELEVATION OF PASSENGER CAR (SUPERLINER)



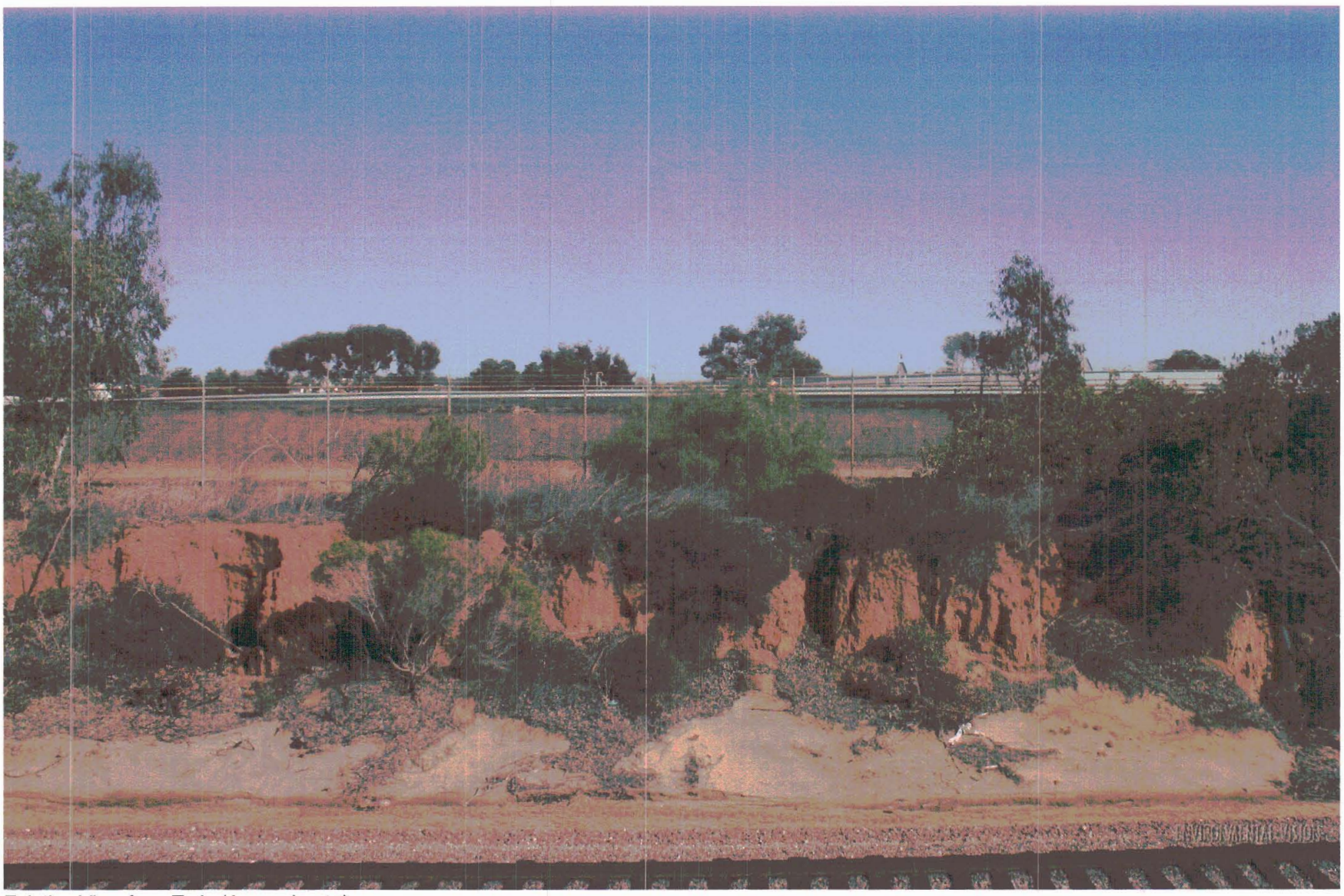
PLAN VIEW OF PASSENGER CAR

FIGURE DR68-4
TYPICAL TRAIN ELEVATION AND PASSENGER VIEW CONE
CARLSBAD ENERGY CENTER PROJECT

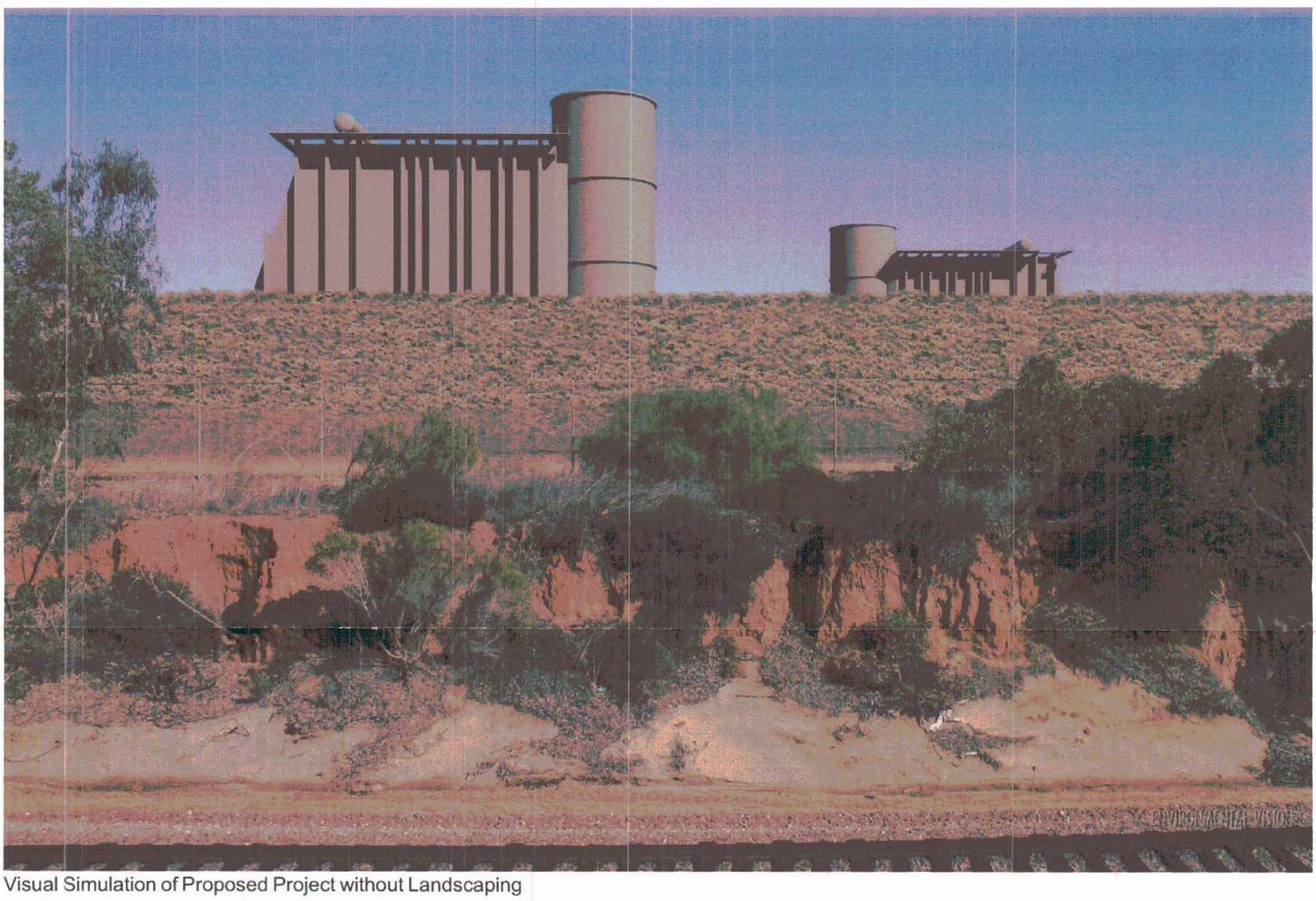
ENVIRONMENTAL VISION

CH2MHILL

121107



Existing View from Train (Approximate)

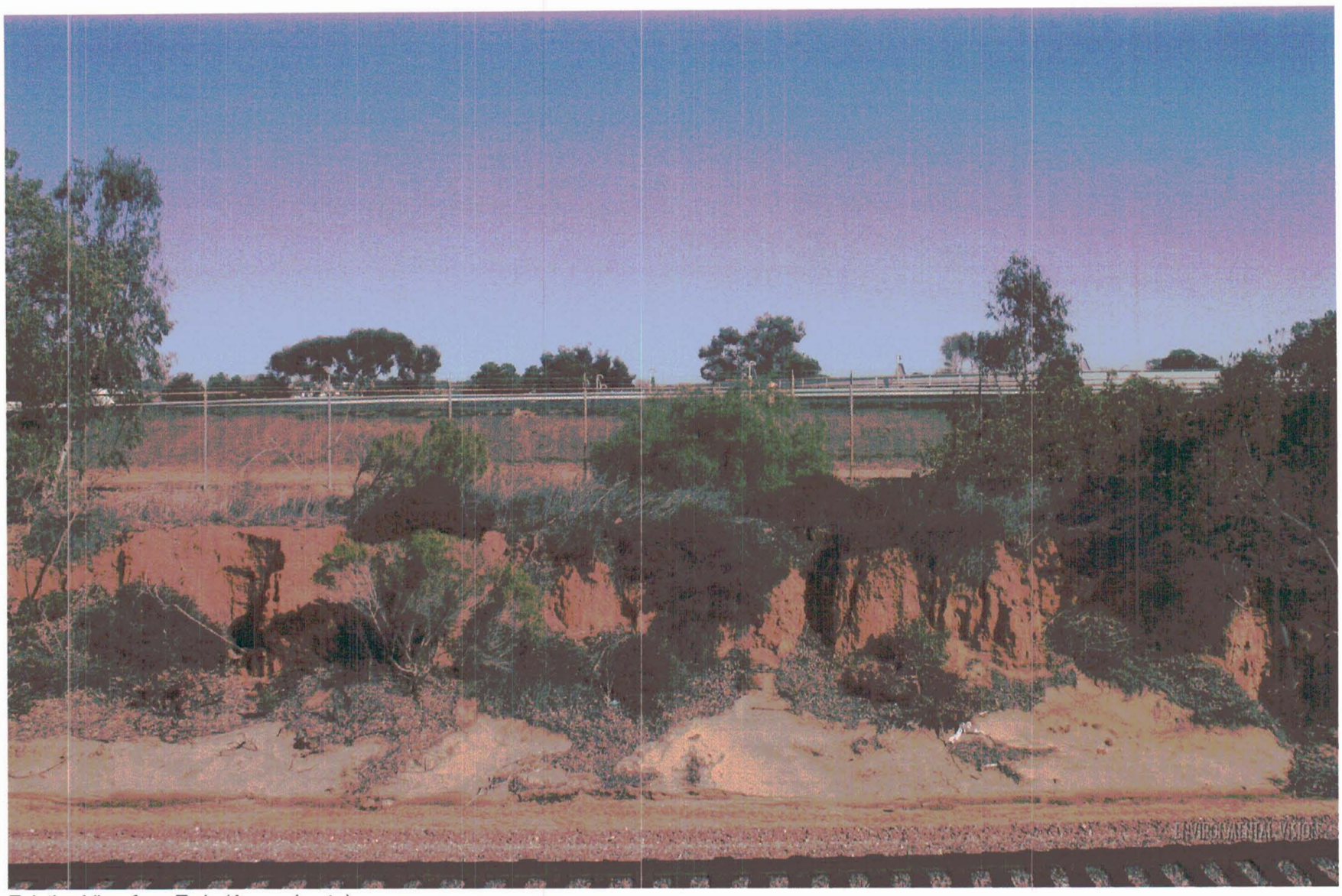


Visual Simulation of Proposed Project without Landscaping

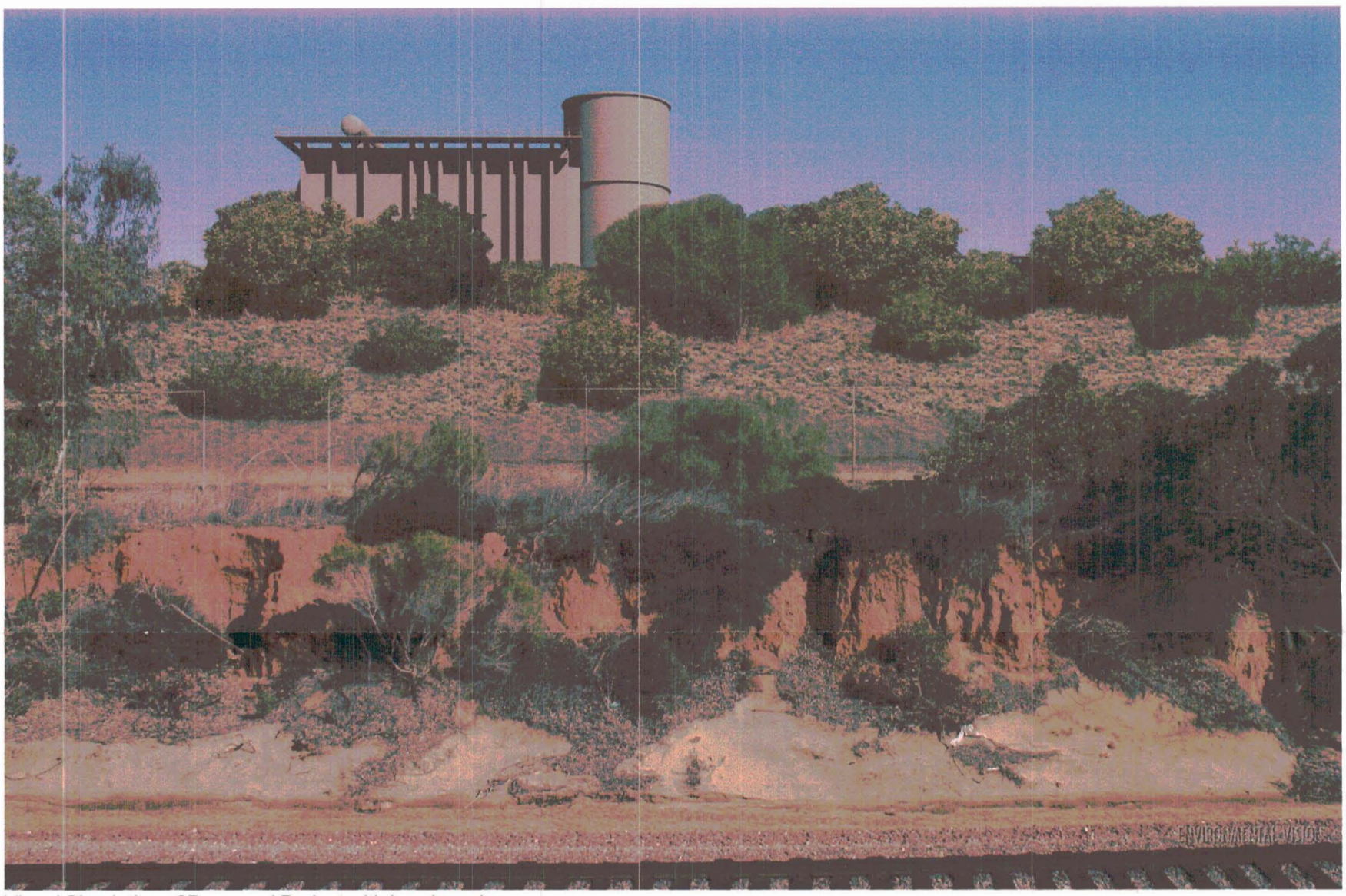
For viewpoint location refer to
Figure DR67a-2 Viewpoint S-7

FIGURE DR68-5a
REPRESENTATIVE PASSENGER TRAIN VIEW
EXISTING VIEW AND VISUAL SIMULATION (NO LANDSCAPING)
CARSLBAD ENERGY CENTER PROJECT

ENVIRONMENTAL VISION
121107
CH2MHILL



Existing View from Train (Approximate)

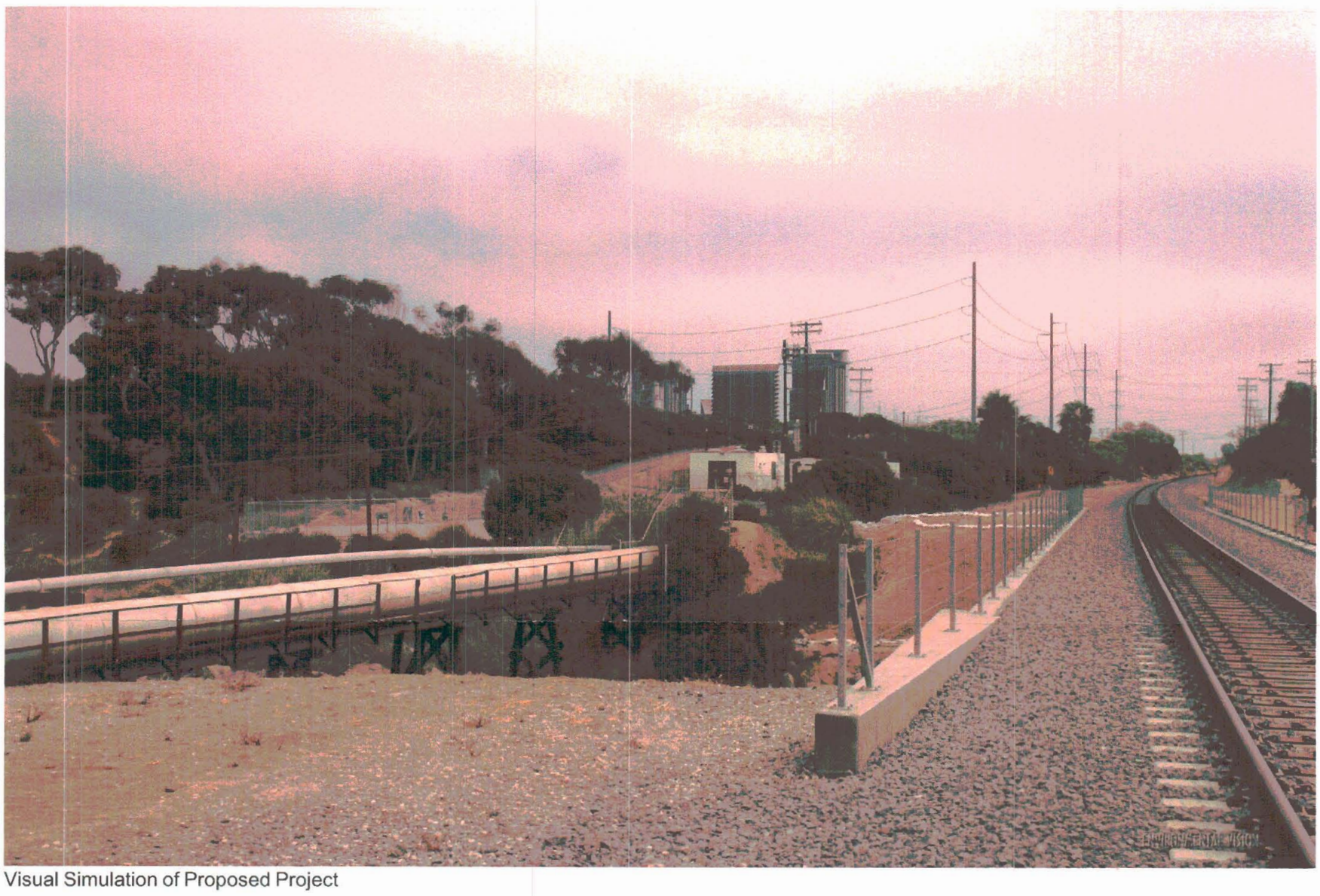


Visual Simulation of Proposed Project with Landscaping

For viewpoint location refer to
~~Figure DR67a-2 Viewpoint S-7~~

~~FIGURE DR68-5b~~
REPRESENTATIVE PASSENGER TRAIN VIEW
EXISTING VIEW AND VISUAL SIMULATION (WITH LANDSCAPING)
CARSLBAD ENERGY CENTER PROJECT

Existing View from Proposed Coastal Rail Trail



Visual Simulation of Proposed Project

For viewpoint location refer to
Figure DR67a-2 Viewpoint S-5

FIGURE DR68-6
FUTURE COASTAL RAIL TRAIL
EXISTING VIEW AND VISUAL SIMULATION
CARSLBAD ENERGY CENTER PROJECT

ATTACHMENT DR67a-1

June 15, 2006

TO: CITIZENS' COMMITTEE TO STUDY THE FLOWER FIELDS AND STRAWBERRY FIELDS AREA

FROM: Deputy City Engineer, Transportation

INTERSTATE HIGHWAY 5 WIDENING

Attached are bullet points condensed from preliminary information obtained from Caltrans for the referenced project. Over the next several months, Caltrans staff will be scheduling presentations to the Carlsbad City Council and asking for a decision regarding aspects of:

1. Freeway widening
2. Freeway enhancements
3. Direct Access Ramp (DAR) location at Cannon Road
4. Construction of soundwalls (if Carlsbad meets FHWA requirements)

Also attached are exhibits obtained from Caltrans that depict the three alternate alignments of the potential direct access ramp (DAR) and a visual simulation of the DAR concept. The DAR concept is for illustrative purposes only, and is not intended to convey that development of the SDG&E parcel will take place.

ROBERT T. JOHNSON, JR., P.E.
Deputy City Engineer, Transportation

RTJ:jb

Attachments

NORTH COAST INTERSTATE 5 CORRIDOR

- Caltrans has initiated preliminary engineering and environmental studies (EIR/EIS) for the I-5 widening.
- Freeway widening begins in the City of San Diego and continues into the City of Oceanside (28 miles).
- Providing "managed lanes" (HOV lanes) in the center median is an integral part of the project.
- Interstate Highway 5 will be widened to a cross-section consisting of 10 lanes plus four HOV lanes ("10 + 4" alternative) or eight lanes will remain and four HOV lanes will be added ("8 + 4" alternative).
- Tentative schedule completes environmental studies and environmental document certification in 2008 with construction to begin in 2009. Concurrent construction in several segments of the corridor will take place.
- Major project goals include:

  - *Community*

    - Retain existing community character
    - Provide amenities
    - Minimize impacts to residences and businesses

  - *Environmental*

    - Minimize encroachment in adjacent sensitive habitat areas
    - Respect existing visual resources and minimize negative impacts
    - Minimize noise impacts to adjacent residential areas
    - Minimize drainage/storm water impacts

  - *Circulation*

    - Encourage use of public transit and other modes
    - Minimize vehicle/pedestrian conflicts
    - Provide connections between the east and west sides of the freeway
    - Improve pedestrian circulation

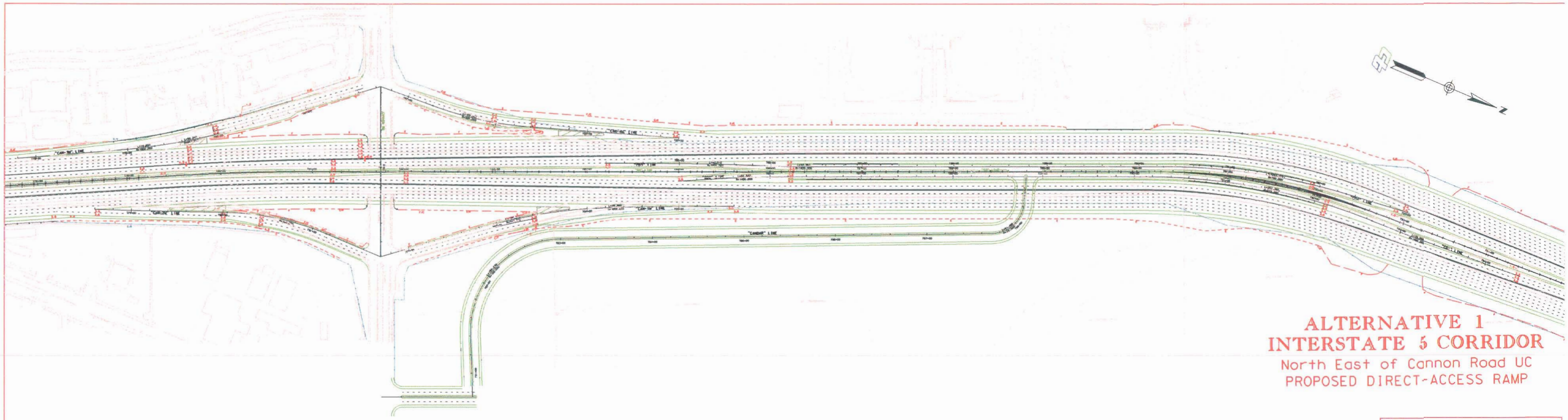
  - *Physical/Aesthetic*

    - Minimize right-of-way width expansion
    - Minimize construction costs
    - Maximize the visual experience for the freeway users
    - Integrate public art into the project, where possible
    - Minimize grading

- Construct a Direct Access Ramp (DAR) from the Cannon Road/Paseo del Norte intersection to the center of the freeway northerly of Cannon Road by constructing a bridge over the northbound lanes. Three potential alignments for the DAR are shown on the attached exhibits. A DAR provides access for high occupancy vehicles and buses from the surface street directly into the managed lanes that will be located in the center of the freeway. An example of the DAR concept is provided on the attached exhibit. This conceptual drawing is not intended to assume that there will be development on the SDG&E parcel immediately east of the freeway. This DAR exhibit is a generic conceptual Caltrans drawing used to convey the DAR concept.

- 74 feet of right-of-way is needed for a DAR. This amount of right-of-way will provide for the construction of four 12-foot lanes, a 10-foot median, and two 8-foot shoulder.

- The widening of the freeway will require about 58 feet from the edge of the existing freeway on the east side of Interstate Highway 5 between Cannon Road and the Agua Hedionda Lagoon to accommodate the "10 + 4" alternative without a DAR. If a DAR is constructed, additional width will be required (undetermined at this time by Caltrans).



ALTERNATIVE 1
INTERSTATE 5 CORRIDOR
North East of Cannon Road UC
PROPOSED DIRECT-ACCESS RAMP

LEGEND:

- : CUT AND FILL LINE
- : EXISTING R/W
- NOT SHOWN : PROPOSED R/W
- : PROPOSED RETAINING WALL

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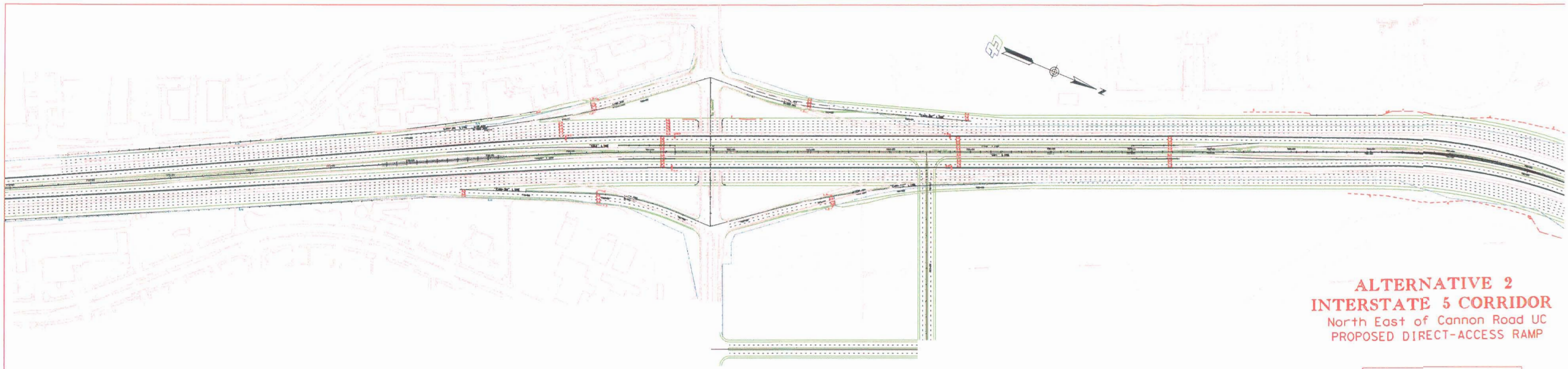

ALTERNATIVE 2
INTERSTATE 5 CORRIDOR
North East of Cannon Road UC
PROPOSED DIRECT-ACCESS RAMP

LEGEND:

— — —	: CUT AND FILL LINE
———	: EXISTING R/W
NOT SHOWN	: PROPOSED R/W
———	: PROPOSED RETAINING WALL

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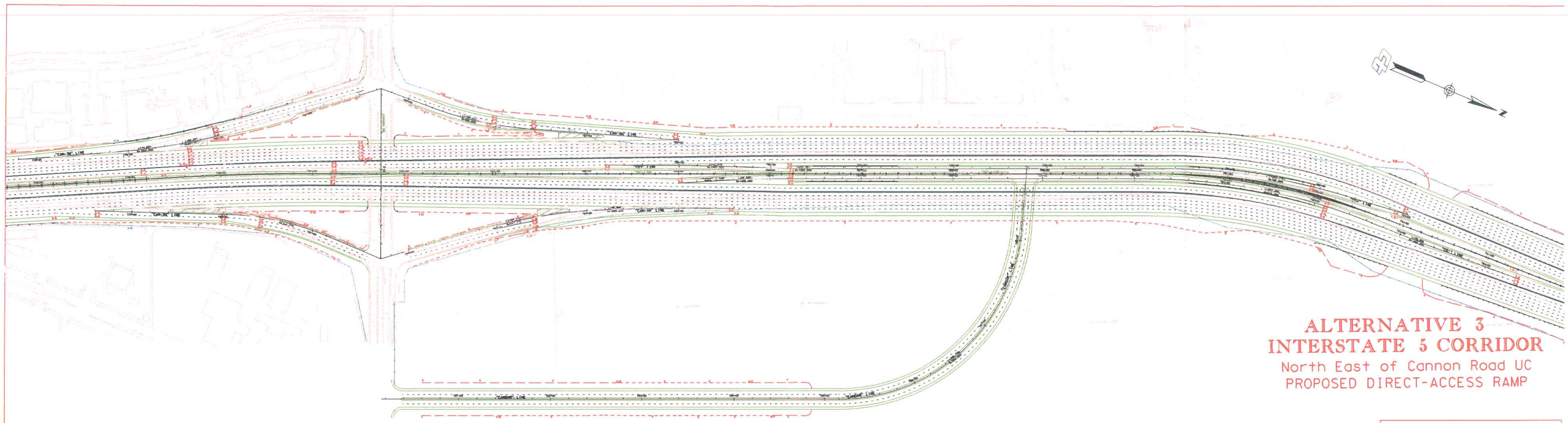

ALTERNATIVE 3
INTERSTATE 5 CORRIDOR
North East of Cannon Road UC
PROPOSED DIRECT-ACCESS RAMP

LEGEND:
- : CUT AND FILL LINE
- : EXISTING R/W
- NOT SHOWN : PROPOSED R/W
- : PROPOSED RETAINING WALL

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DUDEK

[illegible]

ATTACHMENT DR70-1

December 7, 2007 5886-00

Robert Mason
CH2M HILL
3 Hutton Centre Drive, Suite 200
Santa Ana, California 92707

Subject: ***Arborist Assessment – Carlsbad Energy Center Project, Encina Power Station***

Dear Robert:

This letter report concerns the assessment of the trees in the vicinity of the proposed site of the Carlsbad Energy Center Project located at the Encina Power Station in Carlsbad, California. A Dudek International Society of Arboriculture (ISA) Certified Arborist performed a visual inspection of the trees on December 3, 2007. The tree assessment focused on collecting information to determine the trees' current health conditions and expected longevity.

General Tree and Site Conditions

Dudek assessed a total of 381 trees within two distinct groups located in the vicinity of the proposed site of the Carlsbad Energy Center Project at the Encina Power Station in Carlsbad. The following is a summary of tree quantities and conditions observed during field assessment efforts. Tree group locations are presented in *Attachment 1*.

Group 1

Tree Group 1 is located at the east tank farm along a vegetated berm that loops around its north end and then runs north and south along the eastern edge of the tank farm (*Photo 1*). Due to its location adjacent to Interstate 5, a portion of the trees within Group 1 are managed by Caltrans. Group 1 contains a total of 294 trees represented by twelve different species (*Attachment 2*). Of these, 41 trees are located within the Caltrans right-of-way (*Photo 2*). The trees range in size from saplings to large mature trees. The majority of the trees have single trunks ranging from 5 to 25 inches in diameter (as measured at 4.5 feet above grade). Trees range between 15 and 45 feet in height, with canopy extents reaching a maximum of approximately 35 feet. The majority of the trees exhibit good health and structural conditions, lacking observable foliage, canopy, or trunk defects (*Photo 3*). Observed health or structural problems include the following:

- Branch dieback on several bushy yate trees (*Eucalyptus lehmannii*). This condition may be associated with nutrient deficiencies, soil-borne pathogens, or cultural practices (*Photo 4*).
- Old pruning or basal wounds on several trees of varying species. Such wounds may serve as an entry point for fungal pathogens over time (*Photos 5 & 6*).
- Browning foliage on several sugar gum trees (*Eucalyptus cladocalyx*). Such damage may be the result of salt spray or sun scald (*Photos 7 & 8*).
- A total of ten dead or dying trees located through out the berm.

Group 2

The second group of trees was planted as a windrow along a road parallel to the railroad tracks west of the east tank farm. There are 87 trees within Group 2, represented by only two species, sugar gum and lemon-scented gum (*Eucalyptus citriodora*). The trees have trunk diameters measuring between 7 and 25 inches. These trees measure approximately 45 feet in height with canopy extents reaching up to 25 feet in width. The majority of Group 2 trees exhibit healthy foliage, adequate structure, and lack of observable canopy or trunk defects. However, 22 trees were determined to be in poor condition and 4 are dead. Many of these trees exhibit basal wounds (*Photos 9-11*), while trees toward the north end of the windrow have either been topped or directionally pruned for clearance beneath adjacent power lines. No extensive surface roots were observed in this group of trees.

The trees in Groups 1 and 2 are integral components to their respective landscapes as they contribute positively to the aesthetics of the power station property. Each tree has adequate sun exposure and soil capacity for future growth. The soil conditions at the time of inspection were relatively dry, although an irrigation system is currently in place. During this inspection, pests were not observed on any trees. Please refer to the photographs in *Attachment 3* for illustration of tree and site conditions.

Discussion

In an attempt to determine tree ages at the Encina Power Station, Dudek researched historic aerial photographs available online via the California Coastal Record Project.[1] Based on this analysis, Dudek determined that the trees on site were planted sometime between 1972 and 1979, suggesting a maximum tree age of 35 years. The species currently planted on site have potential life spans of 50 to 150 years[2]. Life expectancy of trees is variable depending on numerous environmental and cultural factors, including new pests and diseases which are introduced to

[1] California Coastal Records Project (www.californiacoastline.org)
[2] Urban Forest Ecosystems Institute (www.ufei.calpoly.edu)

California every day. While current tree health conditions are generally good, there is no guarantee that the trees will remain free of pests and pathogens during their lifetime.

In addition to the 381 trees included in this assessment, Dudek observed 47 saplings in various locations within tree Group 1. This recruitment of new trees is highly beneficial and will serve as the next generation when the older mature trees start to decline and die. Natural regeneration of the trees along this berm will ensure that the desired visual screen enhanced by understory trees will remain intact.

The following recommendations are based on our field observations and are intended for maintaining the longevity of the trees on site, considering their function as a visual screen for the power station.

Recommendations

Based on the tree assessment and site inspection, Dudek recommends that new trees be planted in the existing gaps and understory of the mature trees to ensure the continuation of the vegetated berm and windrow in the future. Dudek also recommends removing the 11 dead trees located throughout Groups 1 and 2. Because the trunk damage on several trees within Group 2 may expose the trees to harmful pathogens, Dudek recommends reflectors be placed on the base of the trees to help avoid future basal damage to the trees.

A tree management and plant health care program should also be implemented to ensure the integrity and continued survival of the trees on site. Such a program should account for tree mortality and/or removal over time and guide tree planting and replacement efforts. Additionally, this program should include management of soil moisture, maintaining or improving soil fertility, observing the trees' planting environment for stress factors, and inspecting the trees for early signs of disease and pest populations. Information acquired during such monitoring would allow for the safest and best strategies for controlling pests and disease and promoting the longevity of the trees on site.

Note:
This report provides conclusions and recommendations based on an external examination of the trees and surrounding site by an ISA Certified Arborist. Arborists are tree specialists who use their education, knowledge, training and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees.

Arborists cannot detect every condition that could possibly lead to the failure of a tree. Trees are living organisms that fail in ways not fully understood. Conditions are often hidden within trees

and below ground. This evaluation did not include subterranean or internal examination. Further, this report should not be considered a hazard tree assessment. Arborists cannot guarantee that a tree would be healthy or safe under all circumstances, or for a specified period of time. There are no guarantees that a tree's condition would not change over a short or long period due to climatic, cultural or environmental conditions. Trees provide many benefits to those who live near them. They also include inherent risk that can be minimized, but not eliminated.

I would be pleased to answer any questions or respond to any comments regarding this tree evaluation.

Sincerely,

DUDEK

Tyler R. Stevenson
ISA Certified Arborist #WE-6748A

Att.: Photograph Log

ATTACHMENT 1

Site Map

Carlsbad Energy Center Project - Encina Power Station

Site Map

Attachment 1

ATTACHMENT 2

Tree Information Matrix

Tree Species and Health Summary

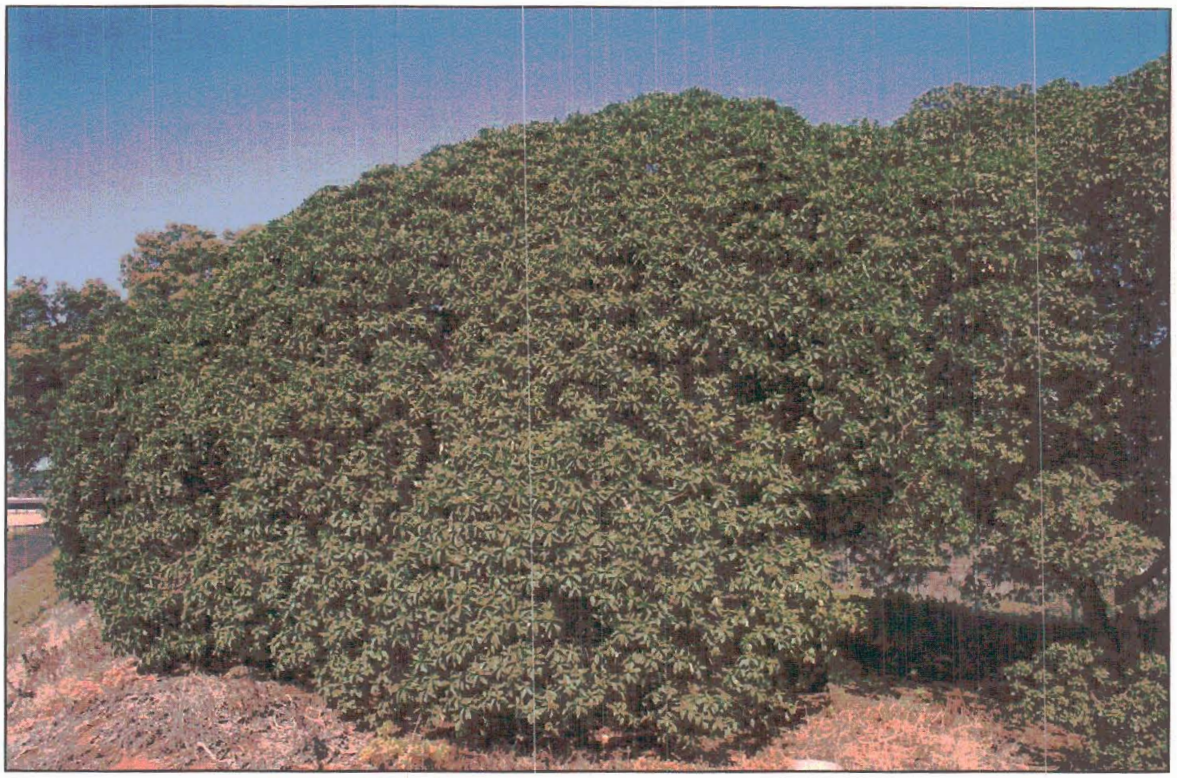
Species		Health								Total	
		#	%	#	%	#	%	#	%	#	%
Acacia baileyana	Bailey acacia	0	0%	0	0%	1	100%	0	0%	1	0.26%
Acacia melanoxylon	Blackwood acacia	0	0%	1	100%	0	0%	0	0%	1	0.26%
Callistemon viminalis	Weeping bottlebrush	0	0%	0	0%	1	100%	0	0%	1	0.26%
Eucalyptus citriodora	Lemon-scented gum	3	13%	10	43%	9	39%	1	4%	23	6.04%
Eucalyptus cladocalyx	Sugar gum	156	69%	51	22%	16	7%	4	2%	227	59.58%
Eucalyptus lehmannii	Bushy yate	24	83%	3	10%	0	0%	2	7%	29	7.61%
Eucalyptus sideroxylon	Red ironbark	2	100%	0	0%	0	0%	0	0%	2	0.52%
Metrosideros excelsus	New Zealand Christmas tree	0	0%	2	100%	0	0%	0	0%	2	0.52%
Myoporum insulare	Myoporum	43	58%	21	28%	6	8%	4	5%	74	19.42%
Pinus halepensis	Aleppo pine	3	100%	0	0%	0	0%	0	0%	3	0.79%
Pittosporum crassifolium	Seaside pittosporum	0	0%	2	67%	1	33%	0	0%	3	0.79%
Populus fremontii	Freemont cottonwood	0	0%	0	0%	1	100%	0	0%	1	0.26%
Schinus molle	California pepper tree	13	93%	1	7%	0	0%	0	0%	14	3.67%
Total		244	64%	91	24%	35	9%	11	3%	381	100.00%

ATTACHMENT 3

Photograph Log

Photograph 1: Bushy Yates along vegetated berm.

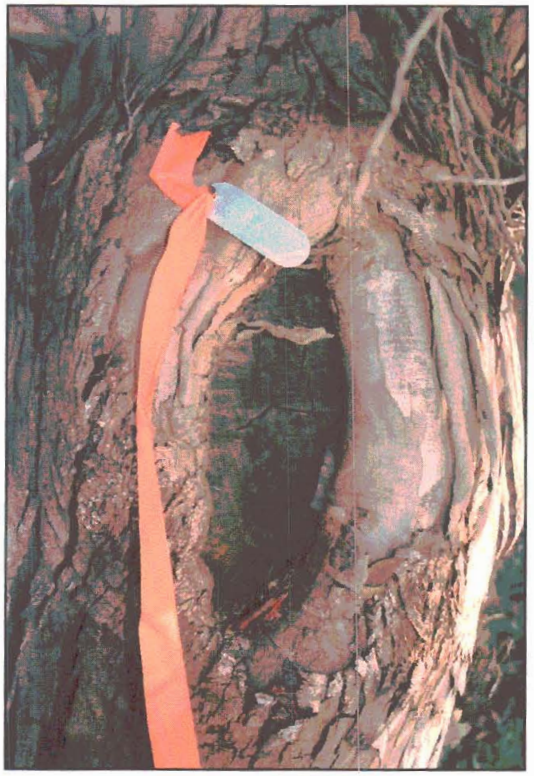
Photograph 2: Sugar gum and California Pepper trees on Caltrans ROW. Interstate 5 in background.



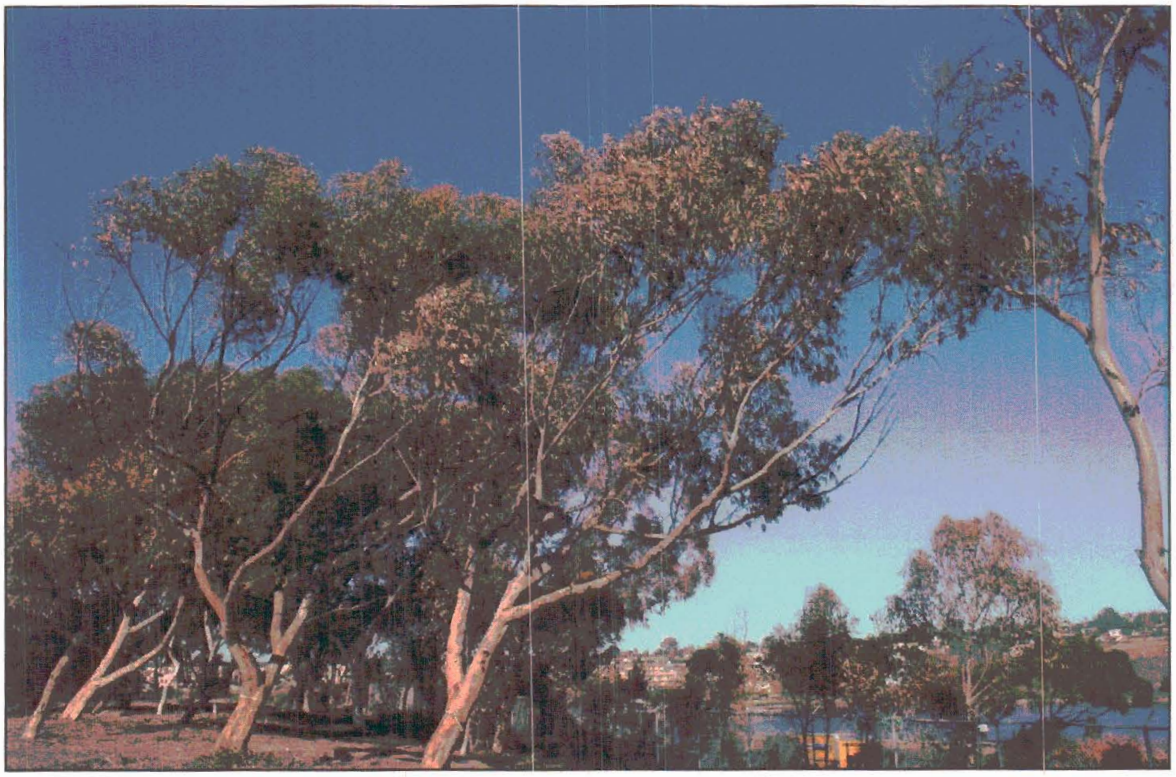
Photograph 3: Healthy myoporum tree

Photograph 4: Branch dieback on Bushy Yate

Photograph 5: Basal wound from breakage of large limb

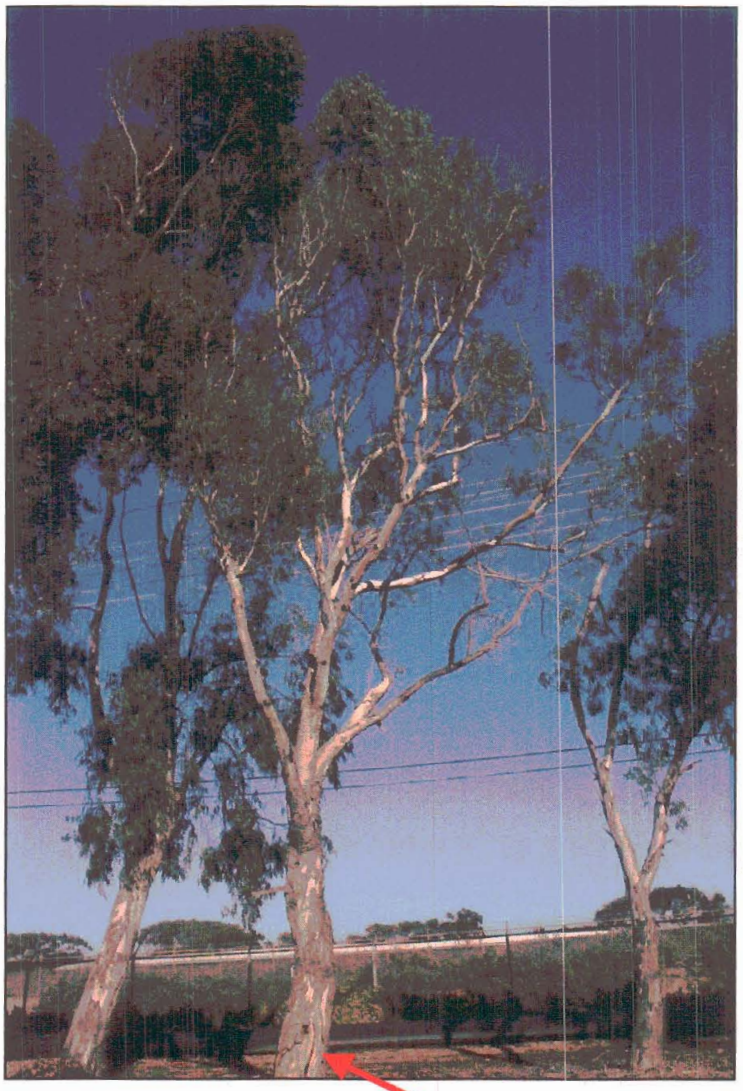


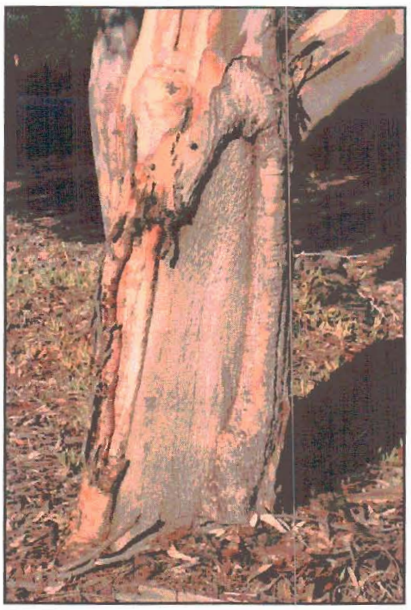
Photograph 6: Old pruning wounds



Photograph 7: Brown foliage resulting from salt spray

Photograph 8: Brown foliage - possible sun scald





Photographs 9 - 11: Declining tree and basal damage.

Tyler Stevenson – Urban Forestry Specialist

EXPERIENCE

Mr. Stevenson is a project manager for Dudek's Urban & Community Forestry Group with five years experience providing technical assistance on projects ranging from arboricultural assessments to large-scale oak management plans. These projects include assessment and inventory of oak woodlands, managing and monitoring the relocation and preservation of trees on development sites, surveys of native trees and vegetation, post-burn damage assessments, Global Positioning System (GPS) mapping, environmental monitoring, data analysis and preparation of assessment reports, oak management and preservation plans and necessary CEQA technical documents. In addition, he routinely utilizes geographic information systems (GIS) and aerial photography in mapping, analysis of resource data, preparation of project plans, and conducting project impact analyses. Tyler also holds a bachelor's degree in forestry and a master's degree in urban forestry.

The Pennsylvania State University, University Park, Pennsylvania - Urban Forest Inventory Technician

- Conducted a 100% Inventory of the Huntingdon & Fort Indiantown Gap urban forests
- Assessed hazard trees and infrastructure damage

The Pennsylvania State University, University Park, Pennsylvania - Teaching Assistant

- Guest lectured Urban Forest Management and Forest Biometrics courses
- Prepared and graded Urban Forest Management quizzes and exams
- Assisted and prepared Forest Biometrics labs

Consulting Utility Forester

- Conducted dead and infected tree inspections for the Southern California Edison Bark Beetle Project
- Pre-inspected and coordinated line clearance work and assessed hazard trees for Pacific Gas & Electric
- Notified property owners and handled customer concerns and complaints
- Monitored and audited tree crew work performance during hazard tree removal and clean-up

EDUCATION

The Pennsylvania State University, University Park, Pennsylvania
MS Forest Resources (Emphasis: Urban Forest Management)
2006

Virginia Polytechnic Institute and State University, Blacksburg, Virginia
BS Forestry (Emphasis: Forest Resource Management)
2002

LICENSES & CERTIFICATIONS

ISA-Certified Arborist
ID# WE-6748A

ACRT Utility Forester Certification

ACRT Power Line & Fire Prevention Certification

American Red Cross Adult CPR/AED

PROFESSIONAL AFFILIATIONS

International Society of Arboriculture

Society of Municipal Arborists

Utility Arborist Association

US Department of Agriculture Forest Service, Blacksburg, Virginia - Forest Technician

- Conducted research on streamside management zones adjacent to forest harvesting operations
- Monitored erosion, sedimentation, and water quality
- Collected invertebrate samples
- Inventoried understory vegetation
- Updated research maps using GIS (ArcView)

Virginia Tech Department of Forestry, Blacksburg, Virginia - Forest Technician

- Coordinated forest management prescriptions for the VT Dept. of Forestry Demonstration Forest
- Delineated and marked watersheds and streamside management zones
- Marked timber for multiple forest management prescriptions
- Day-lighted and maintained forest roads

Maryland Department of Natural Resources, New Germany State Park, Maryland - Forest Inventory Technician

- Conducted the dept. first Continuous Forest Inventory sample using a LandMark GPS, Impulse laser ranging technology, Mapstar Electronic Compass Module, and data recorder

Xi Sigma Pi - Eta Chapter

ADDITIONAL TRAINING

Geographic Information Systems (GIS) (ArcGIS 9.1, ArcView)

Trimble & LandMark GPS hardware and associated software (Terra Sync, Pathfinder Office 3.10)

Waste Management (71 – 73)

Background

The AFC identifies the area around the existing fuel tanks as an area to be developed as part of the proposed project. However, the area is also identified in the AFC as having Historical Recognized Environmental Conditions (HREC) and area of concern (AOC) as defined by the American Society for Testing and Materials (ASTM), due to elevated levels of Total Extractable Hydrocarbons in soil samples and, cadmium, silver and lead detected in groundwater. Lead and silver were also detected in the equipment sample (CH2MHILL 2007, Page 5.14-6). The AFC states the areas within the project site such as tanks, piping, and buildings where samples could not be collected beneath existing structures remain as potential environmental conditions that should be addressed at the time when such facilities are removed as part of normal operation and maintenance of the site (CH2MHILL 2007, Page 2-2).

While the AFC states that removal of two existing fuel tanks are a part of the Encina facility's ongoing operations and maintenance activity and are not part of the proposed project, the area underneath these fuel tanks will be used for proposed project structures and activities. Therefore, since the area is already identified as an HREC, the environmental investigation of the site after demolition, and completion of any necessary remedial action, should be done well in advance of any project construction to ensure that any possible contamination is identified and mitigated to a level of insignificance. The San Diego Regional Water Quality Control Board (SDRWQCB) is the Lead Agency for the Phase II Environmental Site Assessment and all necessary remedial activities and is working with the Department of Toxic Substances Control as a Responsible Agency. Investigation and remediation of hazardous waste during the construction phase of a project should only be done as a contingency measure, when previously unknown contamination is encountered during the normal construction activities.

Data Request

72. Please provide an estimated date for the removal of existing fuel tanks, along with a schedule and workplan for investigation and possible remediation of contaminated soils in the vicinity of the existing fuel tanks. The schedule and workplan should also have been reviewed and approved by the San Diego Regional Water Quality Control Board prior to submittal to the Energy Commission, unless other arrangements are made with Energy Commission staff to address or accommodate SDRWQCB review.

Response: By September 1, 2008, the demolition of the existing fuel tanks and any associated remediation of petroleum-impacted soil are scheduled to be complete. The schedule for the tank demolition is being developed as part of a bid package for the work, and will be provided to the CEC upon request. Similarly, a team is currently developing the work plan for investigation and possible remediation of

impacted soils in the vicinity of the existing fuel tanks. A copy of the final work plan will be provided to the CEC upon request.

73. Please provide the Phase II Environmental Site Assessment and the name and contact information for SDRWQCB staff assigned to the proposed Carlsbad project.

Response: Five copies of the Phase II Environmental Assessment (ESA) (Attachment DR73-1) are being provided to CEC staff. Electronic copies will be provided to the other parties upon request. This Phase II ESA was performed by Fluor Daniel GTI for San Diego Gas and Electric (SDG&E) before Cabrillo Power I LLC took ownership of portions of the Encina Power Plant. Information relevant to the CECP is included in Areas 1 and 1A of the Phase II ESA. These areas address the eastern tank farm, where the CECP will be located. The entire Phase II ESA is being provided for completeness; however, CEC staff should focus on Areas 1 and 1A described in the report.

Also provided for informational purposes are five copies of the *Report on Soil Remediation, Encina Power Plant* (Haley and Aldrich, April 2004) (Attachment DR73-2). Areas 5 and 6 of this report describe soil remediation that occurred in the area of the eastern tank farm, where the CECP will be located.

The appropriate regulatory agency contact for investigation and potential remediation of the tank area is Mr. Nasser Sionit, (619) 338-2239, Site Assessment and Mitigation Program, San Diego County Department of Environmental Health (DEH). DEH is the lead agency for any investigation or remediation at the tank farm. After following the SB-1248 procedures for entering into local cleanup agreements, both the California Regional Water Quality Control Board - San Diego Region and the California Department of Toxic Substances Control have concurred that DEH will be the lead agency.

Cabrillo Power I LLC submitted a voluntary remediation application to the County DEH on November 27, 2007 for investigation and remediation of impacted soils if present within the tank farm following demolition of the Tanks 5, 6 and 7. The demolition of Tanks 5, 6 and 7 will be conducted under permits from the City of Carlsbad and the California Coastal Commission as part of an action that is separate from the processing and licensing of the CECP by the CEC, and prior to construction of the CECP.