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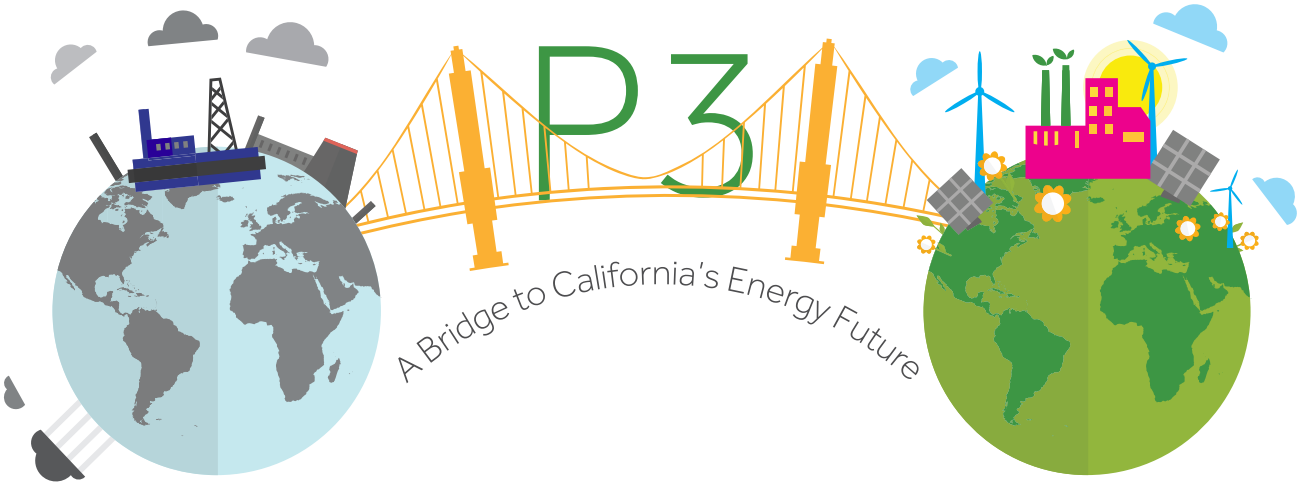
# Application for Certification
## (15-AFC-01)

## Puente Power Project (P3)
Oxnard, CA

## Responses to City of Oxnard Data Requests Set 3 (68-79)




October 2015

Submitted to:
**The California Energy Commission**

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A Trinity Consultants Company

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## RESPONSES TO DATA REQUESTS SET 3

## APPENDICES

## LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES

| | |
|---|---|
| AAQS | ambient air quality standard |
| AERMOD | American Meteorological Society and Environmental Protection Agency preferred atmospheric dispersion model |
| AFC | Application for Certification |
| APE | Area of Potential Effect |
| CAAQS | California ambient air quality standard |
| CAISO | California Independent System Operator |
| CEC | California Energy Commission |
| $CH_4$ | methane |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| °F | Fahrenheit |
| g/gal | grams per gallon |
| g/hr | grams per hour |
| GHG | greenhouse gas |
| hrs/yr | hours per year |
| lb/hr | pounds per hour |
| lbs/mile | pounds per mile |
| lbs | pounds |
| LORS | laws, regulations, ordinances, and standards |
| LARWQCB | Los Angeles Regional Water Quality Control Board |
| m | meters |
| mgd | million gallons per day |
| $\mu g/m^3$ | micrograms per cubic meter |
| $\mu g/m^3/g/s$ | micrograms per cubic meter pet gram per second |
| MLLW | mean low water |
| MMBtu/hr | million British thermal units per hour |
| MSL | mean sea level |
| NAAQS | national ambient air quality standard |
| NAVD88 | |
| $N_2O$ | nitrous oxide |
| $NO_2$ | nitrogen dioxide |
| $NO_X$ | nitrogen oxides |
| OLM | ozone limiting method |
| PDOC | Preliminary Determination of Compliance |
| PM | particulate matter |
| $PM_{10}$ | particulate matter less than or equal to 10 microns in diameter |
| $PM_{2.5}$ | particulate matter less than or equal to 2.5 microns in diameter |
| ppm | parts per million |
| REC | Recognized Environmental Condition |
| RO | reverse osmosis |
| RQ | reportable quantities |
| $SO_2$ | sulfur dioxide |
| tpd | metric tons per day |
| tpm | metric tons per month |
| UTM | Universal Transverse Mercator |
| VOC | volatile organic compounds |

**BACKGROUND**

On September 3, 2015, NRG provided responses and objections to the City of Oxnard's First Set of Data Requests related to air quality emissions from the proposed P3 facility. NRG objected to the requests for certain Excel spreadsheets and technical data on the grounds that the information is confidential trade secret. NRG indicated it would provide at least some of this information subject to a nondisclosure agreement, but has not yet done so. The following data requests follow up on responses to the City's First Set of Data Requests and seek additional information and/or clarification of NRG's initial responses.

**DATA REQUEST**

***68. In its Data Requests 5, 6, and 8, the City requested a copy of the formal vendor guarantee and any evidence that supports the emissions calculations used for the gas turbine. In response, NRG referenced the vendor letter included in Appendix C-2 to the AFC. This is not a formal vendor guarantee. Please provide a copy of the formal vendor guarantee, including all of the operating conditions under which the vendor guarantee is valid. In addition, please explain the experience upon which the Applicant is confident that the turbines will meet the emission limits throughout the life of the project. Please include in such response all evidence (such as stack tests) that demonstrates that the emission rate of 10.6 lb/hour used in emissions calculations has been achieved by the gas turbine in comparable operating modes. The applicant's assertion that it "does not possess the requested information," is not responsive. The applicant or the applicant's consultants can request this information from the vendor and collect it from air districts that have required stack tests on similar GE Frame 7 turbines. Further, the applicant's consultant, Sierra Research, who prepared this response, certainly has a large collection of responsive stack tests conducted on similar GE Frame 7 turbines. If such evidence is in the possession of GE or Sierra Research, please request this information from them.***

**RESPONSE**

Please refer to Applicant’s objection to City Data Request 68 filed on October 21, 2015. Without waiving its prior objection, Applicant responds as follows.

In Appendix C-2 to the AFC, Applicant has provided written confirmation of the emission performance for the exact make/model gas turbine proposed for this project from the turbine vendor, GE. GE is one of the top gas turbine vendors in the world with vast experience and expertise in the manufacture of such equipment. Based on GE’s experience and expertise, Applicant has a high degree of confidence in the emission performance information it has provided.

***69. In response to Data Request 11, NRG referenced an emissions inventory from the Ventura Air Pollution Control District. Please provide a copy of the emission inventory that was relied upon to calculate the baseline data. Please provide any primary source data that you have to support these emissions factors, including actual stack tests for MGS Units 1 and 2. If such evidence is in the possession of GE or Sierra Research, please request this information from them.***

**RESPONSE**

Please refer to Applicant's objection to City Data Request 69 filed on October 21, 2015. Without waiving its prior objection, Applicant responds as follows.

Enclosed as Appendix A-1 is a copy of the Ventura County Air Pollution Control District (VCAPCD) emission inventory data for the Mandalay Generating Station (MGS), including Units 1 and 2, for the period from 2005 to 2013. This data was used to establish the 2009 to 2013 CO, ROC, $PM_{10}$, and SOx baseline emissions for MGS Units 1 and 2. As noted in the AFC[1], the 2014 baseline CO, ROC, $PM_{10}$, and SOX emissions for MGS Units 1 and 2 were based on annual fuel use and the VCAPCD inventory emission factors. The 2009 to 2014 baseline NOx emissions for MGS Units 1 and 2 were based on Continuous Emissions Monitoring System (CEMS) data. It is appropriate to use the VCAPCD emission inventory data to establish the baseline emissions for MGS Units 1 and 2 because this inventory data is used by both the VCAPCD and California Air Resources Board (CARB) for air quality regulatory planning purposes. Also, the VCAPCD emission inventory conservatively uses natural gas fired boiler emission factors from the 1995 version of AP-42, which are lower than the emission factors in the current (1998) version of AP-42. A comparison between the 1995 and 1998 AP-42 natural gas fired boiler CO, ROC, and $PM_{10}$ emission factors is shown in the following table. NOx is not included in this table because, as discussed above, the baseline emissions for MGS Units 1 and 2 are based on CEMS data, and SOx is not shown in the table because that is based on the natural gas sulfur content in the project area[2].

**Table DR69**

**Boiler AP-42 Emission Factors**

| Pollutant | 1995 AP-42 Emission Factors Natural Gas Fired Boilers[3] (lbs/mmscf) | 1998 AP-42 Emission Factors Natural Gas Fired Boilers[4] (lbs/mmscf) |
|---|---|---|
| CO | 40 | 84 |
| ROC | 1.4 | 5.5 |
| $PM_{10}$ | 2.5 | 7.6 |

[1] See Tables C-2.13a to C-2.13f of the AFC.
[2] The VCAPCD emissions inventory for MGS Units 1 and 2 uses a SOx emission factor of 0.6 lbs/mmscf.
[3] AP-42, Table 1.4-2, natural gas fired utility boilers, 1/95.
[4] AP-42, Table 1.4-1, natural gas fired large wall fired boilers, 7/98.

***70. In Data Request 16, the City requested that the Applicant identify options to mitigate the net emission increase for ROC, PM10, and PM2.5. The response indicates that the mitigation is the shutdown of MGS Units 1 and 2 and funding of air quality mitigation programs. The shutdown of MSG Units 1 and 2 is relied on in the netting analysis. Thus, it cannot also be mitigation for the resulting net increase. Please explain how the net increase in emissions will be mitigated. This response also identifies an "air quality mitigation program." This is too vague to satisfy mitigation. Please identify all actions/projects and resulting emission reductions that will be included in the "air quality mitigation program."***

**RESPONSE**

The mitigation of the net emission increases of ROC, $PM_{10}$, and $PM_{2.5}$ emissions for the P3 (after accounting for the benefits of the shutdown of MGS Units 1 and 2) will be provided by funding air quality mitigation programs. Funding an air quality mitigation program such as the Carl Moyer Program or a program developed with VCAPCD is not "too vague to satisfy mitigation" as claimed by the City. This same approach with the same basic requirement to fund a local air quality mitigation program has been approved by the CEC as an adequate form of mitigation of air quality impacts for several power plant projects, including the Carlsbad Energy Center Project (07-AFC-06), East Altamont Energy Center (01-AFC-04), and the Los Esteros Critical Energy Facility – Phase 1 (01-AFC-12).

***71. In Data Request 18, the City requested vendor guaranteed startup/shutdown emission "curves", e.g., NOx in ppm versus load/time since the beginning of startup and shutdown to support the startup and shut down emissions. Instead, the applicant simply repeated the unsupported information in the AFC, referring to DR-8 and DR-17. Please provide the support for these assumed startup and shutdown emissions, in the form of startup/shutdown emission curves and any supporting measurement, e.g., stack test or CEMS data.***

**RESPONSE**

Please refer to Applicant's objection to City Data Request 71 filed on October 21, 2015. Without waiving its prior objection, Applicant responds as follows.

The startup/shutdown emission levels are not "unsupported" - they are based on startup/shutdown emission levels provided by the gas turbine vendor for the new GE 7HA.01 gas turbine proposed for the P3. It is customary to use vendor-supplied emission rates to determine project impacts, and the Applicant has no reason to question the startup/shutdown emission levels provided by the gas turbine vendor.

***72. In response to Data Request 24, NRG stated it does not possess the certificates for emissions offsets that it intends to rely on. The only way to verify the adequacy of the proposed offsets is by reviewing the certificates and the backup file that supports the certificates. Please provide copies of these certificates and the supporting files. If they are in the possession of SCE, SCE's consultants, or the air district, please request this information from them.***

**RESPONSE**

Please refer to Applicant's objection to City Data Request 72 filed on October 21, 2015. Without waiving its prior objection, Applicant responds as follows.

Enclosed as Appendix A-2 are copies of the evaluations prepared by the VCAPCD for the NOx Emission Reduction Credits (ERCs) proposed for mitigation for the P3 (ERC certificate numbers 1078, 1079, 1080, 1083, 1084, 1085, 1091, 1092, 1094, 1097, 1104, 1107, and 1109). Per the Applicant's response to City Data Request 24, while the Applicant does not have copies of the actual ERC certificates for these ERCs, the Applicant has no reason to question the validity of these certificates because any changes to the amounts of these ERC certifications due to sales/trades would be reflected in the District's ERC Registry.

***73. In Data Request 25, NRG states that it is not required to include start-up and shut down emissions in determining compliance with BACT. Please provide the legal justification for excluding start-up and shut down emissions from the BACT requirements.***

**RESPONSE**

Please refer to Applicant's objection to City Data Request 73 filed on October 21, 2015.

***74. In Data Requests 27 and 28, the City noted that the Applicant's analyses indicated mitigated construction emissions are significant and that additional mitigation is required. The applicant responded that these emissions are "short-term in nature with maximum ambient impacts that tend to occur very near the location of the activities." The response gives an example of the 24- hour and annual average PM10 ambient impacts, arguing that impacts are significant only within about 300 feet of the fenceline and thus not significant. This circular argument is not responsive. The construction air quality analysis in Appendix C-8 indicates that mitigated construction emissions are in fact significant, requiring additional mitigation. Please identify additional construction mitigation to reduce the significant construction emission impacts to a less than significant level.***

**RESPONSE**

As discussed in the response to City Data Request 28, the Applicant does not believe the impacts due to construction/decommissioning activities will result in any significant unmitigated air quality impacts. With respected to $NO_2$, CO, $SO_2$, and $PM_{2.5}$ impacts, the Applicant does not

expect any significant unmitigated air quality impacts because, as shown in Table C-6-5 of the AFC, the modeled maximum ambient impacts will not result in an exceedance of any Federal or State ambient air quality standards for these pollutants. Therefore, the Applicant does not believe construction/decommissioning impacts for these pollutants are significant. With respect to $PM_{10}$, as discussed in the response to City Data Request 28, while the maximum modeled construction/decommissioning ambient impacts are above State ambient air quality standards, these impacts drop below the Federal Significant Impact Levels (SILs) within approximately 300 feet of the facility fenceline. It is due to this combination of a very limited area exposed to ambient $PM_{10}$ impacts above the Federal SILs and the short-term nature of the construction/ decommissioning activities that the Applicant believes the construction/decommissioning activities will not result in any significant unmitigated air quality impacts for $PM_{10}$. The construction mitigation measures proposed for this project are consistent with those required by the Commission for other projects.

***75. In Data Request 29 the City noted that construction emission calculations assume that EPA Tier 4i engines would be used for larger equipment and EPA Tier 4 engines for smaller equipment and requested that these assignments be specified as mitigation measures. The response argues that the assumed use is an element of project design. However, the assignments are hidden from view, buried in modeling files, preventing any meaningful public review. Thus, please provide a table that shows each piece of construction equipment, the EPA Tier engine assumed in the emission calculations, and a commitment in the AFC itself to implement the assignments as mitigation for construction emissions.***

**RESPONSE**

The engine EPA Tier level for each type of nonroad Diesel construction equipment is shown in the CalEEMod input files included in the Construction/Decommissioning Emission File compact disc filed with the AFC.[5] Enclosed as Appendix A-3 is a table summarizing the nonroad Diesel engine EPA Tier levels used in the CalEEMod model emission estimates for the construction equipment. The Applicant commits to using EPA Tier 4/4i nonroad Diesel construction equipment for this Project, consistent with the terms of standard CEC construction mitigation Conditions of Certification.

***76. In Data Request 30, the City requested site-specific measurements of silt content to support estimated fugitive dust emission calculations. The response states that haul roads would be covered with gravel, which will not occur until prior to construction, making it impossible to sample these roads. However, the graveled haul roads are not the only source of fugitive dust emissions that rely on silt content. Site grading, haul road grading before gravelling, and all bulldozing also depend on silt content. These site preparation and grading activities will generate significant amounts of fugitive dust. The measurement of silt content is a very simple and inexpensive test that is recommended when AP-42 calculation methods are used, which is the case here. See AP-42, Appendix C.1. Thus, please provide representative site-wide and site- specific, measured values for silt***

[5] Under the "tblConstEquipMitigation" tab of the CalEEMod modeling input file.

***content and silt loading to verify fugitive dust emissions from site preparation and grading.***

**RESPONSE**

Please refer to Applicant's objection to City Data Request 76 filed on October 21, 2015. Without waiving its prior objection, Applicant responds as follows.

The CalEEMod model was used to estimate fugitive dust emissions associated with site preparation/grading activities for the P3. For these activities, the CalEEMod model used two different fugitive dust emission factors—an emission factor for grading activities (for graders, crawler tractors, and scrapers) and an emission factor for bulldozer activities (for bulldozers). For grading activities, the CalEEMod model used the AP-42 fugitive dust emission factor for grading. Because this emission factor is simply a function of mean vehicle speed,[6] silt content/silt loading values are not applicable to this emission factor. For bulldozer activities, the CalEEMod model uses the AP-42 fugitive dust emission factor for bulldozer activities. This emission factor is a function of material silt content (% weight) and moisture content (% weight). The CalEEMod model used default values of 7.9% weight material moisture content and 6.9% weight material silt content for the bulldozer emission factor. These values are based on the mean material moisture/silt content values shown in AP-42.[7] As shown in Appendix A-4, based on a summary of soil survey data for the beach areas of Ventura County performed for the USDA Natural Resources Conservation Service,[8] the soil silt contents range from 1% to 7% weight and the sand contents range from 93% to 99% weight. Therefore, the silt content of 6.9% weight used for the bulldozer emission factor is close to the maximum of this range. Also, given the well-draining sandy composition of the soil in the Ventura County beach areas, the use of the material moisture content of 7.9% weight used for the bulldozer emission factor is reasonable. Therefore, the Applicant believes that the CalEEMod model site preparation/ grading emission calculations for P3 are reasonable.

***77. In Data Request 44, the City noted that the AFC estimated HAP emissions using outdated emission factors from AP-42 and the CARB CATEF database for all operational conditions. AFC Table C-8.1. We requested that the applicant verify these emission factors by providing stack tests to support normal operation and startup/shutdown HAP emissions. The applicant responded that it "does not possess the requested information for the GE 7HA.01 turbine." This is not responsive. The applicant or the applicant's consultants can request this information from the vendor and collect it from air districts that have required stack tests on similar GE Frame 7 turbines. Further, the applicant's consultant, Sierra Research, who prepared this response, certainly has a large collection of responsive stack tests conducted on similar GE Frame 7 turbines. The use of outdated HAP emission factors, conducted on turbines that are not representative of the Frame 7 turbines proposed here, especially during startups and shutdowns, is not a valid basis to estimate health +risks because since these emission factors were measured, changes have occurred in turbine design that affect emissions. Further, studies have demonstrated significant increases in many HAPS during***

[6] See AP-42, Table 11.9-1, grading activities, 7/98.
[7] See AP-42, Table 11.9-3, bulldozer activities/overburden, 7/98.
[8] http://websoilsurvey.nrcs.usda.gov/app/

***startup and shutdown from similar Frame 7 turbines. The formaldehyde emission factor (formaldehyde is a carcinogen), for example, increased from 15 lb/$10^{12}$ Btu to 7,539 lb/$10^{2}$ Btu, or by a factor of 503, and the formaldehyde emissions increased from 0.11 to 16.08 tons/yr or by factor of 146 when the load was reduced from 100% to 30%.[9] Thus, we request that the applicant obtain and docket more recent and relevant HAP stack test information for similar GE Frame 7 turbines that includes normal operation as well as startup and shutdown conditions and use it to revise its HAP emission estimates.***

**RESPONSE**

Please refer to Applicant's objection to City Data Request 77 filed on October 21, 2015. Without waiving its prior objection, Applicant responds as follows.

The Gas Research Institute (GRI) report cited in City Data Request 77 was published in August 1996 and relies on stack tests performed in the 1993 to 1994 time period. Both the CATEF emission factors (most recent background report published in 2000) and the AP-42 gas turbine Section 3.1 published in 2000 also rely on gas turbine toxic air contaminant (TAC)/hazardous air pollutant (HAP) stack test data performed in the 1990s. With regards to the formaldehyde emissions factors from the GRI report cited in City Data Request 77, based on the more recent December 1996 version of the GRI report these emission factors are based on a single set of test results performed on a single water-injected first generation GE Frame 7 gas turbine.[10] Therefore, the GRI report results do not include the multiple test/multiple unit statistical analysis of test data as is done in both the CATEF and AP-42 publications. The GRI report full load formaldehyde emission factor of 1.5 x $10^{-5}$ lbs/MMBtu is significantly lower than the normal operation/uncontrolled CATEF/AP-42 formaldehyde emission factor of 9.0 x $10^{-4}$ lbs/MMBtu used for the analysis of the P3 gas turbine (see Table C-8.1 of AFC). The GRI report low load formaldehyde emission factor of 7.5 x $10^{-3}$ lbs/MMBtu is very close to the uncontrolled startup/shutdown formaldehyde factors of 7.2 x $10^{-3}$ lbs/MMBtu[11] used for the analysis of the P3 gas turbine (see Table C-8.1 of AFC). None of these documents (GRI report, CATEF, AP-42) account for the lower TAC/HAP emissions associated with a new fast start GE 7HA.01 gas turbine equipped with dry low-NOx combustion combined with an oxidation catalyst system. Therefore, the use of the CATEF/AP-42 TAC/HAP emission factors is conservative and likely overestimates the TAC/HAP emissions for the P3 gas turbine. Even with the conservative nature of these TAC/HAP emission factors/emission calculations, as shown on Table 4.9-4 of the AFC the maximum modeled public health impacts are below significance levels. Finally, it is customary to use CATEF/AP-42 TAC/HAP emission factors to estimate emissions for power plant projects.

[9] Gas Research Institute (GRI), Gas-Fired Boiler and Turbine Air Toxics Summary Report, Final Report, August 1996, Table S-5.

[10] Carnot Technical Services, Gas-Fired Boiler and Turbine Air Toxics Summary Report, Prepared for the Gas Research Institute and the Electric Power Research Institute, December 1996, Tables 2-1 and 2-3.

[11] Based on the controlled gas turbine startup/shutdown formaldehyde emission factor of 3.6 x 10-3 lbs/MMBtu without the 50% oxidation catalyst control level.

***78. In Data Request 23, the City requested raw NOx CEMS data for existing Units 1 and 2 that was relied on to estimate NOx emissions for the lookback period 2009 to 2014, including firing rate in MMBtu/hr and MW generated. The response is incomplete. Please provide the following information: (1) The units for the "GASFLOW" columns in the provided spreadsheet. (2) The firing rate in MMBtu/hr and the MWhr generated for each measurement period. (3) The unlocked Excel spreadsheet that shows the calculations used to generate NOx emissions for the lookback period 2009 to 2014. (4) All stack tests conducted on Units 1 and 2. (5) Please explain why there are many zero NOx values when Units 1 and 2 were running and emitting NOx. (6) Please explain how these zero NOx values were handled in calculating annual NOx emissions for the lookback period.***

**RESPONSE**

Please refer to Applicant's objection to City Data Request 78 filed on October 21, 2015. Without waiving its prior objection, Applicant responds as follows.

78-1. The units for the GASFLOW column of the MGS Units 1 and 2 NOx Continuous Emissions Monitoring System (CEMS) data provided by the Applicant are hundred standard cubic feet per hour of natural gas.

78-2. The Applicant has provided hour-by-hour fuel use and NOx lbs/hr CEMS data for the period from 2009 to 2014 for MGS Units 1 and 2 and those data are sufficient to understand the annual baseline NOx emissions for MGS Units 1 and 2.

78-3. The annual baseline NOx emissions for MGS Units 1 and 2 shown on Table C-2.13a of the AFC are simply the annual totals of the hour-by-hour CEMS NOx lbs/hr emissions data already provided by the Applicant. This annual baseline NOx emission summary Table C-2.13a is included in the confidential Excel spreadsheet filed by the Applicant on 8/17/15.

78-4. All stack test data for these units are public documents available from the VCAPCD.

78-5. The zero NOx lbs/hr levels shown in the CEMS data occur when the unit has been operating at a relatively low level (for example, at gas flow rates below approximately 5,000 hscf/hr) and the selective catalytic reduction NOx control system is fully functional. The NOx emissions are so low that the CEMS is rounding the results down to zero.

78.6. The zero NOx values were included in the calculation of annual NOx emissions for the baseline period for MGS Units 1 and 2. Doing so results in a conservative NOx baseline emission estimate for MGS Units 1 and 2.

***79. Unit 3 will continue to operate after the new unit starts up. An increase in emissions from this unit may affect the conclusions as to applicability of PSD review and air quality impacts. Thus, please respond to the following questions regarding Unit 3. (1) Are any changes in the operation of Unit 3 anticipated? If yes, please describe them and quantify any emission changes. (2) Please provide all CEMS data and stack tests for Unit 3.***

**RESPONSE**

Please refer to Applicant's objection to City Data Request 79 filed on October 21, 2015. Without waiving its prior objection, Applicant responds as follows.

79-1a. The Applicant does not expect any changes in the future operation of MGS Unit 3.

79-1b. Not applicable.

79-2. MGS Unit 3 is not equipped with a Continuous Emissions Monitoring System (CEMS). The VCAPCD emission inventory data were used to establish the baseline emissions for MGS Unit 3. As with MGS Units 1 and 2, the VCAPCD emissions inventory for MGS Unit 3 is based on annual fuel use and 1995 AP-42 emission factors for natural gas fired stationary gas turbines. All stack test data for this unit are public documents available from the VCAPCD.

# APPENDIX A

# AIR QUALITY

# APPENDIX A-1-1

# VCAPCD ANNUAL EMISSION INVENTORY DATA

Facility #00013 Annual Emission Totals 2005-2013

| Year | Air Basin | Fac ID# | Facility Name | DEV ID# | Device Name | DEVD1 | DEVD2 | Process ID# | Process Description | SIC# | SCC# | Process Rate | Process Rate Units | TOG TPY | ROG TPY | NOX TPY | CO TPY | SOX TPY | PM TPY | PM 10 TPY | PM25 TPY | NH3 TPY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | SCC | 13 | MANDALAY POWER GENERATION | 1 | BABCOCK WILCOX | UNIT 1 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 1423 | MILLION CUBIC FEET BURNED | 2.359 | 0.996 | 3.390 | 28.460 | 0.427 | 1.779 | 1.779 | 1.779 | 3.010 |
| 2005 | SCC | 13 | MANDALAY POWER GENERATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 2001.1 | MILLION CUBIC FEET BURNED | 3.317 | 1.400 | 5.389 | 40.022 | 0.600 | 2.501 | 2.501 | 2.501 | 1.401 |
| 2005 | SCC | 13 | MANDALAY POWER GENERATION | 7 | PEAKING UNIT | UNIT 3 | | 1 | DIST OIL FOR TURBINES | 4911 | 2-01-001-01 | 0 | 1000 GALLONS BURNED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2005 | SCC | 13 | MANDALAY POWER GENERATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | NAT GAS FOR TURBINES | 4911 | 2-01-002-01 | 26.9 | MILLION CUBIC FEET | 1.112 | 0.102 | 0.580 | 1.553 | 0.008 | 0.273 | 0.271 | 0.271 | 0.000 |
| 2005 | SCC | 13 | MANDALAY POWER GENERATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 0 | GALLONS SOLVENT CONSUMED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2005 | SCC | 13 | MANDALAY POWER GENERATION | 13 | EMERGENCY GEN. | EXEMPT | | 1 | DIESEL GENERATOR | 4911 | 2-03-001-01 | 0 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2005 | SCC | 13 | MANDALAY POWER GENERATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 117 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2005 | SCC | 13 | MANDALAY POWER GENERATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE | 4911 | 4-03-010-03 | 0.9 | 1000 GALLONS STORAGE CAPA | 0.005 | 0.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2005 | Total Annual Emissions | | | | | | | | | | | | | 6.793 | 2.503 | 9.359 | 70.035 | 1.035 | 4.553 | 4.551 | 4.551 | 4.411 |
| | | | | | | | | | | | | | | | | | | | | | | |
| 2006 | SCC | 13 | MANDALAY POWER GENERATION | 1 | BABCOCK WILCOX | UNIT 1 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 1642.1 | MILLION CUBIC FEET BURNED | 2.723 | 1.149 | 3.340 | 32.842 | 0.493 | 2.053 | 2.053 | 2.053 | 1.149 |
| 2006 | SCC | 13 | MANDALAY POWER GENERATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 1825.9 | MILLION CUBIC FEET BURNED | 3.027 | 1.278 | 4.291 | 36.518 | 0.548 | 2.282 | 2.282 | 2.282 | 0.456 |
| 2006 | SCC | 13 | MANDALAY POWER GENERATION | 7 | PEAKING UNIT | UNIT 3 | | 1 | DIST OIL FOR TURBINES | 4911 | 2-01-001-01 | 0 | 1000 GALLONS BURNED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2006 | SCC | 13 | MANDALAY POWER GENERATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | NAT GAS FOR TURBINES | 4911 | 2-01-002-01 | 50.5 | MILLION CUBIC FEET | 2.089 | 0.191 | 1.200 | 2.916 | 0.015 | 0.513 | 0.509 | 0.508 | 0.000 |
| 2006 | SCC | 13 | MANDALAY POWER GENERATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 0 | GALLONS SOLVENT CONSUMED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2006 | SCC | 13 | MANDALAY POWER GENERATION | 13 | EMERGENCY GEN. | EXEMPT | | 1 | DIESEL GENERATOR | 4911 | 2-03-001-01 | 0 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2006 | SCC | 13 | MANDALAY POWER GENERATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 117 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2006 | SCC | 13 | MANDALAY POWER GENERATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE | 4911 | 4-03-010-03 | 1.2 | 1000 GALLONS STORAGE CAPA | 0.229 | 0.228 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2006 | Total Annual Emissions | | | | | | | | | | | | | 8.067 | 2.847 | 8.831 | 72.276 | 1.056 | 4.848 | 4.844 | 4.843 | 1.605 |
| | | | | | | | | | | | | | | | | | | | | | | |
| 2007 | SCC | 13 | MANDALAY GENERATING STATION | 1 | BABCOCK WILCOX | UNIT 1 BOILER NH3 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 1686.5 | MILLION CUBIC FEET BURNED | 2.796 | 1.181 | 2.403 | 33.730 | 0.506 | 2.108 | 2.108 | 2.108 | 3.204 |
| 2007 | SCC | 13 | MANDALAY GENERATING STATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 2736.5 | MILLION CUBIC FEET BURNED | 4.537 | 1.916 | 6.900 | 54.730 | 0.821 | 3.421 | 3.421 | 3.421 | 5.199 |
| 2007 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 1 | DIST OIL FOR TURBINES | 4911 | 2-01-001-01 | 0 | 1000 GALLONS BURNED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2007 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | NAT GAS FOR TURBINES | 4911 | 2-01-002-01 | 30.1 | MILLION CUBIC FEET | 1.245 | 0.114 | 0.700 | 1.738 | 0.009 | 0.306 | 0.304 | 0.303 | 0.000 |
| 2007 | SCC | 13 | MANDALAY GENERATING STATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 20.3 | GALLONS SOLVENT CONSUMED | 0.155 | 0.062 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

| Year | Air Basin | Fac ID# | Facility Name | DEV ID# | Device Name | DEVD1 | DEVD2 | Process ID# | Process Description | SIC# | SCC# | Process Rate | Process Rate Units | TOG TPY | ROG TPY | NOX TPY | CO TPY | SOX TPY | PM TPY | PM 10 TPY | PM25 TPY | NH3 TPY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2007 | SCC | 13 | MANDALAY GENERATING STATION | 13 | EMERGENCY GEN. | EXEMPT | | 1 | DIESEL GENERATOR | 4911 | 2-03-001-01 | 0 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2007 | SCC | 13 | MANDALAY GENERATING STATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 154 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2007 | SCC | 13 | MANDALAY GENERATING STATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE | 4911 | 4-03-010-03 | 1.3 | 1000 GALLONS STORAGE CAPA | 0.248 | 0.247 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2007 | Total Annual Emissions | | | | | | | | | | | | | 8.981 | 3.519 | 10.003 | 90.198 | 1.336 | 5.834 | 5.832 | 5.832 | 8.404 |
| 2008 | SCC | 13 | MANDALAY GENERATING STATION | 1 | BABCOCK WILCOX | UNIT 1 BOILER NH3 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 2322.5 | MILLION CUBIC FEET BURNED | 3.851 | 1.626 | 3.310 | 46.450 | 0.697 | 2.903 | 2.903 | 2.903 | 4.413 |
| 2008 | SCC | 13 | MANDALAY GENERATING STATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 3654.3 | MILLION CUBIC FEET BURNED | 6.059 | 2.558 | 9.214 | 73.086 | 1.096 | 4.568 | 4.568 | 4.568 | 6.943 |
| 2008 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 1 | DIST OIL FOR TURBINES | 4911 | 2-01-001-01 | 0 | 1000 GALLONS BURNED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2008 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | NAT GAS FOR TURBINES | 4911 | 2-01-002-01 | 38.1 | MILLION CUBIC FEET | 1.576 | 0.144 | 0.886 | 2.200 | 0.011 | 0.387 | 0.384 | 0.384 | 0.000 |
| 2008 | SCC | 13 | MANDALAY GENERATING STATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 9.3 | GALLONS SOLVENT CONSUMED | 0.071 | 0.028 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2008 | SCC | 13 | MANDALAY GENERATING STATION | 13 | EMERGENCY GEN. | EXEMPT | | 1 | DIESEL GENERATOR | 4911 | 2-03-001-01 | 0 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2008 | SCC | 13 | MANDALAY GENERATING STATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 154 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2008 | SCC | 13 | MANDALAY GENERATING STATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE | 4911 | 4-03-010-03 | 1.165 | 1000 GALLONS STORAGE CAPA | 0.222 | 0.222 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2008 | Total Annual Emissions | | | | | | | | | | | | | 11.778 | 4.578 | 13.410 | 121.736 | 1.804 | 7.858 | 7.855 | 7.855 | 11.356 |
| 2009 | SCC | 13 | MANDALAY GENERATING STATION | 1 | BABCOCK WILCOX | UNIT 1 BOILER NH3 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 1630.4 | MILLION CUBIC FEET BURNED | 2.703 | 1.141 | 2.323 | 32.608 | 0.489 | 2.038 | 2.038 | 2.038 | 1.141 |
| 2009 | SCC | 13 | MANDALAY GENERATING STATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 1690.4 | MILLION CUBIC FEET BURNED | 2.803 | 1.183 | 4.262 | 33.808 | 0.507 | 2.113 | 2.113 | 2.113 | 0.423 |
| 2009 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 1 | DIST OIL FOR TURBINES | 4911 | 2-01-001-01 | 0 | 1000 GALLONS BURNED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2009 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | NAT GAS FOR TURBINES | 4911 | 2-01-002-01 | 89.3 | MILLION CUBIC FEET | 3.693 | 0.338 | 2.077 | 5.157 | 0.027 | 0.906 | 0.901 | 0.899 | 0.000 |
| 2009 | SCC | 13 | MANDALAY GENERATING STATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 8.6 | GALLONS SOLVENT CONSUMED | 0.066 | 0.026 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2009 | SCC | 13 | MANDALAY GENERATING STATION | 13 | EMERGENCY GEN. | EXEMPT | | 1 | DIESEL GENERATOR | 4911 | 2-03-001-01 | 0.008 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2009 | SCC | 13 | MANDALAY GENERATING STATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 154 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0.007 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2009 | SCC | 13 | MANDALAY GENERATING STATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE | 4911 | 4-03-010-03 | 1.283 | 1000 GALLONS STORAGE CAPA | 0.245 | 0.245 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2009 | Total Annual Emissions | | | | | | | | | | | | | 9.510 | 2.933 | 8.667 | 71.574 | 1.023 | 5.058 | 5.052 | 5.050 | 1.564 |
| 2010 | SCC | 13 | MANDALAY GENERATING STATION | 1 | BABCOCK WILCOX | UNIT 1 BOILER NH3 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 314.3 | MILLION CUBIC FEET BURNED | 0.521 | 0.220 | 1.675 | 6.286 | 0.094 | 0.393 | 0.393 | 0.393 | 0.079 |

| Year | Air Basin | Fac ID# | Facility Name | DEV ID# | Device Name | DEVD1 | DEVD2 | Process ID# | Process Description | SIC# | SCC# | Process Rate | Process Rate Units | TOG TPY | ROG TPY | NOX TPY | CO TPY | SOX TPY | PM TPY | PM 10 TPY | PM25 TPY | NH3 TPY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | SCC | 13 | MANDALAY GENERATING STATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 587.6 | MILLION CUBIC FEET BURNED | 0.974 | 0.411 | 1.482 | 11.752 | 0.176 | 0.735 | 0.735 | 0.735 | 0.147 |
| 2010 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | NAT GAS FOR TURBINES | 4911 | 2-01-002-01 | 42.4 | MILLION CUBIC FEET | 1.754 | 0.160 | 0.986 | 2.449 | 0.013 | 0.430 | 0.428 | 0.427 | 0.000 |
| 2010 | SCC | 13 | MANDALAY GENERATING STATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 13.3 | GALLONS SOLVENT CONSUMED | 0.101 | 0.041 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2010 | SCC | 13 | MANDALAY GENERATING STATION | 13 | EMERGENCY GEN. | EXEMPT | | 1 | DIESEL GENERATOR | 4911 | 2-03-001-01 | 0.02 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.006 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2010 | SCC | 13 | MANDALAY GENERATING STATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 154 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0.004 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2010 | SCC | 13 | MANDALAY GENERATING STATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE | 4911 | 4-03-010-03 | 1.3 | 1000 GALLONS STORAGE CAPA | 0.248 | 0.248 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2010 | Total Annual Emissions | | | | | | | | | | | | | 3.599 | 1.081 | 4.150 | 20.488 | 0.283 | 1.558 | 1.556 | 1.555 | 0.225 |
| | | | | | | | | | | | | | | | | | | | | | | |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 1 | BABCOCK WILCOX | UNIT 1 BOILER NH3 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 334.2 | MILLION CUBIC FEET BURNED | 0.554 | 0.234 | 1.781 | 6.684 | 0.100 | 0.418 | 0.418 | 0.418 | 0.084 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 507.8 | MILLION CUBIC FEET BURNED | 0.842 | 0.356 | 2.707 | 10.156 | 0.152 | 0.635 | 0.635 | 0.635 | 0.127 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | NAT GAS FOR TURBINES | 4911 | 2-01-002-01 | 30.4 | MILLION CUBIC FEET | 1.257 | 0.115 | 0.707 | 1.756 | 0.009 | 0.309 | 0.307 | 0.306 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 15.8 | GALLONS SOLVENT CONSUMED | 0.121 | 0.048 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 13 | EMERGENCY GEN. | EXEMPT | | 1 | DIESEL GENERATOR | 4911 | 2-03-001-01 | 0.00592 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 154 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0.00435 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE (BREATHE) | 4911 | 4-03-010-03 | 1.2571 | 1000 GALLONS STORAGE CAPA | 0.008 | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 16 | GASOLINE ABOVE GROUND TANK (GAGT) | | | 1 | GASOLINE TANK LOADING | 4911 | 4-03-010-03 | 1.2571 | 1000 GALLONS STORAGE CAPA | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 17 | GAGT | | | 1 | GASOLINE TANK UNLOADING | 4911 | 4-03-010-09 | 1.2571 | 1000 GALLONS THROUGHPUT | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 18 | GAGT | | | 1 | VEHICLE FUELING (TANK UNLOADING) | 4911 | 4-04-004-06 | 1.2571 | 1000 GALLONS THROUGHPUT | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 19 | GAGT | | | 1 | GASOLINE VEHICLE FILLING | 4911 | 4-06-004-03 | 1.2571 | 1000 GALLONS TRANSFERRED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | SCC | 13 | MANDALAY GENERATING STATION | 20 | GAGT | | | 1 | GASOLINE FILLING SPILLAGE | 4911 | 4-06-004-02 | 1.2571 | 1000 GALLONS PUMPED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | Total Annual Emissions | | | | | | | | | | | | | 2.783 | 0.762 | 5.198 | 18.596 | 0.262 | 1.361 | 1.360 | 1.359 | 0.211 |
| | | | | | | | | | | | | | | | | | | | | | | |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 1 | BABCOCK WILCOX | UNIT 1 BOILER NH3 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 1140.2 | MILLION CUBIC FEET BURNED | 1.890 | 0.798 | 6.077 | 22.804 | 0.342 | 1.425 | 1.425 | 1.425 | 0.798 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 1166.5 | MILLION CUBIC FEET BURNED | 1.934 | 0.817 | 6.217 | 23.330 | 0.350 | 1.458 | 1.458 | 1.458 | 0.292 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | 2510 MMBTU/HR TURBINE | 4911 | 2-01-002-01 | 109.6 | MILLION CUBIC FEET | 4.533 | 0.414 | 2.549 | 6.329 | 0.033 | 1.112 | 1.106 | 1.104 | 0.000 |

| Year | Air Basin | Fac ID# | Facility Name | DEV ID# | Device Name | DEVD1 | DEVD2 | Process ID# | Process Description | SIC# | SCC# | Process Rate | Process Rate Units | TOG TPY | ROG TPY | NOX TPY | CO TPY | SOX TPY | PM TPY | PM 10 TPY | PM25 TPY | NH3 TPY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 16.8 | GALLONS SOLVENT CONSUMED | 0.128 | 0.051 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 13 | EMERGENCY GEN. | | | 1 | 201 BHP DIESEL GENERATOR | 4911 | 2-03-001-01 | 0.0037 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 154 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0.00261 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE (BREATHE) | 4911 | 4-03-010-03 | 1.0465 | 1000 GALLONS STORAGE CAPA | 0.006 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 16 | GASOLINE ABOVE GROUND TANK (GAGT) | | | 1 | GASOLINE TANK LOADING | 4911 | 4-03-010-03 | 1.0465 | 1000 GALLONS STORAGE CAPA | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 17 | GAGT | | | 1 | GASOLINE TANK UNLOADING | 4911 | 4-03-010-09 | 1.0465 | 1000 GALLONS THROUGHPUT | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 18 | GAGT | | | 1 | VEHICLE FUELING (TANK UNLOADING) | 4911 | 4-04-004-06 | 1.0465 | 1000 GALLONS THROUGHPUT | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 19 | GAGT | | | 1 | GASOLINE VEHICLE FILLING | 4911 | 4-06-004-03 | 1.0465 | 1000 GALLONS TRANSFERRED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 20 | GAGT | | | 1 | GASOLINE FILLING SPILLAGE | 4911 | 4-06-004-02 | 1.0465 | 1000 GALLONS PUMPED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | SCC | 13 | MANDALAY GENERATING STATION | 21 | CORROSION CONTROL | | | 1 | INDUSTRIAL COATING | 4911 | 4-02-005-10 | 121.7 | GALLONS COATING | 0.014 | 0.013 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2012 | Total Annual Emissions | | | | | | | | | | | | | 8.507 | 2.101 | 14.845 | 52.464 | 0.725 | 3.996 | 3.989 | 3.987 | 1.090 |
| | | | | | | | | | | | | | | | | | | | | | | |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 1 | BABCOCK WILCOX | UNIT 1 BOILER NH3 | 215 MW | 1 | 1990 MMBTU/HR NATURAL GAS FOR UNIT #1 | 4911 | 1-01-006-01 | 1063.2 | MILLION CUBIC FEET BURNED | 1.763 | 0.744 | 5.667 | 21.264 | 0.319 | 1.329 | 1.329 | 1.329 | 0.425 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 2 | BABCOCK WILCOX | UNIT 2 | 215 MW | 1 | 1990MMBTU/HR NATURAL GAS FOR UNIT #2 | 4911 | 1-01-006-01 | 1429 | MILLION CUBIC FEET BURNED | 2.369 | 1.000 | 7.617 | 28.580 | 0.429 | 1.786 | 1.786 | 1.786 | 0.572 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 7 | PEAKING UNIT | UNIT 3 | | 2 | 2510 MMBTU/HR TURBINE | 4911 | 2-01-002-01 | 67.5 | MILLION CUBIC FEET | 2.792 | 0.255 | 1.570 | 3.898 | 0.020 | 0.685 | 0.681 | 0.680 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 12 | WIPECLEANING | | | 1 | SOLVENT CLEANING | 4911 | 4-01-003-98 | 37.5 | GALLONS SOLVENT CONSUMED | 0.128 | 0.051 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 13 | EMERGENCY GEN. | | | 1 | 201 BHP DIESEL GENERATOR | 4911 | 2-03-001-01 | 0.0056 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 14 | FIRE WATER PUMPS | EXEMPT | YB35018 U607396 | 1 | 154 HP PERKINS DIESEL ENG. | 4911 | 2-03-001-01 | 0.00203 | THOUSANDS OF GALLONS | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 15 | FUEL TANK | | | 1 | 1000 GALLON AGT GASOLINE (BREATHE) | 4911 | 4-03-010-03 | 0.913 | 1000 GALLONS STORAGE CAPA | 0.006 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 16 | GASOLINE ABOVE GROUND TANK (GAGT) | | | 1 | GASOLINE TANK LOADING | 4911 | 4-03-010-03 | 0.913 | 1000 GALLONS STORAGE CAPA | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 17 | GAGT | | | 1 | GASOLINE TANK UNLOADING | 4911 | 4-03-010-09 | 0.913 | 1000 GALLONS THROUGHPUT | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 18 | GAGT | | | 1 | VEHICLE FUELING (TANK UNLOADING) | 4911 | 4-04-004-06 | 0.913 | 1000 GALLONS THROUGHPUT | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 19 | GAGT | | | 1 | GASOLINE VEHICLE FILLING | 4911 | 4-06-004-03 | 0.913 | 1000 GALLONS TRANSFERRED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 20 | GAGT | | | 1 | GASOLINE FILLING SPILLAGE | 4911 | 4-06-004-02 | 0.913 | 1000 GALLONS PUMPED | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Facility #00013 Annual Emission Totals 2005-2013

| Year | Air Basin | Fac ID# | Facility Name | DEV ID# | Device Name | DEVD1 | DEVD2 | Process ID# | Process Description | SIC# | SCC# | Process Rate | Process Rate Units | TOG TPY | ROG TPY | NOX TPY | CO TPY | SOX TPY | PM TPY | PM 10 TPY | PM25 TPY | NH3 TPY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2013 | SCC | 13 | MANDALAY GENERATING STATION | 21 | CORROSION CONTROL | | | 1 | INDUSTRIAL COATING | 4911 | 4-02-005-10 | 105 | GALLONS COATING | 0.012 | 0.011 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2013 | Total Annual Emissions | | | | | | | | | | | | | 7.070 | 2.069 | 14.856 | 53.743 | 0.768 | 3.801 | 3.796 | 3.795 | 0.997 |

# APPENDIX A-1-2

# VCAPCD ANNUAL INVENTORY EMISSION FACTORS

# Equipment and Emissions Summary

00013 - REN Mandalay Generating Station Permit Period: 7/1/2014 to 6/30/2015 SIC Code 4911 - Electricity Generation

DEVICE NO: 10353 1 - 1990 MMBTU/hr Babcock and Wilcox, rated at 215 MW, Steam Generator (Unit No. 1), equipped with a SCR with NH3 Injection and Low NOx combustion system

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | Max Hourly Throughput | Hours Per Year (if used) |
|---|---|---|---|---|
| 10100601 - Utility Boiler - Nat Gas | MMcf | 33204.6000 MMcf | 3980.0000 MMBTU NG | |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 23.24 | 5.31 | 1.4000 | 1.0000 | 1.4000 | Y | Y | | Y | |
| Nitrogen Oxides | 176.98 | 40.41 | 10.6600 | 1.0000 | 10.6600 | Y | Y | Y | Y | Selective Cat Rdxn (SCR) |
| Particulate Matter | 41.51 | 9.48 | 2.5000 | 1.0000 | 2.5000 | Y | Y | | Y | |
| Sulfur Oxides | 9.96 | 2.27 | 0.6000 | 1.0000 | 0.6000 | Y | Y | | Y | |
| Carbon Monoxide | 664.09 | 151.62 | 40.0000 | 1.0000 | 40.0000 | Y | Y | | Y | |
| Ammonia | 78.03 | 17.82 | 4.7000 | 1.0000 | 4.7000 | Y | Y | Y | Y | |

DEVICE NO: 10355 1 - 2510 MMBTU/hr Turbine Peaking Unit (Unit No. 3)

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | Max Hourly Throughput | Hours Per Year (if used) |
|---|---|---|---|---|
| 20100201 - Turbine-Natural Gas | MMcf | 197.5800 MMcf | 2510.0000 MMBTU NG | |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 0.75 | 18.07 | 7.5600 | 1.0000 | 7.5600 | Y | Y | Y | Y | |
| Nitrogen Oxides | 45.64 | 1104.41 | 462.0000 | 1.0000 | 462.0000 | Y | Y | Y | Y | |
| Particulate Matter | 2.01 | 48.53 | 20.3000 | 1.0000 | 20.3000 | Y | Y | Y | Y | |
| Sulfur Oxides | 0.06 | 1.43 | 0.6000 | 1.0000 | 0.6000 | Y | Y | | Y | |
| Carbon Monoxide | 11.41 | 276.10 | 115.5000 | 1.0000 | 115.5000 | Y | Y | Y | Y | |

# Equipment and Emissions Summary

00013 - REN Mandalay Generating Station Permit Period: 7/1/2014 to 6/30/2015 SIC Code 4911 - Electricity Generation

DEVICE NO: 10360 1 - 1000 Gallon AGT Vault Aboveground Gasoline Storage Tank, equipped with VR Phase I (2-Point System) & Phase II (AGT Vault Balance System)

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | Max Hourly Throughput | Hours Per Year (if used) |
|---|---|---|---|---|
| 40400102 - Gasoline AG Tank Breath | SqRt Gal | 31.6227 SqRt Gal | 0.0036 SqRt Gal | Calculate Hourly Using 8760 Hrs/Yr |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 0.19 | 0.04 | 12.2000 | 1.0000 | 12.2000 | Y | Y | | Y | |

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | Max Hourly Throughput | Hours Per Year (if used) |
|---|---|---|---|---|
| 40400404 - Gasoline AG Tank Loadin | Mgal | 6.0000 Mgal | 0.7500 Mgal | |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 0.00 | 0.38 | 10.0000 | 0.0500 | 0.5000 | Y | Y | | Y | Vapor Recovery (95%) |

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | Max Hourly Throughput | Hours Per Year (if used) |
|---|---|---|---|---|
| 40400406 - Gasoline Tank Unloading | Mgal | 6.0000 Mgal | 0.0500 Mgal | |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 0.00 | 0.01 | 1.0000 | 0.1000 | 0.1000 | Y | Y | | Y | Vapor Recovery (90%) |

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | Max Hourly Throughput | Hours Per Year (if used) |
|---|---|---|---|---|
| 40600401 - Gasoline Vehicle Filling | Mgal | 6.0000 Mgal | 0.0500 Mgal | |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 0.00 | 0.03 | 10.0000 | 0.0500 | 0.5000 | Y | Y | | Y | Vapor Recovery (95%) |

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | Max Hourly Throughput | Hours Per Year (if used) |
|---|---|---|---|---|
| 40600404 - Gasoline Filling Spillage | Mgal | 6.0000 Mgal | 0.0500 Mgal | |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 0.00 | 0.04 | 0.7000 | 1.0000 | 0.7000 | Y | Y | | Y | |

DEVICE NO: 17509 1 - 201 BHP Generac Diesel-Fired Emergency Standby Engine, Model 96A-00728-5, Serial No. 2025978, for emergency electricity generation

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | Max Hourly Throughput | Hours Per Year (if used) |
|---|---|---|---|---|
| 20200103 - Diesel ICE - g/hp-hr<1000 | BHP-g<1000 | 4020.0000 BHP-d<1000 | 20.1000 BHP-d<1000 | Calculate Hourly Using 200 Hrs/Yr |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 0.00 | 0.05 | 1.0700 | 1.0000 | 1.0700 | Y | Y | | Y | |
| Nitrogen Oxides | 0.07 | 0.67 | 15.1000 | 1.0000 | 15.1000 | Y | Y | | Y | |
| Particulate Matter | 0.00 | 0.05 | 1.0800 | 1.0000 | 1.0800 | Y | Y | | Y | |
| Sulfur Oxides | 0.00 | 0.01 | 2.4200 | 0.1000 | 0.2400 | Y | Y | | Y | Low Sulfur 0.05 fuel |
| Carbon Monoxide | 0.01 | 0.15 | 3.2800 | 1.0000 | 3.2800 | Y | Y | | Y | |

# Equipment and Emissions Summary

00013 - REN Mandalay Generating Station Permit Period: 7/1/2014 to 6/30/2015 SIC Code 4911 - Electricity Generation

DEVICE NO: 17510 1 - 154 BHP Perkins England Diesel-Fired Emergency Standby Engine, Model 1006-GT, Serial No. 97-280426-00.001, used for fire suppression

| SOURCE CLASSIFICATION CODE | SCC Units | Prmt Annual Throughput | | Max Hourly Throughput | | Hours Per Year (if used) |
|---|---|---|---|---|---|---|
| 20200103 - Diesel ICE - g/hp-hr<1000 | BHP-g<1000 | 3080.0000 | BHP-d<1000 | 15.4000 | BHP-d<1000 | Calculate Hourly Using 200 Hrs/Yr |

| POLLUTANT | Tons/Yr | Lbs/Hr | Uncntl EF | Cntl Factor | Cntl EF | APE? | HPE? | EF Over | CF Over | Control Device |
|---|---|---|---|---|---|---|---|---|---|---|
| Reactive Organics | 0.00 | 0.04 | 1.0700 | 1.0000 | 1.0700 | Y | Y | | Y | |
| Nitrogen Oxides | 0.05 | 0.51 | 15.1000 | 1.0000 | 15.1000 | Y | Y | | Y | |
| Particulate Matter | 0.00 | 0.04 | 1.0800 | 1.0000 | 1.0800 | Y | Y | | Y | |
| Sulfur Oxides | 0.00 | 0.01 | 2.4200 | 0.1000 | 0.2400 | Y | Y | | Y | Low Sulfur 0.05 fuel |
| Carbon Monoxide | 0.01 | 0.11 | 3.2800 | 1.0000 | 3.2800 | Y | Y | | Y | |

# APPENDIX A-2

# VCAPCD ERC EVALUATIONS

# ECR Certificate No. 1078

## ERC Certificate Analysis

**ERC Certificate No. 1078** **Issuance Date: September 16, 1992**

**Project Description:**

Replacement of six 350 bhp Clark and four 80 bhp Waukesha rich-burn natural gas engines at the South Mountain compressor plant near Santa Paula with electric motors.

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 5.91 tpy | 7.13 tpy |
| Emission Reduction – Current Calculation | 5.91 tpy | 7.13 tpy |
| EPA Surplus Emission Reduction (ER1) | 5.91 tpy | 3.59 tpy |
| District Emission Reduction Credit (ER2) | 5.91 tpy | 6.44 tpy |

**Analysis:**

*Real and Quantifiable* – When this ERC Certificate was issued, Rule 74.9 had a 50 ppm NOx emission limit and a 250 ppm ROC emission limit for rich-burn engines. Source test data for the four 80 bhp Waukesha engines and four of the six 350 bhp Clark engines was reviewed. Except for one Waukesha engine, the source testing demonstrated that the engines did not meet the NOx emission limit and that the engines met the ROC emission limit. The one Waukesha engine met the NOx emission limit and did not meet the ROC emission limit.

Except for the one Waukesha engine, the ROC emission reduction was originally calculated using the source test data and actual fuel use data for two years (1989 and 1990) prior to engine replacement. For the two untested Clark engines, average source test data from the four tested Clark engines was used. Except for the one Waukesha engine, the NOx emission reduction was originally calculated using the Rule 74.9 emission limit and actual fuel use data for two years (1989 and 1990) prior to engine replacement.

The original emission reductions for the one Waukesha engine were calculated using the Rule 74.9 ROC emission limit, the source test NOx limit and actual fuel use data for two years (1989 and 1990) prior to engine replacement. The calculated ROC emission reduction exceeded ROC permitted emissions for the engine. The final calculated emission reduction for ROC was reduced to the permitted emissions limit for the engine.

*Permanent and Enforceable* – Natural gas engines of this size cannot be operated in the District without a Permit to Operate. The Permit to Operate for the ten engines was surrendered when the emission reduction credit certificate was issued.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used.

*EPA Surplus Emission Reduction* – Rule 74.9 currently has a 25 ppm NOx emission limit and a 250 ppm ROC emission limit for rich-burn engines. The one Waukesha engine met the NOx limit during its original source test. It contribution to the original NOx emission reduction (0.05 tpy) has not been reduced. For the other nine engines, the calculated EPA surplus emission reduction for NOx has been reduced to 50% (25 ppm/50 ppm) of the originally calculated emission reduction. Since the ROC emission limit has not changed, the originally calculated ROC emission reduction does not need to be reduced.

*District Emission Reduction Credit* – At the time the emission reduction credit was originally issued, the District had a further study measure that anticipated reducing the NOx emission limit for rich-burn engines to 45 ppm. The SCAQMD had a similar tactic and rule. The original emission reduction credit, therefore, contained a condition stating that the emission reduction credit would be reduced to 6.44 tpy of NOx after the effective date of a rule implementing the further study measure. On July 18, 1997, the emission reduction credit was reduced pursuant to this condition.

# ECR Certificate No. 1079

## ERC Certificate Analysis

**ERC Certificate No. 1079** **Issuance Date: September 16, 1992**

**Project Description:**

Replacement of two 350 bhp Clark lean-burn natural gas engines and one 330 bhp Ingersoll-Rand rich-burn natural gas engine at the Shiells Canyon gas plant near Fillmore with electric motors. (The electric motors were installed at the Torrey Canyon gas plant near Piru.)

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 6.08 tpy | 5.67 tpy |
| Emission Reduction – Current Calculation | 6.08 tpy | 5.67 tpy |
| EPA Surplus Emission Reduction (ER1) | 6.08 tpy | 2.14 tpy |
| District Emission Reduction Credit (ER2) | 6.08 tpy | 2.14 tpy |

**Analysis:**

*Real and Quantifiable* – When this ERC Certificate was issued, Rule 74.9 had a 125 ppm NOx emission limit and a 750 ppm ROC emission limit for lean-burn engines. Source testing of the two 350 bhp Clark engines demonstrated that the engines did not meet these limits. The emission reduction for the two engines was, therefore, originally calculated using the Rule 74.9 emission limits and actual fuel use data for two years (1989 and 1990) prior to engine replacement. The calculated ROC emission reduction exceeded ROC permitted emissions for the two engines. The final calculated emission reduction for ROC was reduced to the permitted emissions limit for the engines.

When this ERC Certificate was issued, Rule 74.9 had a 50 ppm NOx emission limit and a 250 ppm ROC emission limit for rich-burn engines. Source testing of the 330 bhp Ingersoll-Rand engine demonstrated that the engine met these limits. The emission reduction for the engine was originally calculated using the source test data and actual fuel use data for two years (1989 and 1990) prior to engine replacement.

*Permanent and Enforceable* – Natural gas engines of this size cannot be operated in the District without a Permit to Operate. The Permit to Operate for the three engines was surrendered when the emission reduction credit certificate was issued.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used.

*EPA Surplus Emission Reduction* – Rule 74.9 currently has a 45 ppm NOx emission limit and a 750 ppm ROC emission limit for lean-burn engines. For the two lean-burn engines, the calculated EPA surplus emission reduction for NOx has been reduced to 36% (45

ppm/125 ppm) of the originally calculated emission reduction. Since the ROC emission limit has not changed, the originally calculated ROC emission reduction does not need to be reduced.

Rule 74.9 currently has a 25 ppm NOx emission limit and a 250 ppm ROC emission limit for rich-burn engines. The source test from original application demonstrated that the rich-burn engine met these limits. Its contribution to the original ROC emission reduction (0.08 tpy) and to the original NOx emission reduction (0.16 tpy) has not been reduced.

*District Emission Reduction Credit* – At the time the emission reduction credit was originally issued, the District had a further study measure that anticipated reducing the NOx emission limit for lean-burn engines to 45 ppm. The SCAQMD had a similar tactic and rule. The original emission reduction credit, therefore, contained a condition stating that the emission reduction credit would be reduced to 2.14 tpy of NOx after the effective date of a rule implementing the further study measure. On July 18, 1997, the emission reduction credit was reduced pursuant to this condition.

# ECR Certificate No. 1080

## ERC Certificate Analysis

**ERC Certificate No. 1080** **Issuance Date: September 16, 1992**

**Project Description:**

A 150 BHP Clark natural gas-fired lean-burn compressor engine was shut down and removed from the Bardsdale Compressor Plant (former VCAPCD Permit to Operate No. 00055). The function of the compressor engine was replaced by an electric motor-driven compressor.

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 0.95 tpy | 0.57 tpy |
| Emission Reduction – Current Calculation | 0.95 tpy | 0.57 tpy |
| EPA Surplus Emission Reduction (ER1) | 0.95 tpy | 0.57 tpy |
| District Emission Reduction Credit (ER2) | 0.95 tpy | 0.57 tpy |

**Analysis:**

*Real and Quantifiable* – This ERC was originally issued with the caveat that the NOx emission reduction would be reduced to the future NOx limit of Rule 74.9, "Stationary Internal Combustion Engines", of 45 ppm for lean-burn engines. The original NOx emission reduction of 0.57 tpy above reflects the Rule 74.9 limit of 45 ppm NOx. When this ERC Certificate was issued, Rule 74.9 had a 750 ppm ROC emission limit for lean-burn engines which would have resulted in an ROC emission reduction of 8.85 tpy ROC. The emission reduction of 0.95 tpy above is significantly less than 750 ppm ROC as it was limited to the engine's permitted emissions pursuant to Rule 26.6.C. Actual source test data for ROC and NOx showed numbers well above these Rule 74.9 limits.

Actual fuel usage data for calendar year 1989 was used to determine actual emissions pursuant to Rule 26.6.C.

*Permanent and Enforceable* – Natural gas engines of this size cannot be operated in the District without a Permit to Operate. The Permit to Operate for the engine was surrendered.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used.

*EPA Surplus Emission Reduction* – Rule 74.9 currently has a 45 ppm NOx emission limit and a 750 ppm ROC emission limit for lean-burn engines. For this engine, the emissions used to calculate the ERC were in compliance with these NOx and ROC limits.

*District Emission Reduction Credit* – When the emission reduction was issued, the District did not require the emission reduction to be discounted.

# ECR Certificate No. 1083

EMISSION REDUCTION CREDIT SUMMARY
Unocal
Bridge Compressor Plant
Santa Paula, CA

Application No. 0315-121
Date Application Deemed Complete: July 15, 1991
ERC Granted To: Southern California Edison Co.
Date Engine Removed From Service: January 24, 1991

The following Emission Reduction Credits (ERC's) resulted from the removal an I.C. compressor engine. The work done by this compressor engine is now being done by an electric powered compressor at Texaco's South Mountain Compressor Plant. The District views this removal as a replacement of the Texaco Bridge compressor engine with an electric motor at the Texaco facility. APCD Rule 74.9 requires the following emission limits: ROC emissions from rich-burn engines shall not exceed 250 ppmv corrected to 15% oxygen. NOx emissions from rich-burn engines shall not exceed 50 ppmv corrected to 15% oxygen. Therefore, the ERC is for compliance beyond the requirements of APCD Rule 74.9.

ERC emission factors for ROC and NOx are either Rule 74.9 limits or actual emission factors if less than Rule 74.9 limits. Emissions for SOx are calculated using the emission factor from AP-42 of 0.60 lbs/MMCF. Emissions for PM are calculated using the AP-42 emission factor of 10 lbs/MMCF. In addition, APCD rules require that ERC's do not exceed Permitted Emissions.

Engine Make: I.R. Model: 8-SVG B Serial No.: 8C5805
H.P.: 440 Fuel: natural gas, rich-burn

APCD Rule 74.9: In compliance, prior to removal

Engine Use: Compressor Engine at Bridge Compressor Plant

Source Test Date / Company: 02-06-89 BTC Environmental Inc.

Actual Fuel Use: 16.7 MMCF/Yr Permitted: 31.7 MMCF/Yr

| Permitted Emissions: (Tons/Yr) | | Emission Factor: (lbs/MMCF) | |
|---|---|---|---|
| ROC | 0.19 | ROC | 23.74 (Source Test) |
| NOx | 1.70 | NOx | 103.6 (Source test) |
| PM | 0.16 | PM | 10.00 (AP-42) |
| SOx | 0.01 | SOx | 0.60 (AP-42) |

Emission Reduction Credits: (Tons/Yr)

| | | |
|---|---|---|
| ROC | 0.19 | (ERC limited by Permitted Emissions) |
| NSx | 0.87 | (Actual Fuel Use x Emission Factor) |
| PM | 0.08 | (Actual Fuel Use x Emission Factor) |
| SOx | 0.01 | (Actual Fuel Use x Emission Factor) |

CG0315 May 12, 1992

ERC No. 1083

Permit Number: 0315

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - I.R. SVG..... | 440.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 16.7 MMcf | 16.7 MMcf | 2.0 Mcf |

EMISSION FACTORS:

| ~~TOC~~ ROC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 23.74 98.9 | 103.6 | 10.0 | 0.6 | 1813.9 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.20 | 0.87 | 0.08 | 0.01 | 15.18 |
| Pounds per Hour: | 0.05 | 0.21 | 0.02 | 0.00 | 3.68 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 33.84 scfm.
The expansion factor was 8.191.
The ROC average molecular weight was 31.6.
The measured horsepower was unknown.

Engine Shutdown on Jan 24, 1990 fuel use data used for ERC calculation
Fuel use based on letter dated 3/22/91 from Unocal to M. Eckenrode VCAPCD 1990 Process Rate Information

(4) Emissions in ppm (at 15% O2):

| | | |
|---|---|---|
| NOx | 30 | ppm (source test) |
| ROC | 10 | ppm (source test) |
| CO | 863 | ppm (source test) |

(5) Annual hours of operation estimated to be 8244.7 hours.

$\frac{16,709,000 \text{ SCF/yr}}{33.84 \text{ SCF/min} \times 60 \text{ min/Hr}}$

8244.7 Hrs.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 4.2 Mcf.

Date Form Prepared: 30-APR-92 Initials: CG

# ECR Certificate No. 1084

EMISSION REDUCTION CREDIT SUMMARY
Unocal
Acorn Lease
Fillmore, CA

Application No. 0984 -171
Date Application Deemed Complete: 08-08-91
ERC Granted To: Southern California Edison Co.
Date Engine Removed From Service: 02-05-91

The following Emission Reduction Credits (ERC's) resulted from the replacement of an I.C. engine with an electric motor. APCD Rule 74.9 requires the following emission limits: ROC emissions from rich-burn engines shall not exceed 250 ppmv corrected to 15% oxygen. NOx emissions from rich-burn engines shall not exceed 50 ppmv corrected to 15% oxygen. Therefore, the ERC is for compliance beyond the requirements of APCD Rule 74.9.

ERC emission factors for ROC and NOx are either Rule 74.9 limits or actual emission factors if less than Rule 74.9 limits. Emissions for SOx are calculated using the emission factor from AP-42 of 0.60 lbs/MMCF. Emissions for PM are calculated using the AP-42 emission factor of 10 lbs/MMCF. In addition, APCD rules require that ERC's do not exceed Permitted Emissions.

Engine Make: Le Roi Model: A-114 Serial No.: -------
H.P.: 12 Fuel: natural gas, lean-burn
APCD Rule 74.9: In Compliance prior to electrification

Engine Use: Oil Well Rod Pump Prime Mover

Source Test Date / Company: 1-22,25-91 Petro Chem Environmental

Actual Fuel Use: 0.59 MMCF/Yr Permitted: 0.61 MMCF/Yr

| Permitted Emissions: (Tons/Yr) | | Emission Factor: (lbs/MMCF) | |
|---|---|---|---|
| ROC | 0.45 | ROC | 1001.90 (Source Test) |
| NOx | 0.02 | NOx | 361.10 (Source Test)) |
| PM | <0.01 | PM | 10.00 (AP-42) |
| SOx | <0.01 | SOx | 0.60 (AP-42) |

Emission Reduction Credits: (Tons/Yr)

| | | |
|---|---|---|
| ROC | 0.31 | (Actual Fuel Use x Emission Factor) |
| NOx | 0.01 | (Actual Fuel Use x Emission Factor) |
| PM | <0.01 | (Actual Fuel Use x Emission Factor) |
| SOx | <0.01 | (Actual Fuel Use x Emission Factor) |

CGSCE May 1, 1992

ERC No. 1084

Permit Number: 0984

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - Le Roi A-114..... | 12.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 0.6 MMcf | 0.6 MMcf | 0.2 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 9586.1 | 23.0 | 10.0 | 0.6 | 806.5 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.70 | 0.01 | 0.00 | 0.00 | 0.25 |
| Pounds per Hour: | 0.42 | 0.00 | 0.00 | 0.00 | 0.15 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 3.06 scfm.
The expansion factor was 9.11.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 6 ppm (source test)
ROC 1,722 ppm (source test)
CO 345 ppm (source test)

(5) Annual hours of operation estimated to be 3333.33 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.1 Mcf.

Date Form Prepared: 07-MAY-92 Initials: CG

Permit Number: 0984

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - LeRoi Acorn 8..... | 12.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 0.6 MMcf | 0.6 MMcf | 0.2 Mcf |

EMISSION FACTORS:

| | ~~TOC~~ ROC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|---|
| | 1001.85 ~~4174.4~~ | 23.0 | 10.0 | 0.6 | 806.5 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.31 | 0.01 | 0.00 | 0.00 | 0.25 |
| Pounds per Hour: | 0.18 | 0.00 | 0.00 | 0.00 | 0.15 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 3.06 scfm.
The expansion factor was 9.11.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 6 ppm (source test)
ROC 750 ppm (permit limit)
CO 345 ppm (source test)

(5) Annual hours of operation estimated to be 3338 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.1 Mcf.

Date Form Prepared: 01-MAY-92 Initials: CG

# ECR Certificate No. 1085

Emission Reduction Credit Summary:

Application No. 0050-121

The Emission Reduction Credits associated with this application resulted from the replacement of three (3) 15 hp rod pump I.C. Engines and one (1) 45 hp I.C. Engine with electric motors.

| Engine | ROC | NOx | PM | SOx |
|---|---|---|---|---|
| E15-898 | 0.68 | 0.01 | <0.01 | <0.01 |
| E15-910 | 0.34 | 0.20 | <0.01 | <0.01 |
| E15-929 | 0.54 | 0.23 | <0.01 | <0.01 |
| UCUB2317 | 0.16 | 0.12 | <1.01 | <0.01 |
| Total: | 1.72 | 0.56 | 0.00 | 0.00 |

ERC No. 1085

EMISSION REDUCTION CREDIT SUMMARY
T.B. Properties
Burson & Elkins Leases
Fillmore, CA

Application No.0050-121
Date Application Deemed Complete: 08-12-91
ERC Granted To: Southern California Edison Co.
Date Engine Removed From Service: 04-11-91

The following Emission Reduction Credits (ERC's) resulted from the replacement of an I.C. engine with an electric motor. APCD Rule 74.9 requires the following emission limits: ROC emissions from rich-burn engines shall not exceed 250 ppmv corrected to 15% oxygen. NOx emissions from rich-burn engines shall not exceed 50 ppmv corrected to 15% oxygen. Therefore, the ERC is for compliance beyond the requirements of APCD Rule 74.9.

ERC emission factors for ROC and NOx are either Rule 74.9 limits or actual emission factors if less than Rule 74.9 limits. Emissions for SOx are calculated using the emission factor from AP-42 of 0.60 lbs/MMCF. Emissions for PM are calculated using the AP-42 emission factor of 10 lbs/MMCF. In addition, APCD rules require that ERC's do not exceed Permitted Emissions.

Engine Make: Intl Har Model:U1 Serial No.:UCUB2317
H.P.: 45 Fuel:natural gas, rich-burn
APCD Rule 74.9:Not in compliance prior to electrification

Engine Use:Oilwell rod pump prime mover

Source Test Date / Company: 11-04-90 CARNOT

Actual Fuel Use: 0.03 MMCF/Yr Permitted: N/A MMCF/Yr

| Permitted Emissions: (Tons/Yr) | | Emission Factor: (lbs/MMCF) | | |
|---|---|---|---|---|
| ROC | Exempt | ROC | 1261.7 | (Source Test) |
| NOx | Exempt | NOx | 187.2 | (Source Test) |
| PM | Exempt | PM | 10.00 | (AP-42) |
| SOx | Exempt | SOx | 0.60 | (AP-42) |

Emission Reduction Credits: (Tons/Yr)

| | | |
|---|---|---|
| ROC | 0.16 | (Actual Fuel Use x Emission factor) |
| NOx | 0.12 | (Actual Fuel Use x Emission factor) |
| PM | <0.01 | (Actual Fuel Use x Emission factor) |
| SOx | <0.01 | (Actual Fuel Use x Emission factor) |

CGSCE May 8, 1992

Permit Number: 0050

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - Intl Harvester Burson 1..... | 45.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 0.3 MMcf | 0.3 MMcf | 0.0 Mcf |

EMISSION FACTORS:

| | TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|---|
| | 5257.1 | 947.1 | 10.0 | 0.6 | 2342.4 | lbs/MMcf |

ROC = 1261.7

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.16 | 0.12 | 0.00 | 0.00 | 0.30 |
| Pounds per Hour: | 0.06 | 0.05 | 0.00 | 0.00 | 0.11 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was .801 scfm.
The expansion factor was 8.88.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 253 ppm (source test)
ROC 969 ppm (source test)
CO 1,028 ppm (source test)

(5) Annual hours of operation estimated to be 5376 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.4 Mcf.

Date Form Prepared: 08-MAY-92 Initials: CG

EMISSION REDUCTION CREDIT SUMMARY
T.B. Properties
Burson & Elkins Leases
Fillmore, CA

Application No.0050-121
Date Application Deemed Complete: 08-12-91
ERC Granted To: Southern California Edison Co.
Date Engine Removed From Service: April 11, 1991

The following Emission Reduction Credits (ERC's) resulted from the replacement of an I.C. engine with an electric motor. APCD Rule 74.9 requires the following emission limits: ROC emissions from rich-burn engines shall not exceed 250 ppmv corrected to 15% oxygen. NOx emissions from rich-burn engines shall not exceed 50 ppmv corrected to 15% oxygen. Therefore, the ERC is for compliance beyond the requirements of APCD Rule 74.9.

ERC emission factors for ROC and NOx are either Rule 74.9 limits or actual emission factors if less than Rule 74.9 limits. Emissions for SOx are calculated using the emission factor from AP-42 of 0.60 lbs/MMCF. Emissions for PM are calculated using the AP-42 emission factor of 10 lbs/MMCF. In addition, APCD rules require that ERC's do not exceed Permitted Emissions.

Engine Make: unknown Model:C108 Serial No.:E15-929
H.P.: 15 Fuel:natural gas, rich-burn
APCD Rule 74.9:Not in compliance prior to electrification

Engine Use:Oilwell rod pump prime mover

Source Test Date / Company: 11-30-90 Petro Chem Environmental

Actual Fuel Use: 0.40 MMCF/Yr Permitted: N/A MMCF/Yr

| Permitted Emissions: (Tons/Yr) | | Emission Factor: (lbs/MMCF) | |
|---|---|---|---|
| ROC | Exempt | ROC | 2781.1 (Source Test) |
| NOx | Exempt | NOx | 1194.2 (Source Test) |
| PM | Exempt | PM | 10.00 (AP-42) |
| SOx | Exempt | SOx | 0.60 (AP-42) |

Emission Reduction Credits: (Tons/Yr)

| | | |
|---|---|---|
| ROC | 0.54 | (Actual Fuel Use x Emission factor) |
| NOx | 0.23 | (Actual Fuel Use x Emission factor) |
| PM | <0.01 | (Actual Fuel Use x Emission factor) |
| SOx | <0.01 | (Actual Fuel Use x Emission factor) |

CGSCE May 12, 1992

Permit Number: 0050

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - Bardsdale 929..... | 1.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 0.4 MMcf | 0.4 MMcf | 0.0 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 11588.5 | 1194.2 | 10.0 | 0.6 | 492.2 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.54 | 0.23 | 0.00 | 0.00 | 0.10 |
| Pounds per Hour: | 0.13 | 0.05 | 0.00 | 0.00 | 0.02 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was .754 scfm.
The expansion factor was 8.88.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 319 ppm (source test)
ROC 2,136 ppm (~~source test~~) → No Source Test - Used Lowest Emissi Factor From Other 2 15HP Engines
CO 216 ppm (source test)

(5) Annual hours of operation estimated to be 8616 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.0 Mcf.

Date Form Prepared: 12-MAY-92 Initials: CG

EMISSION REDUCTION CREDIT SUMMARY
T.B. Properties
Burson & Elkins Leases
Fillmore, CA

Application No.0050-121
Date Application Deemed Complete: 08-12-91
ERC Granted To: Southern California Edison Co.
Date Engine Removed From Service: April 11, 1991

The following Emission Reduction Credits (ERC's) resulted from the replacement of an I.C. engine with an electric motor. APCD Rule 74.9 requires the following emission limits: ROC emissions from rich-burn engines shall not exceed 250 ppmv corrected to 15% oxygen. NOx emissions from rich-burn engines shall not exceed 50 ppmv corrected to 15% oxygen. Therefore, the ERC is for compliance beyond the requirements of APCD Rule 74.9.

ERC emission factors for ROC and NOx are either Rule 74.9 limits or actual emission factors if less than Rule 74.9 limits. Emissions for SOx are calculated using the emission factor from AP-42 of 0.60 lbs/MMCF. Emissions for PM are calculated using the AP-42 emission factor of 10 lbs/MMCF. In addition, APCD rules require that ERC's do not exceed Permitted Emissions.

Engine Make: Intl Der Model:E15RC Serial No.:E15-910
H.P.: 15 Fuel:natural gas, rich-burn
APCD Rule 74.9:Not in compliance prior to electrification

Engine Use:Oilwell rod pump prime mover

Source Test Date / Company: 11-30-90 Petro Chem Environmental

Actual Fuel Use: 0.20 MMCF/Yr Permitted: N/A MMCF/Yr

| Permitted Emissions: (Tons/Yr) | | Emission Factor: (lbs/MMCF) | |
|---|---|---|---|
| ROC | Exempt | ROC | 2781.1 (74.9 limit) |
| NOx | Exempt | NOx | 1650.9 (74.9 limit) |
| PM | Exempt | PM | 10.00 (AP-42) |
| SOx | Exempt | SOx | 0.60 (AP-42) |

Emission Reduction Credits: (Tons/Yr)

| | | |
|---|---|---|
| ROC | 0.34 | (Actual Fuel Use x Emission factor) |
| NOx | 0.20 | (Actual Fuel Use x Emission factor) |
| PM | <0.01 | (Actual Fuel Use x Emission factor) |
| SOx | <0.01 | (Actual Fuel Use x Emission factor) |

CGSCE May 8, 1992

Permit Number: 0050

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - Bardsdale 2 E15-910..... | 15.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 0.2 MMcf | 0.2 MMcf | 0.0 Mcf |

EMISSION FACTORS:

| | TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|---|
| | 11588.5 | 1650.9 | 10.0 | 0.6 | 6904.3 | lbs/MMcf |

ROC = 2781.1

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.34 | 0.20 | 0.00 | 0.00 | 0.85 |
| Pounds per Hour: | 0.08 | 0.05 | 0.00 | 0.00 | 0.20 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was .473 scfm.
The expansion factor was 8.88.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 441 ppm (source test)
ROC 2,136 ppm (source test)
CO 3,030 ppm (source test)

(5) Annual hours of operation estimated to be 8712 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.1 Mcf.

Date Form Prepared: 08-MAY-92 Initials: CG

EMISSION REDUCTION CREDIT SUMMARY
T.B. Properties
Burson & Elkins Leases
Fillmore, CA

Application No.0050-121
Date Application Deemed Complete: 08-12-91
ERC Granted To: Southern California Edison Co.
Date Engine Removed From Service: April 11, 1991

The following Emission Reduction Credits (ERC's) resulted from the replacement of an I.C. engine with an electric motor. APCD Rule 74.9 requires the following emission limits: ROC emissions from rich-burn engines shall not exceed 250 ppmv corrected to 15% oxygen. NOx emissions from rich-burn engines shall not exceed 50 ppmv corrected to 15% oxygen. Therefore, the ERC is for compliance beyond the requirements of APCD Rule 74.9.

ERC emission factors for ROC and NOx are either Rule 74.9 limits or actual emission factors if less than Rule 74.9 limits. Emissions for SOx are calculated using the emission factor from AP-42 of 0.60 lbs/MMCF. Emissions for PM are calculated using the AP-42 emission factor of 10 lbs/MMCF. In addition, APCD rules require that ERC's do not exceed Permitted Emissions.

Engine Make: USS Oil Model:E15RC Serial No.:E15-898
H.P.: 15 Fuel:natural gas, rich-burn
APCD Rule 74.9:Not in compliance prior to electrification

Engine Use:Oilwell rod pump prime mover

Source Test Date / Company: 11-30-90 Petro Chem Environmental

Actual Fuel Use: 0.30 MMCF/Yr Permitted: N/A MMCF/Yr

| Permitted Emissions: (Tons/Yr) | | Emission Factor: (lbs/MMCF) | |
|---|---|---|---|
| ROC | Exempt | ROC | 5365.7 (74.9 limit) |
| NOx | Exempt | NOx | 86.1 (74.9 limit) |
| PM | Exempt | PM | 10.00 (AP-42) |
| SOx | Exempt | SOx | 0.60 (AP-42) |

Emission Reduction Credits: (Tons/Yr)

| | | |
|---|---|---|
| ROC | 0.68 | (Actual Fuel Use x Emission factor) |
| NOx | 0.01 | (Actual Fuel Use x Emission factor) |
| PM | <0.01 | (Actual Fuel Use x Emission factor) |
| SOx | <0.01 | (Actual Fuel Use x Emission factor) |

CGSCE May 8, 1992

Permit Number: 0050

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - Elkins 7..... | 15.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 0.3 MMcf | 0.3 MMcf | 0.0 Mcf |

EMISSION FACTORS:

| | TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|---|
| | 22357.7 | 86.1 | 10.0 | 0.6 | 658.5 | lbs/MMcf |

ROC = 5365.7

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.68 | 0.01 | 0.00 | 0.00 | 0.08 |
| Pounds per Hour: | 0.20 | 0.00 | 0.00 | 0.00 | 0.02 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was .616 scfm.
The expansion factor was 8.88.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 23 ppm (source test)
ROC 4,121 ppm (source test)
CO 289 ppm (source test)

(5) Annual hours of operation estimated to be 6840 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.1 Mcf.

Date Form Prepared: 08-MAY-92 Initials: CG

April 11, 1991

1991 APR -9 AM 10: 06

Mr. Karl Krause
County of Ventura
Air Pollution Control District
Government Center
800 S. Victoria Ave.
Ventura, CA 93009

**SUBJECT: ENGINE REPLACEMENT PURSUANT TO SCE/VCAPCD MERGER MITIGATION AGREEMENT**

Dear Mr. Krause:

This letter is to notify you that the following engines have been removed from service and replaced with electric motors at the Bardsdale and Elkins leases, South of Elkins Golf Course, Fillmore, CA.

| Engine Type | Engine HP | Engine MFG | Engine Ser # | Engine Permit# |
|---|---|---|---|---|
| Process Gas | 15 | Oil Well | E15-929 | Exempt |
| Process Gas | 15 | Oil Well | E15-898 | Exempt |
| Process Gas | 15 | Oil Well | E15-910 | Exempt |
| Process Gas | 45 | International | UCUB2317 | Exempt |

All engines listed above will have been permanently disabled and will be sold for scrap and/or spare parts.

These engines are being replaced under Southern California Edison Company's "Electric Motor Program," therefore, please transfer to SCE the emission reduction credits pursuant to the SCE/VCAPCD Merger Mitigation Agreement signed June 19, 1990.

Sincerely,

Warren W. Thompson
606 Sespe Ave #106
Fillmore, CA 93015

c: Ted Gold, SCE
P. O. Box 4757
Ventura, CA 93007

# ECR Certificate No. 1091

## ERC Certificate Analysis

**ERC Certificate No. 1091** **Issuance Date: May 19, 1993**

**Project Description:**

Two natural gas-fired lean-burn compressor engines were shut down and removed from the former Texaco Gas Plant 7 in the Ventura Avenue Oil Field (former VCAPCD Permit to Operate No. 00020). The function of the compressor engines was replaced by electric motor-driven compressors.

660 BHP Cooper-Bessemer GMV-6, no add-on controls for NOx
800 BHP Cooper-Bessemer GMV-8, with SCR control system for NOx

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 22.98 tpy | 7.21 tpy |
| Emission Reduction – Current Calculation | 22.98 tpy | 7.21 tpy |
| EPA Surplus Emission Reduction (ER1) | 22.98 tpy | 7.21 tpy |
| District Emission Reduction Credit (ER2) | 20.68 tpy | 6.49 tpy |

**Analysis:**

*Real and Quantifiable* – This ERC was originally issued with the caveat that the NOx emission reduction would be reduced to the South Coast AQMD Rule 1110.2 NOx limit of 36 ppm for lean-burn engines greater than or equal to 500 BHP. The original NOx emission reduction of 7.21 tpy above reflects the Rule 1110.2 limit of 36 ppm NOx. Rule 26.4.D.1 requires this reduction as South Coast AQMD Rule 1110.2 was considered to be a "tactic" when the ERC was issued. When this ERC was issued, Rule 74.9 had a 750 ppm ROC emission limit for lean-burn engines, and Rule 1110.2 had a 250 ppm ROC emission limit for lean-burn engines, which would have resulted in an ROC emission reduction of 69.45 tpy ROC and 28.95 tpy ROC, respectively. The emission reduction of 22.98 tpy ROC above is less than 250 ppm ROC as it was limited to the engine's permitted emissions pursuant to Rule 26.6.C. Actual source test data for ROC and NOx showed numbers above the Rule 74.9 ROC limit of 750 ppm and the Rule 1110.2 limit of 250 ppm. Actual fuel usage data for calendar year 1989, and process rate information for 1990, was used to determine actual emissions pursuant to Rule 26.6.C.

*Permanent and Enforceable* – Natural gas engines of this size cannot be operated in the District without a Permit to Operate. The Permit to Operate for the engines was surrendered.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used.

*EPA Surplus Emission Reduction* – Rule 74.9 currently has a 45 ppm NOx emission limit and a 750 ppm ROC emission limit for lean-burn engines. For this engine, the emissions used to calculate the ERC were in compliance with these NOx and ROC limits.

*District Emission Reduction Credit* – Pursuant to Rule 26.4.C.2, the original emission reduction was discounted by 10% when the ERC was issued.

# ECR Certificate No. 1092

## ERC Certificate Analysis

**ERC Certificate No. 1092** **Issuance Date: May 19, 1993**

**Project Description:**

Replacement of eleven 200 bhp Waukesha rich-burn natural gas engines used to pump irrigation water within the Pleasant Valley Water District with electric motors.

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 3.49 tpy | 123.47 tpy |
| Emission Reduction – Current Calculation | 3.49 tpy | 123.47 tpy |
| EPA Surplus Emission Reduction (ER1) | 3.49 tpy | 4.08 tpy |
| District Emission Reduction Credit (ER2) | 3.14 tpy | 111.12 tpy |

**Analysis:**

*Real and Quantifiable* – Pursuant to the emission reduction calculation method in Rule 26.6.E.1, the emission reduction for the eleven 200 bhp Waukesha engines was originally calculated using source test data for the engines and estimated actual fuel use data for two years prior to engine replacement. Information on actual fuel use and total acre-feet of water pumped was available for one year (1989). Information on total acre-feet of water pumped was available for a second year (1990). This data was combined to estimate the actual fuel use for 1990. (Note: 16,816 acre-feet was pumped in 1989 and 15,946 acre-feet was pumped in 1990.)

*Permanent and Enforceable* – Engines used for driving irrigation pumps were not required to obtain a Permit to Operate in the District (former exemption of Rule 23.D.5) when the ERC Certificate was granted. Prior to issuing the original ERC Certificate, the District inspected each of the well sites where these engines had been located and verified that the engines had been replaced with electric motors. As indicated below, although these engines were not required to have a Permit to Operate, they would still be subject to the current version of Rule 74.9.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used. The method of estimated actual fuel use based on one year of actual fuel use and two years of actual acre-feet of water pumped would continue to be considered a reasonable approach. As noted above, approximately the same amount of water was pumped each year.

*EPA Surplus Emission Reduction* – The current version of Rule 74.9 includes an exemption for agricultural engines but it does not include an exemption for engines used for driving irrigation pumps. Because these engines were operated by the Pleasant Valley Water District, they would not be exempt from Rule 74.9 pursuant to the agricultural

engine exemption. Rule 74.9 currently has a 25 ppm NOx emission limit and a 250 ppm ROC emission limit for rich-burn engines. At the time the emission reduction credit was originally issued, District staff calculated that the NOx emission reduction from the engines would be 8.16 tpy if the engines were subject to a 50 ppm NOx limit. The calculated EPA surplus emission reduction is, therefore, 50% (25 ppm/50 ppm) of this number or 4.08 tpy. At the time the emission reduction credit was issued, the source tests of the engines demonstrated that they all complied with the 250 ppm ROC limit.

*District Emission Reduction Credit* – At the time the emission reduction credit was originally issued, the District did not anticipate that the engines would be subject to a future version of Rule 74.9. However, pursuant to Rule 26.4.C.2, the original emission reduction was discounted by 10% when the ERC Certificate was issued.

# ECR Certificate No. 1094

## ERC Certificate Analysis

**ERC Certificate No. 1094** **Issuance Date: May 19, 1993**

**Project Description:**

This ERC was granted for the electrification of forty-one (41) oil well rod pumping units, resulting in the 41 natural gas fired internal combustion engines, at the Vintage Petroleum (formerly Arco) Fee Lease in Ojai, CA.

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 5.47 tpy | 5.77 tpy |
| Emission Reduction – Current Calculation | 5.47 tpy | 5.57 tpy |
| EPA Surplus Emission Reduction (ER1) | 5.47 tpy | 5.57 tpy |
| District Emission Reduction Credit (ER2) | 5.47 tpy | 5.57 tpy |

**Analysis:**

*Real and Quantifiable* – When this ERC Certificate was originally issued on May 19, 1993, it was issued with a limitation contained in Rule 26.4 that part of the emission reduction was accounted for as a further study measure in the AQMP. On July 18, 1997, the emission reduction credit, NOx, was reduced as required by Rule 26.4. and was reissued on July 18, 1997. This reduction occurred before the emission reduction credit was ever used, therefore the revised reduction is considered to be surplus to all requirements.

The 41 engines ranged in size from 19 to 74 BHP. Actual emissions were obtained from source tests on all engines, except for two. Engine operating hour data was submitted for two years for 1989 and 1990. Fuel use data was calculated from the hour data and fuel flow rates determined during the source testing. All actual emissions were adjusted for compliance with Rule 74.9, "Stationary Internal Combustion Engines", as necessary.

*Permanent and Enforceable* – Natural gas engines of 50 BHP and greater cannot be operated in the District without a Permit to Operate. The Permit to Operate for the engines was surrendered when the emission reduction credit certificate was issued. For engines less that 50 BHP, permit conditions were added to enforce a permanent emission reduction.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used. As discussed above, the emission reduction calculations were revised to include the further study measure in the AQMP.

*EPA Surplus Emission Reduction* – As discussed above, the emission reduction credit as revised, complied with Rule 74.9 and the further study measure in the AQMP. Therefore, all of the recalculated (current) reduction is considered to be an EPA surplus emission reduction.

*District Emission Reduction Credit* – The recalculated and original emission reductions shown above do not include (as an addition) the portion of the ERC that was required to be discounted pursuant to Rule 26.4.C. This portion can normally be shown as an EPA surplus reduction as the discount is not required by EPA rules. However, this portion was also considered to be subject to the further study measure and would have also been reduced. Therefore, it was not credited as a part of this analysis.

# ECR Certificate No. 1097

## ERC Certificate Analysis

**ERC Certificate No. 1097** **Issuance Date: February 24, 1994**

**Project Description:**

This ERC was granted for the partial electrification of the Grubb Lease Compressor Plant resulting in the removal of two (2) 330 BHP and two (2) 660 BHP compressor engines.

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 18.30 tpy | 19.46 tpy |
| Emission Reduction – Current Calculation | 14.37 tpy | 4.97 tpy |
| EPA Surplus Emission Reduction (ER1) | 14.37 tpy | 4.97 tpy |
| District Emission Reduction Credit (ER2) | 14.37 tpy | 4.97 tpy |

**Analysis:**

*Real and Quantifiable* – When this ERC Certificate was originally issued on February 24, 1994, it was issued with a limitation contained in Rule 26.4 that part of the emission reduction was accounted for as a further study measure in the AQMP. On July 18, 1997, the emission reduction credit, both ROC and NOx, was reduced as required by Rule 26.4. and was reissued on July 22, 1997. This reduction occurred before the emission reduction credit was ever used, therefore the revised reduction is considered to be surplus to all requirements.

Actual emissions were obtained from source tests on the engines conducted during January 1991. Engine operating hour data was submitted for two years for 1989 and 1990. Fuel use data was calculated from the hour data and fuel flow rates determined during the source testing.

*Permanent and Enforceable* – Natural gas engines of this size cannot be operated in the District without a Permit to Operate. The Permit to Operate for the engines was surrendered when the emission reduction credit certificate was issued.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used. As discussed above, the emission reduction calculations were revised to include the further study measure in the AQMP.

*EPA Surplus Emission Reduction* – As discussed above, the emission reduction credit as revised, complied with Rule 74.9 and the further study measure in the AQMP. Therefore, all of the recalculated (current) reduction is considered to be an EPA surplus emission reduction.

*District Emission Reduction Credit* – The recalculated and original emission reductions shown above do not include (as an addition) the portion of the ERC that was required to be discounted pursuant to Rule 26.4.C. This portion can normally be shown as an EPA surplus reduction as the discount is not required by EPA rules. However, this portion was also considered to be subject to the further study measure and would have also been reduced. Therefore, it was not credited as a part of this analysis.

M:\Engineering Analyses\ERC Certificate Summary\Certificate 1097.doc

# ECR Certificate No. 1104

## ERC Certificate Analysis

**ERC Certificate No. 1104** **Issuance Date: February 27, 1996**

**Project Description:**

Replacement of five rich-burn natural gas engines at the Mel Blanc and Cal Pac Leases in the Sespe Field near Fillmore with electric motors. The five engines, ranging in size from 28 bhp to 60 bhp, were used to power oil well pumps.

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 4.33 tpy | 3.00 tpy |
| Emission Reduction – Current Calculation | 4.33 tpy | 3.00 tpy |
| EPA Surplus Emission Reduction (ER1) | 4.33 tpy | 2.95 tpy |
| District Emission Reduction Credit (ER2) | 3.90 tpy | 2.66 tpy |

**Analysis:**

*Real and Quantifiable* – Pursuant to the emission reduction calculation method in Rule 26.6.E.1, the emission reduction for the five engines was originally calculated using source test data for the five engines and the actual hours of operation data for two years (1989 and 1990) prior to engine replacement. Only one of the engines was rated at 50 bhp or more. This engine was subject to Rule 74.9 that had a 50 ppm NOx emission limit and a 250 ppm ROC emission limit for rich-burn engines. This engine was not in compliance with either emission limit. For this engine, the emission reduction calculation for ROC and NOx was done assuming compliance with the Rule 74.9 emission limits rather than the ROC and NOx emission rates measured during the source test.

*Permanent and Enforceable* – Oil wells cannot be operated in the District without a Permit to Operate. The Permit to Operate that includes the Mel Blanc and Cal Pac Leases is conditioned to require that the five oil wells associated with these engines be free-flowing or operated on electric-motor driven artificial lift equipment. If any of the wells are shut down, another well at the facility is required to be operated in this manner. All new wells in the District are required to be free-flowing or operated on electric-motor driven artificial lift equipment pursuant to the new source review requirement to have BACT.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used. The District would prefer to use actual fuel use data rather than actual hours of operation. For small engines, however, actual hours of operation would generally be accepted.

*EPA Surplus Emission Reduction* – Rule 74.9 currently has a 25 ppm NOx emission limit and a 250 ppm ROC emission limit for rich-burn engines. The one rich-burn engine with a horsepower rating greater than 50 bhp would be required to achieve these emission limits. Its NOx contribution to the original calculation was 0.10 tpy of NOx. The calculated EPA surplus emission reduction has been reduced to 50% (25 ppm/50 ppm) of the originally calculated emission reduction for this engine. Since the ROC emission limit has not changed, the originally calculated ROC emission reduction does not need to be reduced.

*District Emission Reduction Credit* – Pursuant to Rule 26.4.C.2, the original emission reduction was discounted by 10%, to 2.70 tpy of NOx, when the ERC Certificate was issued. Moreover, at the time the emission reduction credit was originally issued, the District had a tactic that anticipated reducing the NOx emission limit for rich-burn engines to 25 ppm. The original emission reduction credit, therefore, contained a condition stating that the emission reduction credit would be reduced to 2.66 tpy of NOx after the effective date of a rule implementing the tactic. On July 18, 1997, the emission reduction credit was reduced pursuant to this condition.

# ECR Certificate No. 1107

# COUNTY OF VENTURA
# RESOURCE MANAGEMENT AGENCY/APCD

Memorandum

TO: Permit to Operate File No. 366-241 April 18, 1994

FROM: Christopher Gallenstein

SUBJECT: Engineering Analysis; ERC Application No. 366-241

Southern California Edison Company (SCE) submitted ERC Application No. 366-241 on July 10, 1992, for the electrification of 8 rich burn internal combustion engines. These engines functioned as prime movers on oil wells owned by Seneca Resources. The application was considered complete on February 10, 1994. Source tests for each engine were conducted by CARNOT and completed between the dates November 28 and December 6, 1990.

These engines were subject to Tactics N-108 and R-108. Tactics N-108 and R-108 were recently implemented by revising Rule 74.9, "Stationary Internal Combustion Engines". As mandated by District Rule 26.4.B.2, emission reductions which result from emissions units subject to a tactic are eligible for banking if the application is deemed complete before the effective date of a rule implementing the tactic. After the effective date, any emission reduction credits subject to the tactic are to be reduced to the levels mandated by the rule implementing the tactic (revised Rule 74.9). The effective date of revised Rule 74.9, implementing Tactics N-108 and R-108, is January 1, 1997.

The following are the engines included in this application:
Note: all engines listed are rich burn engines

| Well Number | BHP | Make/Model |
|---|---|---|
| Goodman No. 4 | 28 | M&M 283-4A |
| Goodman No. 6 | 60 | Waukesha |
| Anza Mohawk No. 57 | 42 | M&M 425-6A |
| Frankel No. B-18 | 80 | M&M 800-6A |
| Frankel No. B-20 | 42 | M&M 425-6A |
| Frankel No. B-21 | 42 | M&M 425-6A |
| Frankel No. B-22 | 80 | M&M 800-6A |
| Anza Orcutt No. 57 | 42 | Waukesha VRG220 |

ERC NO. 1107

Engines rated at greater than 50 BHP are subject to permit/rule compliance/tactic limits. Engines rated at less than 50 BHP are not subject to permit/rule compliance/tactic emission limits. Emissions from engines rated at less than 50 BHP were based on actual emissions. Emissions for engines rated at greater than 50 BHP were calculated using current 74.9 emission limits, as the implementation of revised Rule 74.9 is January 1, 1997, (Rich Burn Engines; ROC: 250 PPMV @15%O2; NOx: 50 PPMV @15%O2; CO: 4500 PPMV @15%O2), permitted emissions, actual emissions, and tactic emission limits (revised Rule 74.9)(ROC:250 PPMV @15%O2; NOx: 25 PPMV @15%O2) as applicable.

Fuel gas analyses were performed only on field gas servicing engines on wells: Anza Mohawk No. 57, Goodman Nos. 4 and 6, and Anza Orcutt 57. The high heating value (HHV) for these engines were based on the fuel analysis. Using this information, the expansion factor sum was estimated to be 10.23. The HHV for the other engines were based on EPA method 19 natural gas using a carbon based "F" factor (1040 Btu/scf). Using this information, the expansion factor sum was estimated to be 9.1. Fuel flow rates for all engines (in SCFM) were measured during each source test using a dry gas meter.

The source test data for the 42 BHP Minneapolis & Moline engine on well Anza Mohawk 57 indicated a ROC emission level of 11,000 PPMV as CH4. The District believes that the ROC source test data for this engine is unrealistically high. The ROC emissions for this engine were therefore obtained by averaging the ROC concentrations of the other two 42 BHP Minneapolis & Moline engines in this application (Frankel B-20 and B-21) to obtain a 461 ppmv as CH4 and using the actual fuel use data for Anza Mohawk 57 (see calculation sheet).

Table 1 lists the hours of operation, fuel flow rates, and total fuel consumption averaged over the two year period (1989, 1990).

Table 2 lists the emissions from each engine using actual emissions, permitted emissions, rule compliance emission limits, and tactic emission limits.

Table 3 lists the amount of emissions in actual emissions, permitted emissions, and emissions with and without tactic emission limits.

Table 4 lists the actual ROC and CO emissions. This information was calculated by using the source test data, correcting the concentrations to 15% O2, and averaging the results.

As required by District Rule 26.4.C.2, emission reductions which result from the replacement of an emissions unit with a lower emitting unit are discounted by 10%, as is the case of replacing internal combustion engines with electric motors. In addition, particulate emissions (PM) are banked as PM10. The conversion of PM to PM10 is

found by using EPA Air Emissions Species Manual, Volume II, Second Edition for internal combustion engines (EPA -450/2-90-001b). The mass fraction of PM in the 0-10 um range is 0.553. Table 3 also lists the amount of emissions available to be banked. One amount includes all emissions subject to Tactic R-108 and N-108 after discounting by 10% and the conversion of PM to PM10. The second amount includes all emissions to be banked without limiting the ERC to the tactic and after discounting by 10% and converting PM to PM10. The use of the difference in the two emissions amounts is limited to projects with a limited lifetime. Calculation sheets are included for each engine.

The emissions reductions resulting from this application were banked as Emission Reduction Credit (ERC) Certificate No. 1107.

Table 1

| Eng No. | BHP | Hours 1989 | Hours 1990 | Hours Average | Fuel Rate SCFM* | Total Fuel MMCF/Yr |
|---|---|---|---|---|---|---|
| GM4 | 28 | 7608 | 4848 | 6228 | 1.575 | 0.59 |
| GM6 | 60 | 7680 | 5924 | 6802 | 2.493 | 1.02 |
| AM57 | 42 | 6600 | 7055.5 | 6827.8 | 2.445 | 1 |
| FB18 | 80 | 7848 | 8243.5 | 8045.8 | 6.961 | 3.36 |
| FB20 | 42 | 8136 | 7909 | 8022.5 | 4.407 | 2.12 |
| FB21 | 42 | 8280 | 8030 | 8155 | 3.35 | 1.64 |
| FB22 | 80 | 7920 | 8028.5 | 7974.3 | 4.318 | 2.07 |
| AO57 | 42 | 8184 | 8211 | 8197.5 | 1.984 | 0.98 |

Table 2

| Eng No. | HP | ROC(250) Tactic/Rule | ROC(A) Actual | ROC(P) Permit | NOx(50) Rule 74.9 | NOx(A) Actual | NOx Permit | NOx(25) Tactic | PM(A) Actual | PM(P) Permit | SOx(A) Actual | SOx(P) Permit | CO(a) Actual | CO(P) Permit | CO(R) Rule 74.9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GM4 | 28 | N/A | 0.14 | N/A | N/A | 0.69 | N/A | N/A | 0 | N/A | 0 | N/A | 0.63 | N/A | N/A |
| GM6 | 60 | 0.19 | 4.77 | 0.6 | 0.11 | 0.27 | 6.26 | 0.05 | 0.01 | 0.03 | 0 | 0 | 27.89 | 0.8 | 6.01 |
| AM57 | 42 | N/A | 0.35 | N/A | N/A | 0.26 | N/A | N/A | 0.01 | N/A | 0 | N/A | 27.95 | N/A | N/A |
| FB18 | 80 | 0.56 | 10.59 | 1 | 0.32 | 0.89 | 10.42 | 0.16 | 0.02 | 0.04 | 0 | 0 | 90.21 | 1.33 | 17.85 |
| FB20 | 42 | N/A | 0.39 | N/A | N/A | 0.23 | N/A | N/A | 0.01 | N/A | 0 | N/A | 32.62 | N/A | N/A |
| FB21 | 42 | N/A | 0.7 | N/A | N/A | 1.9 | N/A | N/A | 0.01 | N/A | 0 | N/A | 0.93 | N/A | N/A |
| FB22 | 80 | 0.34 | 2.67 | 1 | 0.2 | 0.6 | 10.42 | 0.1 | 0.01 | 0.04 | 0 | 0 | 48.81 | 1.33 | 10.85 |
| AC57 | 42 | N/A | 1.73 | N/A | N/A | 0.17 | N/A | N/A | 0 | N/A | 0 | N/A | 35.91 | N/A | N/A |
| | | | 21.34 | | | 5.01 | | | 0.07 | | | | | | |

Table 3

| ENG No. | ROC | ROC Tactic | NOx | NOx Tactic | PM | SOx | CO |
|---|---|---|---|---|---|---|---|
| GM4 | 0.14 | 0.14 | 0.69 | 0.69 | 0.00 | 0.00 | 0.63 |
| GM6 | 0.19 | 0.19 | 0.11 | 0.05 | 0.01 | 0.00 | 0.80 |
| AM57 | 0.35 | 0.35 | 0.26 | 0.26 | 0.01 | 0.00 | 27.95 |
| FB18 | 0.56 | 0.56 | 0.32 | 0.16 | 0.02 | 0.00 | 1.33 |
| FB20 | 0.39 | 0.39 | 0.23 | 0.23 | 0.01 | 0.00 | 32.62 |
| FB21 | 0.70 | 0.70 | 1.90 | 1.90 | 0.01 | 0.00 | 0.93 |
| FB22 | 0.34 | 0.34 | 0.20 | 0.10 | 0.01 | 0.00 | 1.33 |
| AO57 | 1.73 | 1.73 | 0.17 | 0.17 | 0.00 | 0.00 | 35.91 |
| Total: | 4.40 | 4.40 | 3.88 | 3.56 | 0.07 | 0.00 | 101.50 |
| Adjust PM to PM10 −10% | 0.44 | 0.44 | 0.39 | 0.36 | 0.04<br>0.00 | 0.00 | 10.15 |
| To ERC: | 3.96 | 3.96 | 3.49 | 3.20 | 0.04 | 0.00 | 0.00 |

*** CO is not banked in Ventura County

ERC366−3

Table 4

| Eng No. | BHP | ROC@15%O2 Average | CO@15%O2 Average |
|---|---|---|---|
| GM4 | 28 | 314.7 | 815.5 |
| GM6 | 60 | 6244.4 | 20886.8 |
| AM57 | 42 | 460.5* | 21262.4 |
| FB18 | 80 | 4723.1 | 22993.2 |
| FB20 | 42 | 277.1 | 13170.6 |
| FB21 | 42 | 644.2 | 486.4 |
| FB22 | 80 | 1936.3 | 20237.2 |
| AO57 | 42 | 2370.4 | 28037 |

*Concentration derived from averaging FB20 and FB21

Permit Number: 0366

PERMITTED EMISSION CALCULATION SHEET
Internal Combustion-Reciprocating
Natural Gas (Source Test Data)

PERMIT ITEM(S): Actual

| | Capacity |
|---|---|
| 1 - GM4 | 28.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 0.6 MMcf | 0.6 MMcf | 0.1 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 1966.9 | 2341.7 | 10.0 | 0.6 | 2140.7 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.14 | 0.69 | 0.00 | 0.00 | 0.63 |
| Pounds per Hour: | 0.04 | 0.22 | 0.00 | 0.00 | 0.20 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 1.575 scfm.
The expansion factor was 10.23.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 543 ppm (source test)
ROC 315 ppm (source test)
CO 816 ppm (source test)

(5) Annual hours of operation estimated to be 6228 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.3 Mcf.

Date Form Prepared: 14-MAR-94 Initials: CG

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - GM6..... | 60.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 1.0 MMcf | 1.0 MMcf | 0.1 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 39028.2 | 530.4 | 10.0 | 0.6 | 54828.8 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 4.77 | 0.27 | 0.01 | 0.00 | 27.89 |
| Pounds per Hour: | 1.40 | 0.08 | 0.00 | 0.00 | 8.20 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 2.493 scfm.
The expansion factor was 10.23.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 123 ppm (source test)
ROC 6,244 ppm (source test)
CO % 20886.8 ppm (source test)

(5) Annual hours of operation estimated to be 6802 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.6 Mcf.

Date Form Prepared: 14-MAR-94 Initials: CG

Permit Number: 0366

PERMITTED EMISSION CALCULATION SHEET
Internal Combustion-Reciprocating
Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - GM6..... | 60.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 1.0 MMcf | 1.0 MMcf | 0.1 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 1562.5 | 107.8 | 10.0 | 0.6 | 11812.7 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.19 | 0.05 | 0.01 | 0.00 | 6.01 |
| Pounds per Hour: | 0.06 | 0.02 | 0.00 | 0.00 | 1.77 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 2.493 scfm.
The expansion factor was 10.23.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 25 ppm (permit limit)
ROC 250 ppm (permit limit)
CO 4,500 ppm (permit limit)

(5) Annual hours of operation estimated to be 6802 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.6 Mcf.

Date Form Prepared: 02-MAR-94 Initials: cs

Page _____ of _____ EMCALC 2/89

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
Internal Combustion-Reciprocating
Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - GM6..... | 60.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 1.0 MMcf | 1.0 MMcf | 0.1 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 1562.5 | 215.6 | 10.0 | 0.6 | 11812.7 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.19 | 0.11 | 0.01 | 0.00 | 6.01 |
| Pounds per Hour: | 0.06 | 0.03 | 0.00 | 0.00 | 1.77 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 2.493 scfm.
The expansion factor was 10.23.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 50 ppm (permit limit)
ROC 250 ppm (permit limit)
CO 4,500 ppm (permit limit)

(5) Annual hours of operation estimated to be 6802 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.6 Mcf.

Date Form Prepared: 02-MAR-94 Initials: cs

Permit Number: 0373

PERMITTED EMISSION CALCULATION SHEET
Internal Combustion-Reciprocating
Natural Gas Less Than 1000 BHP

PERMIT ITEM(S):
1 - Waukesha VRG 310U #4 Goodman/Arzen Mohawk Hull No. 6 ..... Capacity 60.00 BHP

FUEL USE INFORMATION:

| Fuel | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas: | 5.0 MMcf | 5.0 MMcf (5) | 0.6 Mcf |

EMISSION FACTORS:

| Fuel | TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|---|
| Natural Gas: | 1000.0 | 2500.0 | 10.0 | 0.6 | 320.0 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.60 | 6.26 | 0.03 | 0.00 | 0.80 |
| Pounds per Hour: | 0.14 | 1.43 | 0.01 | 0.00 | 0.18 |

NOTES:

(1) Hourly fuel use derived using the following heating value(s):
Natural Gas: 1050 Btu/cubic foot

(2) Source(s) for emission factors:
Natural Gas: Derived from AP-42 factors

(3) ROC Emissions derived using the following reactivity value(s):
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(4) Emission factors and hourly fuel use derived using a thermal efficiency of 10000 Btu/BHP-Hr

(5) Based on operation at full load-full time

Device #18

Date Form Prepared: 28-NOV-88 Initials: tt



EMCALC 7/85

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - AM57..... | 42.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 1.0 MMcf | 1.0 MMcf | 0.1 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 2878.2 | 526.1 | 10.0 | 0.6 | 55814.7 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.35 | 0.26 | 0.01 | 0.00 | 27.95 |
| Pounds per Hour: | 0.10 | 0.08 | 0.00 | 0.00 | 8.19 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 2.445 scfm.
The expansion factor was 10.23.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 122 ppm (source test)
ROC 461 ppm (source test)
CO % 21262.4 ppm (source test)

(5) Annual hours of operation estimated to be 6827.8 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.4 Mcf.

Date Form Prepared: 13-APR-94 Initials: CG

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - FB18..... | 80.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 3.4 MMcf | 3.4 MMcf | 0.4 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 26258.6 | 529.4 | 10.0 | 0.6 | 53691.0 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 10.59 | 0.89 | 0.02 | 0.00 | 90.21 |
| Pounds per Hour: | 2.63 | 0.22 | 0.00 | 0.00 | 22.42 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 6.961 scfm.
The expansion factor was 9.1.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 138 ppm (source test)
ROC 4,723 ppm (source test)
CO % 22993.2 ppm (source test)

(5) Annual hours of operation estimated to be 8045.8 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.8 Mcf.

Date Form Prepared: 17-MAR-94 Initials: CG

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - FB18..... | 80.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 3.4 MMcf | 3.4 MMcf | 0.4 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 1389.9 | 191.8 | 10.0 | 0.6 | 10507.9 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.56 | 0.32 | 0.02 | 0.00 | 17.66 |
| Pounds per Hour: | 0.14 | 0.08 | 0.00 | 0.00 | 4.39 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 6.961 scfm.
The expansion factor was 9.1.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 50 ppm (permit limit)
ROC 250 ppm (permit limit)
CO 4,500 ppm (permit limit)

(5) Annual hours of operation estimated to be 8045.8 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.8 Mcf.

Date Form Prepared: 17-MAR-94 Initials: CG

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

| PERMIT ITEM(S): | Capacity |
|---|---|
| 1 - FB18..... | 80.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 3.4 MMcf | 3.4 MMcf | 0.4 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 1389.9 | 95.9 | 10.0 | 0.6 | 10507.9 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.56 | 0.16 | 0.02 | 0.00 | 17.66 |
| Pounds per Hour: | 0.14 | 0.04 | 0.00 | 0.00 | 4.39 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 6.961 scfm.
The expansion factor was 9.1.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 25 ppm (permit limit)
ROC 250 ppm (permit limit)
CO 4,500 ppm (permit limit)

(5) Annual hours of operation estimated to be 8045.8 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.8 Mcf.

Date Form Prepared: 17-MAR-94 Initials: CG

Permit Number: 0366

old

PERMITTED EMISSION CALCULATION SHEET
Internal Combustion-Reciprocating
Natural Gas Less Than 1000 BHP

Frankel "B"
B-22, B-39, B-18

PERMIT ITEM(S): Capacity
3 - M & M Models S00-6A..... 80.00 BHP

Permit

FUEL USE INFORMATION:

| Fuel | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas: | 25.0 MMcf | 25.0 MMcf | 2.3 Mcf |

EMISSION FACTORS:

| Fuel | TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|---|
| Natural Gas: | 1000.0 | 2500.0 | 10.0 | 0.6 | 320.0 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 3.00 | 31.25 | 0.13 | 0.01 | 4.00 |
| Pounds per Hour: | 0.55 | 5.71 | 0.02 | 0.00 | 0.73 |

NOTES:

(1) Hourly fuel use derived using the following heating value(s):
Natural Gas: 1050 Btu/cubic foot

(2) Source(s) for emission factors:
Natural Gas: Derived from AP-42 factors

(3) ROC Emissions derived using the following reactivity value(s):
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(4) Emission factors and hourly fuel use derived using a thermal efficiency of 10000 Btu/BHP-Hr

Date Form Prepared: 29-MAY-90 Initials: so

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - FB20..... | 42.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 2.1 MMcf | 2.1 MMcf | 0.3 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 1540.6 | 218.7 | 10.0 | 0.6 | 30754.4 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.39 | 0.23 | 0.01 | 0.00 | 32.62 |
| Pounds per Hour: | 0.10 | 0.06 | 0.00 | 0.00 | 8.13 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 4.407 scfm.
The expansion factor was 9.1.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 57 ppm (source test)
ROC 277 ppm (source test)
CO % 13170.6 ppm (source test)

(5) Annual hours of operation estimated to be 8022.5 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.4 Mcf.

Date Form Prepared: 30-MAR-94 Initials: CG

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - FB21..... | 42.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 1.6 MMcf | 1.6 MMcf | 0.2 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 3580.5 | 2317.1 | 10.0 | 0.6 | 1134.9 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.70 | 1.90 | 0.01 | 0.00 | 0.93 |
| Pounds per Hour: | 0.17 | 0.47 | 0.00 | 0.00 | 0.23 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 3.35 scfm.
The expansion factor was 9.1.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 604 ppm (source test)
ROC 644 ppm (source test)
CO 486 ppm (source test)

(5) Annual hours of operation estimated to be 8155 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.4 Mcf.

Date Form Prepared: 17-MAR-94 Initials: CG

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - FB22..... | 80.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 2.1 MMcf | 2.1 MMcf | 0.3 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 10763.6 | 583.1 | 10.0 | 0.6 | 47255.5 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 2.67 | 0.60 | 0.01 | 0.00 | 48.81 |
| Pounds per Hour: | 0.67 | 0.15 | 0.00 | 0.00 | 12.24 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 4.318 scfm.
The expansion factor was 9.1.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 152 ppm (source test)
ROC 1,936 ppm (source test)
CO % 20237.2 ppm (source test)

(5) Annual hours of operation estimated to be 7974.3 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.8 Mcf.

Date Form Prepared: 17-MAR-94 Initials: CG

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - FB22..... | 80.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 2.1 MMcf | 2.1 MMcf | 0.3 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 1389.9 | 191.8 | 10.0 | 0.6 | 10507.9 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.34 | 0.20 | 0.01 | 0.00 | 10.85 |
| Pounds per Hour: | 0.09 | 0.05 | 0.00 | 0.00 | 2.72 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 4.318 scfm.
The expansion factor was 9.1.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 50 ppm (permit limit)
ROC 250 ppm (permit limit)
CO 4,500 ppm (permit limit)

(5) Annual hours of operation estimated to be 7974.3 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.8 Mcf.

Date Form Prepared: 17-MAR-94 Initials: CG

Permit Number: 0366

# PERMITTED EMISSION CALCULATION SHEET
## Internal Combustion-Reciprocating
## Natural Gas (Source Test Data)

PERMIT ITEM(S):

| | Capacity |
|---|---|
| 1 - FB22..... | 80.00 BHP |

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 2.1 MMcf | 2.1 MMcf | 0.3 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 1389.9 | 95.9 | 10.0 | 0.6 | 10507.9 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 0.34 | 0.10 | 0.01 | 0.00 | 10.85 |
| Pounds per Hour: | 0.09 | 0.02 | 0.00 | 0.00 | 2.72 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 4.318 scfm.
The expansion factor was 9.1.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 25 ppm (permit limit)
ROC 250 ppm (permit limit)
CO 4,500 ppm (permit limit)

(5) Annual hours of operation estimated to be 7974.3 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.8 Mcf.

Date Form Prepared: 17-MAR-94 Initials: CG

Permit Number: 0366

old

PERMITTED EMISSION CALCULATION SHEET
Internal Combustion-Reciprocating
Natural Gas Less Than 1000 BHP

Frmkl "B"
B-22, B-39, B-18

PERMIT ITEM(S): Capacity
3 - M & M Models 900-6A..... 80.00 BHP

Permit

FUEL USE INFORMATION:

| Fuel | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas: | 25.0 MMcf | 25.0 MMcf | 2.3 Mcf |

EMISSION FACTORS:

| Fuel | TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|---|
| Natural Gas: | 1000.0 | 2500.0 | 10.0 | 0.6 | 320.0 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 3.00 | 31.25 | 0.13 | 0.01 | 4.00 |
| Pounds per Hour: | 0.55 | 5.71 | 0.02 | 0.00 | 0.73 |

NOTES:

(1) Hourly fuel use derived using the following heating value(s):
Natural Gas: 1050 Btu/cubic foot

(2) Source(s) for emission factors:
Natural Gas: Derived from AP-42 factors

(3) ROC Emissions derived using the following reactivity value(s):
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(4) Emission factors and hourly fuel use derived using a thermal efficiency of 10000 Btu/BHP-Hr

Date Form Prepared: 29-MAY-90 Initials: so

Permit Number: 0366

PERMITTED EMISSION CALCULATION SHEET
Internal Combustion-Reciprocating
Natural Gas (Source Test Data)

PERMIT ITEM(S): Actual Capacity
1 - A057..... 42.00 BHP

FUEL USE INFORMATION:

| | Baseline Annual | Permitted Annual | Permitted Hourly |
|---|---|---|---|
| Natural Gas | 1.0 MMcf | 1.0 MMcf | 0.1 Mcf |

EMISSION FACTORS:

| TOC | NOx | PM | SO2 | CO | Units |
|---|---|---|---|---|---|
| 14812.7 | 340.7 | 10.0 | 0.6 | 73598.4 | lbs/MMcf |

PERMITTED EMISSIONS:

| | ROC | NOx | PM | SO2 | CO |
|---|---|---|---|---|---|
| Tons per Year: | 1.73 | 0.17 | 0.00 | 0.00 | 35.91 |
| Pounds per Hour: | 0.42 | 0.04 | 0.00 | 0.00 | 8.76 |

NOTES:

(1) Source(s) for emission factors:
TOC, NOx, CO: Derived from Source Test Data
PM, SO2: Derived from AP-42 Factors

(2) TOC factor derived using the following reactivity value:
Natural Gas: ROC = 0.240 * TOC
(Source: EPA Data)

(3) Source test information:
Fuel use (per engine) was 1.984 scfm.
The expansion factor was 10.23.
The ROC average molecular weight was 16.0.
The measured horsepower was unknown.

(4) Emissions in ppm (at 15% O2):
NOx 79 ppm (source test)
ROC 2,370 ppm (source test)
CO % 28037 ppm (source test)

(5) Annual hours of operation estimated to be 8197.5 hours.

(6) Using a thermal efficiency of 10000 Btu/BHP-Hr, the hourly fuel use would be 0.4 Mcf.

Date Form Prepared: 14-MAR-94 Initials: CG

**Seneca Resources Corporation**

*a National Fuel Gas System company*

June 22, 1992

Mr. Karl Krause
Manager of Engineering
Ventura County APCD
702 County Square Drive
Ventura, California 93003

Re: Southern California Edison-Motors Program Conversion, Phase II

Dear Karl:

With letter Seneca Resources Corporation (SRC) advises the District of the successful conversion of eight (8) additional ICE conversions to electric (reference SRC Phase I letter dated November 14, 1991) in accordance with SRC's participation in Southern California Edison's motors program.

The following wells have been converted to electric and subject to Phase II of the program:

1. Mel Blanc 18, 19 and 20
   Consolidated PTO #370

2. Goodman 4 and 6
   Consolidated PTO 366

3. Anza Orcutt and Anza Mohawk
   Consolidated PTO #366

4. Cal Pac #66
   Consolidated PTO #0370

Seneca, hereby relinquishes the claim to the Emission Reduction Credits for the above mentioned conversions to Southern California Edison.

If additional information is required, please advise.

Sincerely,

J. K. Erisman
Operations Administrator

cc: B. McMahan, SRC
Dave Manis, SCE
Kusha Janati, SCE

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P.O. BOX 630/SANTA PAULA, CALIFORNIA 93060

**Seneca Resources Corporation**
*a National Fuel Gas System company*

91 NOV 15 PM 2:03

November 14, 1991

Mr. Karl Krause
Manager of Engineering
Ventura County A.P.C.D
702 County Square Drive
Ventura, California 93003

RE: Southern California Edison-Motors Program Conversion

Dear Karl:

Seneca Resources Corporation participated in Southern California Edison's ICE conversion to electric motor program. This letter is to advise you of the successful conversion of six (6) motors operating pumping units and the respective Permit to Operate (PTO):

1. Harth #1- PTO 0381- 80 HP Minneapolis Moline, serial number 06602924 (currently up for renewal),

2. Frankel B #18- PTO 0366- 90 HP Waukesha, serial number 7817GU (removed from permit by prior renewal),

3. Frankel B #20- PTO 0366- 60 HP Waukesha, serial number VRS 310 U (removed from permit by prior renewal),

4. Frankel B #21- PTO 0366- 42 HP Minneapolis Moline, no serial number (removed from permit by prior renewal),

5. Frankel B #22- PTO 0366- 80 HP Minneapolis Moline, serial number 06602924 (removed from prior renewal),

6. Mel Blanc #525-PTO 0370- 60 HP Waukesha, serial number 363102 (removed from permit by prior renewal).

Seneca, hereby relinquishes the claim to the Emission Reduction Credits for the above mentioned, however in the event Southern California Edison does not claim these credits within two (2) years of the date of this letter, at Seneca's option, be converted and banked by Seneca.

If additonal information is required please do not hesitate to give me a call at (805) 656-2445.

Sincerely,

J.K. Erisman

cc: B. McMahan, SRC
Dave Manis, SCE

# ECR Certificate No. 1109

## ERC Certificate Analysis

**ERC Certificate No. 1109** **Issuance Date: September 7, 1994**

**Project Description:**

Replacement of a 227 BHP Waukesha natural gas engine used to power an agricultural irrigation water well pump owned by the Nisbet Family Trust.

**Emission Reduction Calculation Summary:**

| | ROC | NOx |
|---|---|---|
| Emission Reduction – Original Calculation | 13.41 tpy | 2.14 tpy |
| Emission Reduction – Current Calculation | 13.41 tpy | 2.14 tpy |
| EPA Surplus Emission Reduction (ER1) | 13.41 tpy | 2.14 tpy |
| District Emission Reduction Credit (ER2) | 12.07 tpy | 1.93 tpy |

**Analysis:**

*Real and Quantifiable* – Pursuant to the emission reduction calculation method in Rule 26.6.E.1, the emission reduction for the 227 BHP Waukesha engine was originally calculated using source test data for ROC and NOx, and actual fuel use data for 1990 that represents approximately 1800 hours per year of operation. The engine was exempt from the ROC and NOx limits of Rule 74.9, "Stationary Internal Combustion Engines", based on Rule 74.9.D.5 exemption for engines used in agricultural operations.

*Permanent and Enforceable* – Engines used for driving irrigation pumps were not required to obtain a Permit to Operate in the District (former exemption of Rule 23.D.5) when the ERC Certificate was granted. Prior to issuing the original ERC Certificate, the District inspected the well site where this engine had been located and verified that the engine had been replaced with an electric motor.

*Current Calculations* – The District currently uses the same calculation method for calculating emission reductions from natural gas engines that was originally used.

*EPA Surplus Emission Reduction* – The current version of Rule 74.9 includes the same exemption in Rule 74.9.D.5 for agricultural engines. Therefore, the engine is not subject to the ROC and NOx limits of Rule 74.9.

*District Emission Reduction Credit* – Pursuant to Rule 26.4.C.2, the original emission reduction was discounted by 10% when the ERC Certificate was issued.

# APPENDIX A-3

# DEISEL CONSTRUCTION EQUIPMENT EPA TIER LEVELS

| Table A-3<br>P3 Diesel Construction Equipment EPA Tier Levels | | |
|---|---|---|
| **Construction Equipment** | **Engine Rating HP** | **EPA Tier Level** |
| Tractor | 200 | Tier 4i |
| Forklift | 40 | Tier 4 |
| M2250 ringer/2250 crawler crane | 500 | Tier 4i |
| 150-ton crawler | 300 | Tier 4i |
| Hydraulic crane (55-ton) | 300 | Tier 4i |
| Hydraulic crane (45-ton) | 250 | Tier 4i |
| Articulating boom manlift | 75 | Tier 4 |
| Air compressor | 50 | Tier 4 |
| Backhoe loader | 80 | Tier 4i |
| Front-end loader | 130 | Tier 4i |
| Hydraulic excavator | 250 | Tier 4i |
| Bulldozer | 300 | Tier 4i |
| Bulldozer w/ripper | 300 | Tier 4i |
| Vibratory roller | 125 | Tier 4i |
| Walk behind vibratory roller | 25 | Tier 4 |
| Motor grader | 200 | Tier 4i |
| Jumping jack compactors | 7.5 | Tier 4 |
| Welding machine | 25 | Tier 4 |
| Light plant | 25 | Tier 4 |

# APPENDIX A-4

# VENTURA COUNTY BEACH AREA SOIL DATA

# Particle Size and Coarse Fragments

This table shows estimates of particle size distribution and coarse fragment content of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Depth* to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

*Sand* as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Silt* as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

*Total fragments* is the content of fragments of rock and other materials larger than 2 millimeters in diameter on volumetric basis of the whole soil.

*Fragments 2-74 mm* refers to the content of coarse fragments in the 2 to 74 millimeter size fraction.

*Fragments 75-249 mm* refers to the content of coarse fragments in teh 75 to 249 millimeter size fraction.

*Fragments 250-599 mm* refers to the content of coarse fragments in the 250 to 599 millimeter size fraction.

*Fragments >=600 mm* refers to the content of coarse fragments in the greater than or equal to 600 millimeter size fraction.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

# Report—Particle Size and Coarse Fragments

| Particle Size and Coarse Fragments–Ventura Area, California | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Map symbol and soil name** | **Horizon** | **Depth** | **Sand** | **Silt** | **Clay** | **Total fragments** | **Fragments 2-74 mm** | **Fragments 75-249 mm** | **Fragments 250-599 mm** | **Fragments >=600 mm** |
| | | *In* | *L-RV-H Pct* | *L-RV-H Pct* | *L-RV-H Pct* | *RV Pct* | *RV Pct* | *RV Pct* | *RV Pct* | *RV Pct* |
| CnB—Coastal beaches | | | | | | | | | | |
| Coastal beaches | H1 | 0-6 | -99- | - 1- | 0- 1- 1 | 7 | 7 | — | — | — |
| | H2 | 6-60 | -93- | - 7- | 0- 1- 1 | 7 | 7 | — | — | — |
| W—Water | | | | | | | | | | |
| Water | — | — | — | — | — | — | — | — | — | — |

# Data Source Information

Soil Survey Area: Ventura Area, California
Survey Area Data: Version 8, Sep 25, 2014