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Application for Certification
(15-AFC-01)

Puente Power Project (P3)
Oxnard, CA

Responses to City of Oxnard Data Requests Set 1 (1-46)

September 2015

Submitted to:
The California Energy Commission

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AIR POLLUTION RESEARCH & CONTROL
ENVIRONMENTAL PROJECT MANAGEMENT
A Trinity Consultants Company

TABLE OF CONTENTS

RESPONSES TO DATA REQUESTS SET 1

AIR QUALITY
1 THROUGH 46

APPENDICES

Appendix A Air Quality
Appendix A-1

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

Technical Area: Air Quality
Author: Jacquelyn Record

BACKGROUND: SUPPORTING INFORMATION

The AFC, Appendix C-2, provides emission estimates for operation of the Project; Appendix C-6 provides emission estimates for construction of the Project; and Appendix C-8 provides emission estimates for non-criteria pollutant emissions. These estimates are contained in a large number of Excel spreadsheets presented in pdf format, thus obscuring the underlying calculations. The calculations, which sometimes extend over several linked spreadsheets, are difficult to follow without access to the underlying calculations. While most spreadsheets can be reverse engineered, presuming all assumptions are documented, this is intensely time consuming. Interested parties should not bear this burden when the information is readily available to the applicant. Further, this information has been frequently provided on request by applicants in other CEC proceedings. Finally, some calculations cannot be verified because not all inputs are shown in the printouts.

DATA REQUEST

1. CEC Staff in Data Request Set 1, Data Request 2, requested "original spreadsheet files" for Appendix C-2 and C-8. We request all information provided in response to CEC Data Request 2. In addition, to the extent not covered by CEC Data Request 2, please provide all Excel spreadsheets used to support the emission estimates in the AFC, Appendices C-2, C-6, and C-8, in their native electronic format and unprotected (i.e., showing formulas), if necessary under confidential cover and/or pass-word protected.

RESPONSE

An objection to this data request was filed on August 24, 2015.

2. Please provide all responses and data produced in response to staff and intervener data requests for all issue areas.

RESPONSE

An objection to this data request was filed on August 24, 2015.

3. Please provide a copy of the NRG Generation Unit Repowering request submitted to CAISO on December 13, 2013; additional supporting materials submitted on January 9, 2014; new data submitted on January 27, 2015; and all related information and correspondence. RDA at 97 .

RESPONSE

An objection to this data request was filed on August 24, 2015.

4. Please provide a copy of RAPA bid and all related documents including correspondence with SCE.

RESPONSE

An objection to this data request was filed on August 24, 2015.

BACKGROUND: PM2.5/PM10 EMISSIONS

The AFC estimates a net increase in PM2.5 emissions of 9.8 ton/yr. AFC, Table 4.1-22. The PSD significance threshold for PM2.5 is 10 ton/yr. AFC, Table 4.1-11 & 40 CFR 52.21 (b)(1)(23). If PM2.5 emissions equal or exceed 10 ton/yr, Prevention of Significant Deterioration (PSD) review is required for this pollutant and thus PSD review for greenhouse gas emissions (GHG) is triggered. The PM2.5 emissions are underestimated and are not adequately supported. When these errors are corrected, PSD review is triggered for PM2.5.

5. The PM2.5/PM10 emissions from the new gas turbine during normal operation (10.6 lb/hr) are based on a letter from the turbine vendor. AFC, Appx. C-2, pdf 38. Please provide the following information on this letter: (1) Is this a formal vendor guarantee for the life of the turbine or does it only apply under new and clean conditions? (2) If the subject letter is not the formal vendor guarantee, please provide the formal vendor guarantee for emissions from the new turbine for all criteria pollutants; (3) Do the PM10 and PM2.5 emission rates include both filterable and condensable particulate matter? If not, please justify any exclusion. (4) Please provide stack tests conducted on GE 7HA.01 gas turbines to confirm the accuracy of the PM10 and PM2.5 emission rate of 10.6 lb/hr.

RESPONSE

5-1. As indicated in the January 9, 2015 letter from GE Energy, a copy of which is included in Appendix C-2 of the AFC, "GE confirms that the . . . 7HA.01 gas turbine, installed in a simple cycle configuration and equipped with an SCR and CO catalyst will achieve" the steady state operation emission values identified in the letter, including 10.6 pounds per hour for total particulates. The emission values identified in the January 9, 2015 letter from GE are guarantee values specified in GE's confidential Technical Specification for the project. Based upon experience, the Applicant is confident that the turbines will meet these limits throughout the life of the turbine. Of course, the project will be subject to conditions setting forth emission limits and monitoring requirements to assure compliance over the life of the project.

5-2. Please see response to DR-5-1 above.

5-3. The $PM_{10}/PM_{2.5}$ emissions provided by the gas turbine vendor include both filterable and condensable particulate matter.

5-4. Applicant does not possess the requested information. The project will be subject to conditions setting forth emission limits and monitoring requirements to assure compliance with the particulate emission limits.

6. The BACT analysis concludes that the lowest PM10 emission rate permitted for simple cycle turbines is 5.0 lb/hr, which scales to this project, based on heat input, to 13.4 lb/hr. AFC, Appx. C-3, p. 14. Please provide all evidence that supports the claim that the GE7HA.01 turbine can meet the lower PM10/PM2.5 emission rate of 10.6 lb/hr used in emission calculations.

RESPONSE

Per response to DR-5, the $PM_{10}/PM_{2.5}$ emission rate for this unit is based on information provided by the gas turbine vendor for the specific gas turbine make/model number proposed for the project. See the gas turbine vendor letter included in Appendix C-2, Table C-2.3 of the AFC.

7. The AFC should have rounded up the increase in PM2.5 emissions of 9.8 ton/yr to the same number of significant figures as the factor with the least number of significant figures in its calculations and in the significance threshold, which is one. The properly rounded increase in PM2.5 emissions is 10 ton/yr, which equals the PSD significance threshold of 10 ton/yr. Please identify and support all justifications for not rounding up PM2.5 emissions to 10 ton/yr.

RESPONSE

There is no regulatory requirement to round up to a specific number of significant figures. EPA has described projects with annual potential to emit levels of 99.9 tons/yr as exempt from PSD review, indicating that EPA considers such projects to be below the major source threshold of 100 tons/yr.[1] It is customary in this context to use at least one significant figure beyond the decimal point when reporting annual emissions in units of tons per year. The AFC correctly shows that the net $PM_{2.5}$ emission increase for the project is 9.8 tons/yr, which is lower than the PSD trigger level of 10 tons/yr.

8. The PM2.5/PM10 emission calculations assume 9.00 lbs/hr during GT startup and 9.98 lb/hr during GT shutdowns. AFC, Appx. C-2, pdf 53, 54, 56. These emission rates are unsupported. Please provide a vendor guarantee, stack test, or other reliable primary data that supports these startup/shutdown emission rates.

RESPONSE

The emission levels during the gas turbine startup and shutdown periods shown in Table C-2.2 of Appendix A-2 are based on emission data supplied by the gas turbine vendor. The Applicant is confident in the emission data provided by the gas turbine vendor because GE is one of the top gas turbine manufacturers in the world and has provided emission data for the exact make/model gas turbine proposed for this project. The Applicant does not have access to the primary data used by the vendor to develop its emission estimates.

[1] Memorandum from J. Craig Potter, Assistant Administrator for Air and Radiation (ANR-443) to Regional Administrators, Regions I-X, Improving New Source Review (NSR) Implementation (December 1, 1987).

9. The PM2.5/PM10 emissions from the new diesel generator are based [on] EPA nonroad compression-ignition engine exhaust emission standards for model year 2015 (0.04 g/kW-hr, included in the AFC, Appx. C-2 at pdf 50 and highlighted in yellow). The footnote to this emission factor indicates "[a]t least 50 percent of a manufacturer's engine production must meet these standards during each year of the phase in. Engines not meeting these standards must meet the applicable phase-out standards." The AFC contains no guarantee that the subject diesel generator would be a 2015 model that meets this standard for PM2.5/PM10 or any other pollutant. Please provide a commitment as a mitigation measure to be incorporated in the AFC that the new diesel generator will meet a PM2.5/PM10 emission rate of 0.04 g/kW-hr.

RESPONSE

As discussed in the AFC and the March 19, 2015 application for an authority to construct/determination of compliance submitted to the VCAPCD, the Applicant is requesting approval to install an emergency diesel generator engine certified to the EPA final Tier 4 standards (the Tier 4 final standards shown in Appendix C-2, Table C-2.6b of the AFC). The Applicant is not requesting approval to install an engine certified to an interim and/or a phase-in certification standard. Thus, the Applicant will be committed to installing an emergency diesel generator engine certified to the Tier 4 final $PM_{2.5}/PM_{10}$ emission standard of 0.03 g/kW-hr applicable to generator sets, which is more stringent than the level requested by the City.

10. The PM2.5/PM10 emission factor used to estimate PM2.5/PM10 emissions from the new diesel generator is 0.02 g/bhp-hr. AFC, Appx. C-2, pdf 40. However, the emission factor reported in the attached non-road Diesel EPA Tier 4 certification standard, at Appx. C-2, pdf 50, is 0.04 g/kwh, which converts to 0.03 g/bhp- hr. Please explain the origin of and support the 0.02 g/bhp-hr emission factor used to calculate PM2.5/PM10 emissions from the new diesel generator.

RESPONSE

As shown in AFC (Appendix C-2, Table C-2.6b, Note L), the EPA final Tier 4 $PM_{10}/PM_{2.5}$ certification standard for generator sets above 560 kW is 0.03 g/KW-hr (not 0.04 g/KW-hr as assumed by the City), which converts to the emission factor of 0.02 g/bhp-hr used in the detailed emergency generator calculations included in Appendix C-2, Table C-2.5 of the AFC.

11. Appendix C-2, pdf 57 to 64, contains a netting analysis for PM10/PM2.5. The baseline PM10/PM2.5 emissions, occurring in 2012 to 2013, were calculated using VCAPCD inventory emission factors. Appx. C-2, pdf 57. Please provide stack tests or other reliable primary data sources that support these emission factors.

RESPONSE

The baseline $PM_{10}/PM_{2.5}$ emissions for MGS Units 1 and 2 were based on VCAPCD inventory data. The VCAPCD inventory data are based on actual annual fuel use for Units 1 and 2 and an EPA-established particulate emission factor of 2.5 lbs/mmcf for natural gas combustion.

12. The netting analysis for all criteria pollutants is based on the average emissions occurring in 2012 and 2013. AFC, pp. 4.l-21 Appx. C-2, pdf 63. The AFC asserts without any support that "[t]his 2-year period was determined to be the most representative because it best reflects the current market conditions of the electricity system in the project area." The average fuel use in 2012 and 2013 was higher than in any other two year period within the six year look-back period of 2009 to 2014 and higher even than the current year. The selection of these two high years inflates the baseline, resulting in a lower net emission increase than if, for example, 2010 to 2011 were used. If any other two year period in the look-back period were used, the net increase in PM2.5 emissions would be significant, assuming all other AFC assumptions. Please justify the choice of 2012 to 2013 as the baseline years for PM2.5/PM10. Your justification should include a discussion of "current market conditions" that support your choice, explained within the framework of PSD.

RESPONSE

PSD regulations allow the Applicant to select any consecutive 24-month period during the baseline period to determine the baseline actual emissions for existing units (40 CFR 52.21(b)(48)(i)). "Current market conditions" is not an element of the analysis within the framework of PSD.

13. If warranted by any of your responses to data requests 5 to 12, please conduct a PSD analysis for PM2.5 emissions.

RESPONSE

As discussed in Section 4.1.3.7.1 of the AFC, and confirmed in the responses above, the project does not trigger PSD.

14. The PM2.5/PM10 emission calculations do not include malfunction emissions. Please revise the emission calculations to include an estimate of malfunction emissions.

RESPONSE

The $PM_{2.5}$/PM_{10} emission calculations are based on the potential to emit of the new equipment. Neither the definition of "potential to emit" contained in the Ventura County Air Pollution Control District rules governing non-attainment new source review (VCAPCD Rule 26.21.25) nor the definition of "potential to emit" in the federal regulations governing PSD (40 CFR § 52.21(b)(4)) specifies inclusion of malfunction emissions. Note that this is in contrast to other types of emission calculations, which specifically require inclusion of malfunction emissions (See, e.g., federal PSD definition of "baseline actual emissions" at 40 CFR § 52.21(b)(48)(i)(a)).

15. The AFC, Table 4.1-23, reports a net emission change for PM2.5/PM10 of -28.7 ton/yr. The supporting emission calculations in Appendix C-2 report a net

emission change for PM2.5/PM10 of +9.8 ton/yr. AFC, Appx. C-2, pdf 64. Please resolve this discrepancy and provide corrected emission tables.

RESPONSE

These two values are calculated for different purposes, and as a result are calculated using different methodologies. As discussed in the AFC, Table 4.1-23 (corrected table numbering) shows the net emission increase based on VCAPCD New Source Review equipment replacement calculations. As noted in this table, the net emission change of -28.7 tons/year for $PM_{10}/PM_{2.5}$ is based on the potential to emit levels for MGS Units 1 and 2. The supporting calculations for this table are included in Appendix C-2, Table C-2.15 of the AFC. The net emission change for the project of 9.8 tons/year for $PM_{10}/PM_{2.5}$ referred to in this request is based on the PSD applicability calculations for a PSD facility modification with the results summarized in Table 4.1-22 (corrected table numbering) of the AFC and supporting calculations included In Appendix C-2, Table C-2.14. The PSD net emission calculations are based on the actual baseline emissions for MGS Units 1 and 2.

16. The AFC indicates that the Applicant will review options to mitigate the net emission increase for ROC, PM10, and PM2.5. AFC, p. 4.1-41. Please identify the methods that will be used to mitigate these emissions.

RESPONSE

As discussed in Section 4.1.5 of the AFC, the mitigation proposed for the net emission increase for ROC, PM_{10}, and $PM_{2.5}$ is comprised of the shutdown on MGS Units 1 and 2 and funding local air quality mitigation programs.

BACKGROUND: NOx EMISSIONS

The AFC estimates a net increase in NOx emissions of 31.2 ton/yr. AFC, Table 4.1-22. The PSD significance threshold for NOx is 40 ton/yr. AFC, Table 4.1-11 and 40 CFR 52.21 (b)(1)(23). If NOx emissions equal or exceed 40 ton/yr, Prevention of Significant Deterioration (PSD) review is required for this pollutant. The NOx emissions are underestimated and are not adequately supported. When the omissions and underestimates are corrected, NOx emissions likely will equal or exceed 40 ton/yr, thus triggering PSD review for NOx.

The AFC indicates that during a CTG startup, there are approximately 30 minutes with elevated emissions (emissions higher than during normal operation), followed by 30 minutes of normal operating emissions. Similarly, the AFC indicates that during a CTG shutdown, there are approximately 48 minutes of normal operation, followed by 12 minutes with elevated emissions. AFC, p. 4.1-19. The AFC also reports 98.7 lb/hr of NOx during CTG startups, 22.7 lb/hr of NOx during shutdowns, and 23.4 lb/hr during normal operation. AFC, Tables 4.1-18 and 4.1-19. These estimates are internally inconsistent.

17. The emission calculations assume that hourly NOx shutdown emissions (22.7 lb/hr) are less than normal operating emissions (23.4 lb/hr). AFC, Table 4.1-18. This is technically infeasible as shutdown emissions include 12 minutes of higher than normal operating emissions (23.4 lb/hr) plus 48 minutes of normal operating emissions (23 .4 lb/hr). Thus, there is an error in either the emission calculations

or the statement of facts governing them. Our calculations indicate shutdown emissions should be at least 54.5 lb/hr,[2] which increases the net increase in NOx emission to 39 ton/yr, just 1 ton/yr shy of the NOx PSD significance threshold. Please check the NOx shutdown emissions and revise the NOx emission calculations, including the NOx netting analysis, to correct any errors.

RESPONSE

The emission levels during the gas turbine startup and shutdown periods were provided by the gas turbine vendor. This information shows 4 lbs of NOx during the 12-minute shutdown period. When these emissions are combined with the NOx emissions during the 48 minutes of normal operation emissions prior to the shutdown period (23.4 lbs/hr x 48 min/60 min), the resulting hourly NOx emissions are 22.7 lbs/hr. There are no errors in these calculations. During the shutdown period, the mass emission rate (lbs/hr) can be lower than when the unit is operating at full load as a result of the dramatic reduction in fuel flow rates that occurs during this process.

18. The AFC fails to disclose the emission rate assumed during the 30 minutes of elevated emissions during startup and the 12 minutes of elevated emissions during shutdown, or the source of these estimates.[3] Please disclose the assumed startup/shutdown elevated emission rates/concentrations and provide vendor guaranteed startup/shutdown emission curves (e.g., NOx in ppm versus load/time since start of startup and shutdown) to support these assumptions.

RESPONSE

Please see the responses to DR-8 and DR-17.

[2] The elevated NOx emission rate assumed during startup: (0.5 hr)(23.36 lb/hr) + (0.5 hr)x = 98.68 lb/hr, where x is the emission rate in lb/hr assumed during the elevated portion of a startup. Solving this equation, x= 174 lb/hr during the elevated portion of the startup. Thus, the startup emission rate of 98.68 lb/hr assumes 174 lb/hr of NOx emissions during the elevated portion of the startup.

[3] Our calculations indicate that the 30 minutes of elevated emissions during startup release 174 lb/hr.

19. The PSD netting analysis for NOx used baseline years of 2012 to 2013, during which NOx emissions from existing U1 and U2 averaged 4.9 ton/yr. AFC, Table C-2.14, pdf 64. However, if any other two year period in the six year look-back period from 2009 to 2014 were used, the baseline emissions would be much smaller, ranging from 0.66 to 2.17 ton/yr. AFC, Appx. C-2, Table C-2.13a, pdf 58. The use of any other two year period, coupled with the error in the shutdown NOx emissions discussed in Data Request 18, would result in a net increase in NOx emissions, pursuant to 40 CFR 52.21.b.23.i, that exceeds the PSD significance threshold for NOx of 40 ton/yr, triggering federal PSD review for NOx and thus, federal PSD review for GHG. The AFC asserts without any support that "(t]his 2-year period was determined to be the most representative because it best reflects the current market conditions of the electricity system in the project area." "Current market conditions" is not consistent with the concept of "baseline" prior to the start of construction under 40 CFR 52.21. Please justify the choice of 2012 to 2013 as the baseline years for NOx. Your justification should include a discussion of "current market conditions" as they relate to 40 CFR 52.21.

RESPONSE

As discussed in the response to DR-17, there are no errors in the NOx emission calculations for the new gas turbine. As shown on Table 4.1-20 (corrected table numbering) of the AFC, the maximum expected annual emissions for the new equipment (new gas turbine and emergency generator engine) are approximately 36.1 tons/year. This emission level is below the 40 ton/year PSD trigger level. PSD regulations allow the Applicant to select any consecutive 24-month period during the baseline period to determine the actual baseline emissions for existing units (40 CFR § 52.21(b)(48)(i)).

20. If warranted by any of your responses to Data Requests 17 to 19, please conduct a PSD analysis for NOx emissions.

RESPONSE

As discussed in the response to DR-19, and confirmed in the responses above, the project does not trigger PSD for NOx.

21. Startup and shutdown emissions comprise about 35% of the total annual NOx emissions. Please explain how compliance with startup and shutdown emissions rates will be assured during facility operation. Will CEMS and/or stack tests be used to demonstrate compliance?

RESPONSE

The new gas turbine will be equipped with a NOx CEMS to monitor emissions during all phases of unit operation, including startup/shutdown periods.

22. The NOx emission calculations do not include malfunction emissions. Please revise the emission calculations to include an estimate of malfunction emissions.

RESPONSE

Please see the response to DR-14.

23. Please provide the raw NOx CEMS data for existing Units 1 and 2 relied on to estimate NOx emissions for the lookback period 2009 to 2014 (AFC, Table C-2.13a, pdf 58) in an unlocked Excel spreadsheet, including firing rate in MMBtu/hr and MW generated.

RESPONSE

The NOx CEMS data for existing MGS Units 1 and 2 for the period from 2009 to 2014 are being docketed electronically.

24. The analysis to determine if a project is a major modification under VCAPCD Rule 26.1 concludes that 40.5 ton/yr of NOx offsets are required and that the applicant controls 52.7 tons/yr of offsets. AFC, Appx. C-2, Table C-2.15, pdf 65. The AFC also indicates the applicant has purchased sufficient offsets for the project. AFC, p. 4.1-41. Please provide copies of the offset certificates and supporting files for all NOx offsets you propose to surrender to meet VCAPCD Rule 26.1.

RESPONSE

The NOx emission reduction credits (ERCs) totaling approximately 52.7 tons/year that will be used for the P3 (on an as-needed basis) are Southern California Edison Company ERC certificate numbers 1078, 1079, 1080, 1083, 1084, 1085, 1091, 1092, 1094, 1097, 1104, 1107, and 1109. The Applicant does not have copies of the actual ERC certificates for these ERCs; they are in the possession of the current owner. However, the Applicant has confirmed the validity of these certificates in the District's ERC registry.

25. The BACT analysis identifies operating practices to minimize NOx, CO and VOC emissions during startup and shutdown and concludes these constitute BACT for these periods. However, these periods are excluded from the BACT emission limits. AFC, Appx. C-3, pp. 18-19, Table C-3.4. Please adopt these practices as mitigation measures and explain how compliance with these practices will be confirmed.

RESPONSE

The Applicant is obligated to review BACT for gas turbine startup and shutdown periods and this was done as part of the BACT analysis included in Appendix C-3 of the AFC. While emissions from gas turbine startup and shutdown operations are not subject to compliance with the steady-state BACT emission limits, they are covered by the operating conditions the Applicant provided and analyzed in the AFC. Assuming the CEC and VCAPCD concurs with this

analysis, based on the information provided in the AFC the CEC Staff and VCAPCD will develop conditions limiting emissions during gas turbine startup and shutdown periods.

BACKGROUND: CONSTRUCTION AND DECOMMISSIONING EMISSIONS

The AFC, Appendix C-6, includes construction emissions and air quality modeling of these emissions. However, the emissions are inadequately supported, the significance of the emissions are not discussed, and mitigation is not proposed for significant impacts.

26. Construction and decommissioning emissions were estimated using the CalEEMod model. AFC, Appendix C-6, p. C-6-2. The specific version of this model is not identified. This model has been modified several times, including three releases in 2013: 2013.2, 2013.2.1, and 2013.2. These versions incorporated revised emission factors for entrained fugitive road dust emissions; incorporated the CARB's EMFAC2011 and OFFROAD databases; added nitrous oxide (N_20) calculations from off-road and on-road sources; corrected the unmitigated fugitive dust emissions of PM10 from haul trucks, updated climate zone options; and modified the running loss equation for emissions of ROG from on-road vehicles to match emission factors (per vehicle trip instead of per mile driven).[4] Which version is relied on in the calculations in Appendix C-6? Please provide all CalEEMod model inputs and outputs in original electronic format if not otherwise provided in response to these data requests.

RESPONSE

CalEEMod model version 2013.2.2 (the most recent version of CalEEMod currently available from the CalEEMod website as of the date of preparation of the AFC, available at http://caleemod.com/) was used to calculate the construction and decommissioning emissions shown in Appendix C-6 of the AFC. The CalEEMod model input and output files were included in the Construction/Decommissioning Emission File compact disc filed with the AFC.

27. The AFC refers the reader to Appendix C-6 for construction mitigation. AFC, p. 4.1-41. Appendix C-6, Sec. C-6.2, lists 13 "typical mitigation measures," which were assumed to be in place in the emission calculations. AFC, p. C-6- 3 to C-6-5. However, all of these measures mitigate only particulate matter emissions, neglecting potentially significant NOx impacts. See Data Request 17, 19. Further, the AFC fails to specifically commit to implementing any of these mitigation measures, which were assumed to be in place in the emission calculations. Please expand the construction emission analysis to specifically commit to implement these "typical mitigation measures" plus any additional measures required to reduce NOx and PM10/PM2.5 impacts to a less than significant level.

RESPONSE

The PM_{10}/$PM_{2.5}$ and combustion emissions mitigation measures accounted for in the CalEEMod model construction/decommissioning emission calculations are listed in Appendix C-6 of the

[4] CalEEMod, List of Revisions; Available at: http://www.aqmd.gov/docs/default-source/caleemod/Model/2013.2.2/revisions-2013-2-2.pdf?sfvrsn=0.

AFC (page C-6-3 Fugitive Dust Control Efficiency and page C-6-4 Exhaust Emission Source Assumptions). The Applicant commits to implementing these mitigation requirements.

28. The AFC fails to make any findings as to the significance of the "mitigated" construction emissions, i.e., are the mitigated emissions still significant, requiring additional mitigation? Appendix C-6 includes ambient air quality modeling for construction emissions, but no conclusions are drawn from these analyses nor mitigation proposed, even though they are significant. See Data Request 39. Please discuss the significance of construction emissions, based either on the ambient air quality monitoring or established significance thresholds for construction emissions, such as those adopted by Ventura County and other nearby air pollution control districts.[5] The daily construction emissions reported in AFC, Table C-6-1, exceed the NOx construction significance thresholds of 24 to 25 lb/day established by Ventura, Shasta, Butte and Colusa counties and the PM10 significance threshold of 2.5 lb/day established by nearby San Luis Obispo County Air Pollution Control District. Thus, mitigated NOx and PM10 emissions are significant, requiring mitigation. This is consistent with the results of the air quality modelling. Thus, construction impacts are significant and must be mitigated. Please revise the AFC to evaluate the significance of the "mitigated" construction emissions and propose additional mitigation.

RESPONSE

As discussed in the response to DR-27, the AFC identifies the PM_{10}/$PM_{2.5}$ and combustion emission mitigation measures associated with construction/decommissioning activities. The AFC also summarizes the ambient air quality impacts associated with these construction/decommissioning activities and makes a determination as to whether these impacts will cause or contribute to a violation of state or federal ambient air quality standards. The emissions associated with construction/decommissioning activities are short-term in nature with maximum ambient impacts that tend to occur very near the location of the activities. For example, the 24-hr and annual average PM_{10} ambient impacts due to construction/ decommissioning activities drop below the Federal SILs within approximately 300 feet of the facility fenceline. The Applicant's conclusion is that these activities will not result in any significant unmitigated air quality impacts.

29. The construction emission calculations assume that EPA Tier 4i engines would be used for the larger equipment (>75 hp) and EPA Tier 4 engines for the smaller equipment (<75 hp). AFC, p. C-6-4 . Please specify this as a mitigation measure to assure it is implemented.

RESPONSE

As discussed in Appendix C-6 of the AFC, the construction/decommissioning emission calculations assume the use of a combination of EPA-certified Tier 4i and Tier 4 final equipment (depending on the engine hp rating). Therefore, the use of Tier 4i/4 equipment is an element of

[5] BAAQMD, California Air District CEQA Significance Thresholds, Appendix A, Available at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/ CEQA/Thresholds_Report_Revised_Appendices_ 082309.ashx?la=en.

the project design that has been included in the construction/decommissioning emission analysis included in the AFC.

30. Unpaved/paved surface travel emissions were calculated based on CalEEMod statewide average silt content of 8.5% and silt loading of 0.1 g/m2. AFC, p. C-6-3. Please provide site-specific, measured values for silt content and silt loading.

RESPONSE

The onsite construction material haul roads will be covered with gravel prior to the start of construction. Because this final upgrade to these roads will not occur until prior to construction, it is not possible to sample the roads to determine the spite-specific silt content and silt loading as requested. Therefore, the use of the average default values in the CalEEMod model is reasonable.

31. The AFC indicates that the input to the CalEEMod model – the number, type, and engine rating of construction equipment – were based on information provided by the owner's engineer. AFC, p. C-6-4. Please provide all correspondence containing and/or relating to this information.

RESPONSE

The construction equipment per month, including number, type and engine rating, expected to be on site during construction and decommissioning is provided in AFC Table 2.9-3. Construction is expected to occur over a 21-month period (October 2018 through June 2020). Decommissioning is expected to occur for 3 months following the start of commercial operation of the new unit. Enclosed as Appendix A-1 is the relevant correspondence with the owner's engineer supporting the information summarized in the AFC.

BACKGROUND: AMBIENT AIR QUALITY MODELING

The AFC includes ambient air quality modeling results for normal operation (Table 4.1-27, 4.1-29), the commissioning period (Table 4.1-30), for a comparison to PSD significance thresholds (Table 4.1-31), and for construction (Table C-6-5). These results indicate that the Project would result in significant NOx and PM10 ambient air quality impacts that are not acknowledged or mitigated in the AFC.

32. The AFC concludes that "during normal operation, the results indicate that P3 would not cause or contribute to violations of state or federal air quality standards, with the exception of the 24-hour and annual state PM10 standards [Table 4.1- 29]." The AFC then dismisses this significant impact, arguing "existing background concentrations already exceed state standards." AFC, p. 4.1-28. The significance test is "cause or contribute to violations of state or federal air quality standards." The Project clearly contributes to violations, which is a significant impact. Please explain how this significant impact will be mitigated.

RESPONSE

As shown on Table 4.1-29 (corrected table numbering) of the AFC, following the commissioning period the maximum modeled 24-hour and annual average PM_{10} impacts for the project are 0.7 µg/m^3 and 0.0 µg/m^3, respectively. These maximum impacts are below the 24-hour and annual average EPA significant impact levels (SILs) of 5 and 1 µg/m^3 shown on Table 4.1-31 (corrected table numbering) of the AFC. The primary purpose of federal SILs is to identify a level of ambient impact that is sufficiently low relative to an ambient air quality standard such that the impact can be considered de minimis. Hence, EPA considers a source whose individual impact falls below a SIL to have a de minimis impact on air quality concentrations that already exist. If a project's impacts are below a federal SIL, these impacts are not considered to cause or contribute to a violation of an ambient air quality standard and/or increment.[6] Consequently, since the Project's PM_{10} impacts are below federal SILs, the Applicant does not believe the impacts will cause or contribute to a violation of the 24-hr or annual PM_{10} ambient air quality standards..

33. The AFC concludes that "during commissioning activities P3 would not cause or contribute to violations of state or federal air quality standards, with the exception of the 24-hour state PM10 standard [Table 4.1-30]." The AFC again dismisses this significant impact, arguing "existing background concentrations already exceed state standards." AFC, p. 4.1-29. The significance test is "cause or contribute to violations of state or federal air quality standards." The Project clearly contributes to violations, which is a significant impact. Please explain how this significant impact will be mitigated.

RESPONSE

As shown on Table 4.1-30 (corrected table numbering) of the AFC, during the commissioning period the maximum modeled 24-hour average PM10 impacts for the project are 1.0 µg/m^3. This maximum impact is below the 24-hour average EPA significant impact level (SILs) of 5 µg/m^3 shown on Table 4.1-31 (corrected table numbering) of the AFC. Consequently, since the Project's PM^{10} impacts are below the federal SIL, the Applicant does not believe the impacts will cause or contribute to a violation of the 24-hr PM_{10} ambient air quality standard.

34. The AFC argues that the "maximum project impact, combined with maximum background levels, are below the most stringent state and federal ambient air

[6] 75 FR 64891: "Accordingly, a source that demonstrates that the projected ambient impact of its proposed emissions increase does not exceed the SIL for that pollutant at a location where a NAAQS or increment violation occurs is not considered to cause or contribute to that violation."

quality standards." AFC, p. 4.1-29. However, AFC Tables 4.1-29 (normal operation) and Table 4.1-30 (commissioning), for both new equipment and new equipment plus Unit 3, contain errors for the 98th percentile values. All of the sums are wrong, and much higher than reported. For example, Table 4.1-29 shows the maximum 98th percentile NOx impact is 23.9 ug/m3 and the background is 67.8 ug/m3. The sum of these two equals 91.7 ug/m3, not 69.3 ug/m3, as shown in Table 4.1-29 for new equipment. Similarly, Table 4.1-30 reports the maximum 98th percentile project impact is 70.5 ug/m3 and the background is 67.8 ug/m3. The sum of these two equals 138.3 ug/m3, not 95 ug/m3, as reported in Table 4.1-30 for new equipment. Thus, please check Tables 4. I - 29 and 4.1-30 and provide corrected versions.

RESPONSE

With regards to the federal 1-hr NO_2 standard, the modeling performed for this project adds the measured ambient background concentration for each hour to the modeled project impact, for that hour, at each receptor. The 98th percentile value of the combined result is determined for each receptor. The highest of these values is the value that is reported in Table 4.1-29. The same is true for Table 4.1-20, only using commissioning emissions.

These values are not equal to the sum of the 98th percentile impact for the project plus the 98th percentile impact for measured background because those two impacts do not occur at the same time. The meteorological conditions that result in high background concentrations do not result in high project impacts, and vice versa.

The tables are correct.

35. The 98th percentile analysis of the I-hour NOx standard in Table 4. I-29 adds the modelled impact to the background. The background was calculated as "the 3-year average of the 98th percentile, because that is the basis of the federal standard." AFC, Table 4.1-29, footnote a. This footnote is not adequate to determine whether the applicant followed established EPA guidance on making this determination.[7] Thus, please provide unlocked Excel spreadsheets or other calculations that disclose how the background I-hour NOx concentration was determined for NOx impacts during normal operation, including all background ambient NOx data used in the calculations.

RESPONSE

See the response to DR-34 regarding how background NO_2 levels are accounted for in the modeling of the 1-hr NO_2 federal ambient air quality standard. The detailed AERMOD ambient air quality modeling files are included in the compact disc filed as part of this data response.

36. The 98th percentile analysis of the 1-hour NOx standard in Table 4.1-30 adds the modelled impact to the background. The background was calculated as "the 98th

[7] Memorandum from R. Chris Owen and Roger Brode, Re: Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the $N0_2$ National Ambient Air Quality Standard," September 30, 2014 (EPA 2014).

percentile, because that is the basis of the federal language." AFC, Table 4.1-30, footnote a. This footnote differs from that on Table 4.1-29, excluding the "3-year average." This footnote is not adequate to determine whether the applicant followed established EPA guidance on making this determination, as set out in EPA 2014. Thus, please provide unlocked Excel spreadsheets or other calculations that disclose how the background I -hour NOx concentration was determined for NOx impacts during the commissioning, including all background ambient NOx data used in the calculations.

RESPONSE

See the responses to DR-34 and DR-35.

37. Table 4.1-29 and 4.1-30 indicate that the new equipment and new equipment plus Unit 3 would violate the state 24-hour and annual average PM10 standards. The AFC dismisses these significant impacts, arguing "existing background concentrations already exceed state standards." AFC, p. 4.1-28. However, Ventura County is nonattainment for the State standard. CEC Data Request 2. Elsewhere, the AFC correctly notes that "PSD source emissions must not cause or contribute to an exceedance of any ambient air quality standard." AFC, p. 4.1-8. As the modeled PM10 concentrations contribute to an existing exceedance of the state PM10 standards, this is a significant impact that cannot be dismissed just because the background concentrations already exceed state standards. Thus, please recommend mitigation to eliminate this significant impact.

RESPONSE

See the response to DR-32.

38. The construction air quality analysis in Table C-6-5 for the 98th percentile 1-hour NOx emissions contains a calculation error. The total impact should be 213.5 ug/m3 (145.7 + 67.8 = 213.5), which exceeds the federal NOx standard of 188 ug/m3. Thus, construction NOx air quality NOx impacts are significant and unmitigated. Please revise Table C-6-5 to correct this error, modify the AFC to disclose a significant NOx construction impact, and propose NOx mitigation.

RESPONSE

See the response to DR-34.

39. The construction air quality analysis in Table C-6-5 indicates that both the 24-hour (72.7 v. 50 ug/m3) and annual PM10 (24.6 v. 20 ug/m3) modeled maximum impacts exceed state PM10 standards. These exceedances are not identified as significant construction impacts or mitigated in the AFC. Thus, please revise the AFC to acknowledge these impacts and propose mitigation to reduce them to a less than significant level.

RESPONSE

See the response to DR-28.

40. Please provide all of the modeling input and output files in original electronic format, relied on to estimate operation and construction air quality impacts described in AFC Section 4.1.3.3 and Appendix C-6.

RESPONSE

The HARP2 ambient air quality modeling input and output files for project operation and for construction/decommissioning activities were included in the compact discs filed with the AFC. The AERMOD ambient air quality modeling input and output files for project operation and for construction/decommission activities were inadvertently left off the discs filed with the AFC. The compact disc filed as part of this data response includes both the HARP2 and AERMOD air quality modeling files for project operation and for construction/decommissioning activities.

41. The in-stack N02/NOx ratios used to model NOx emissions from the new gas turbine were provided by the turbine vendor. AFC, p. A-9. Please provide all communications between the turbine vendor and the applicant regarding these in-stack ratios, including supporting test data to verify their accuracy for the GE7HA.01 turbine.

RESPONSE

An objection to this data request was filed on August 24, 2015.

BACKGROUND: GREENHOUSE GAS EMISSIONS

The AFC argues that PSD review does not apply for GHG emissions, as the net emission change is below PSD significance thresholds for all criteria pollutants, except GHG emissions. AFC, p. 4.1-9. However, the Project triggers federal PSD review for both PM2.5 and NOx when the errors in the AFC's analysis are corrected. Thus, PSD review is also triggered for greenhouse gas emissions (GHG) as they exceed the significance threshold of 75,000 ton/yr (AFC, Table 4.1-11) by a significant amount (340,557 MT/yr). AFC, Table C-2.16.

42. Please conduct a top down BACT analysis for GHG emissions that includes energy storage, energy efficiency, and rapid-start combined cycle gas turbines.

RESPONSE

As discussed above, the project does not trigger PSD review for any pollutant. There is no regulatory requirement for this project to perform a BACT analysis for GHG.

43. Please provide all analyses that considered rapid start combined cycle turbines and energy storage options as project alternatives.

RESPONSE

As discussed in Section 5 of the AFC, a key project objective is meeting the obligations of the Resource Adequacy Purchase Agreement (RAPA) with Southern California Edison (SCE). Deployment of alternative generating technology such as combined cycle gas turbine technology and/or energy storage would fail to meet the project objective of meeting the obligations of the RAPA. Therefore, these alternative generating technologies were not considered and will not be considered further.

BACKGROUND: HAZARDOUS AIR POLLUTANT (HAP) EMISSIONS

The AFC estimated HAP emissions using outdated emission factors from AP-42 and the CARB CATEF database. AFC Table C-8.1. Since these emission factors were published, many stack tests have been conducted on gas turbines similar to the GE 7HA.1 proposed for the project.

44. Please provide stack tests obtained from the turbine vendor and from air district files to support normal operation and startup/shutdown HAP emissions.

RESPONSE

The applicant does not possess the requested information for the GE 7HA.01 gas turbine.

45. Please provide all information that supports NRG's assertion that all major stationary sources owned or operated by NRG Energy, Inc. in California are in compliance with all applicable federal Clean Air Act emissions limitations and standards.

RESPONSE

NRG tracks applicable federal Clean Air Act requirements, including those delegated to local air districts, based on the procedures specified in each facility's permits. Compliance with all applicable regulatory requirements is reported as specified in the respective permits.

46. Attachment 2 to the response to Data Adequacy indicates that not all air districts with units were copied. Please explain these omissions.

RESPONSE

The intention was not to copy all air districts in which relevant major stationary sources are located. The Ventura County Air Pollution Control District was copied as the air district within which the Puente Power Project is located and that is responsible for issuing the Preliminary and Final Determinations of Compliance for the project. The San Joaquin Valley Air Pollution Control District was copied because it is providing technical assistance to VCAPCD in its review of the project.

APPENDIX A

AIR QUALITY

APPENDIX A-1

CONSTRUCTION/DECOMMISSIONING ASSUMPTIONS PROVIDED BY OWNER'S ENGINEER

Connell, Anne

From: Connell, Anne
Sent: Thursday, March 05, 2015 6:39 PM
To: Tom W. Andrews (TAndrews@sierraresearch.com); Simon, Ricky
Cc: Bayer, Kelly; Lam, Bill; max pietrantoni (pietrantonimax@gmail.com); Piantka, George; Dawn.Gleiter@nrg.com
Subject: P3 - decommissioning information
Attachments: decom insert MP Revisions 030515.docx; Decom Average Construction Equipment ON site Per Month Jun-Aug 2020.pdf; Decom Staff by month Jun-Aug 2020.pdf

Ricky and Tom

See attached for edits from Max and Bill regarding decommissioning information, assumed to be 3 months, Jun, Jul Aug 2020.

Anne Connell, PE
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AECOM and URS have joined together as one company.
Please note my new AECOM email address.

Connell, Anne

From: max pietrantoni <pietrantonimax@gmail.com>
Sent: Wednesday, March 04, 2015 6:23 PM
To: Connell, Anne; Bayer, Kelly
Cc: Lam, Bill; Ferraro, David
Subject: P3 MGS Decommissioning Information
Attachments: decom insert MP Revisions.docx; Copy of Construction Staff bY Trade - Revised MP.xlsx; Copy of Average Construction Equipment ON site Per Month.xlsx

Anne/Kelly, after consulting with Bill we made a few changes to the decommissioning plant. Attached is a markup of the description and the additions to the craft and construction equipment tables. Anything else on this?

--
Max Pietrantoni
(714) 931-3744
pietrantonimax@gmail.com

3/5/2015	Average Construction Equipment On Site Per Month (For Decommissioning)				
		Fuel	2020		
Construction Equipment	**HP**	**Diesel\Gas**	**JUN**	**JUL**	**AUG**
Decommissioning					
Pickup Truck	150	Gas	1	1	1
1-ton flat bed Truck	150	Gas			
Tractor	200	Diesel			
Forklift	40	Gas	1	1	1
Fuel/Lube truck	150	Gas			
M2250 ringer /2250 crawler crane	500	Diesel			
150 ton crawler	300	Diesel			
HydraulicCrane (55 ton)	300	Diesel			
Hydraulic Crane (45ton)	250	Diesel			
Articulating Boom Manlift (120, 80.60 and 40)	75	Gas			
Air Compressor	50	Gas			
Backhoe Loader	80	Diesel			
Front End Loader	130	Diesel			
Dump Truck (30 ton)	300	Diesel			
Hydraulic Excavator	250	Diesel			
Bulldozer	300	Diesel			
Bull Dozer w/ripper	300	Diesel			
Vibratory roller	125	Gas			
Walk behind Vibratory Roller	25	Gas			
Motor Grader	200	Diesel			
Jumping Jack Compactors	7.5	Gas			
Water Truck	300	Diesel			
Concrete Pumper Truck	350	Diesel			
Concrete mixer truck	250	Diesel			
Welding Machine (Diesel)	25	Diesel			
Light Plant	25	Gas			
Tanker Truck	250	Diesel	3	3	3
Construction Total			5	5	5
DEMOLITION					
Hydrraulic Excavator	250	Diesel			0
1-ton flat bed Truck	150	Gas			0
Forklift	40	Gas			0
Fuel/Lube truck	150	Gas			0
Water Truck	300	Diesel			0
Articulating Boom Manlift (120, 80.60 and 40)	75	Gas			0
Air Compressor	50	Gas			0
Hydraulic Crane (75ton)	350	Diesel			0

Connell, Anne

From: max pietrantoni <pietrantonimax@gmail.com>
Sent: Wednesday, February 25, 2015 5:53 PM
To: Connell, Anne; Bayer, Kelly
Cc: Lam, Bill; Ferraro, David
Subject: P3 Comment Resolution
Attachments: Revised Construction Staffing Table 2.8-1.docx; Table 2.8-3 revised 02_25_2015.docx; Table 2.8-4 Construction Water Final 02_25_2105.docx

Anne, just to make sure, I went through the PD revisions we made especially in the construction areas. I have attached the latest Table revisions that should be in the current PD, although you may already have them.
Table 2.8-1 Construction Staff by Trade shows a peak workforce of 90 total (by the way, in order to address a comment made earlier, this table includes startup and commissioning staffing).
Table 2.8-2 no changes
Table 2.8-3 Average Construction Equipment on Site - It now shows an additional column for March 2020-end of project schedule
Table 2.8-4 Construction Water- the attached is the final look of the Table

As for the decommissioning of U2&3, we envision that it would take place over the course of 6 months at the most, with a low level of activity. A small staff of electricians, pipefitters and laborers will perform the activities described in section 2.5. There will be no heavy construction equipment required (like cranes, etc.). Hazardous chemicals will be hauled away,in their own containers, such as totes, if applicable. The largest hazardous fluid inventory is anticipated to be the lube oil from the steam turbines and other storage tanks. It will be pumped out and hauled away by track. Other tasks will be performed by manual craft activities, such as deenergize and disconnect electrical equipment, mechanically disconnect and cap pumps, piping and other equipment, etc. In our current assessment there will be no heavy construction activities until the start on demolition.

--
Max Pietrantoni

(714) 931-3744
pietrantonimax@gmail.com

Table 2.8-3
Average Construction Equipment On Site Per Month

Construction Equipment	Percent Usage	HP	Fuel (Diesel/ Gas)	2018			2019												2020		
				Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Construction																					
Pickup truck	75%	150	Gas	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	2	1
1-ton flatbed truck	50%	150	Gas																		
Tractor	50%	200	Diesel	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
Forklift	75%	40	Gas	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1
Fuel/lube truck	25%	150	Gas	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
M2250 ringer /2250 crawler crane	25%	500	Diesel	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
150-ton crawler	50%	300	Diesel	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
Hydraulic crane (55-ton)	65%	300	Diesel	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Hydraulic crane (45-ton)	65%	250	Diesel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Articulating boom manlift (120, 80, 60, and 40)	79%	75	Gas	0	0	0	0	0	0	0	0	2	4	6	6	6	4	2	2	1	1
Air compressor	80%	50	Gas	1	1	1	1	1	1	1	2	2	2	2	2	2	1	0	0	0	0
Backhoe loader	40%	80	Diesel	0	0	0	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0
Front-end loader	70%	130	Diesel	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Dump truck (30-ton)	100%	300	Diesel	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Hydraulic excavator	85%	250	Diesel	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Bulldozer	80%	300	Diesel	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulldozer w/ripper	80%	300	Diesel	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vibratory roller	80%	125	Gas	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Walk behind vibratory roller	60%	25	Gas	0	0	0	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0
Motor grader	80%	200	Diesel	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Jumping jack compactors	60%	7.5	Gas	0	0	0	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0
Water truck	50%	300	Diesel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Concrete pumper truck	15%	350	Diesel	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0
Concrete mixer truck	15%	250	Diesel	0	0	0	0	0	0	2	2	2	1	0	0	0	0	0	0	0	0
Welding machine (diesel)	70%	25	Diesel	0	0	0	1	1	1	1	2	2	2	2	1	1	1	1	0	0	0
Light plant	30%	25	Gas	0	0	0	0	0	0	1	1	1	2	2	2	2	2	0	0	0	0
Light plant	30%	25	Gas		1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0
Construction Total				**8**	**12**	**15**	**20**	**20**	**20**	**19**	**23**	**26**	**27**	**25**	**22**	**22**	**18**	**8**	**7**	**5**	**4**
Demolition																					
Hydraulic excavator	100%	250	Diesel	2	2	3	3	3	3	2	1	1	1	0	0	0	0	0	0	0	
1-ton flatbed truck	100%	150	Gas	1	1	2	2	2	2	1	1	1	1	0	0	0	0	0	0	0	
Forklift	100%	40	Gas	1	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	
Fuel/lube truck	50%	150	Gas	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	
Water truck	100%	300	Diesel	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	
Articulating boom manlift (120, 80.60, and 40)	100%	75	Gas	2	2	2	3	3	3	2	1	1	1	0	0	0	0	0	0	0	
Air compressor	100%	50	Gas	1	2	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	
Hydraulic crane (75-ton)	50%	350	Diesel	1	2	2	3	3	3	2	1	1	1	0	0	0	0	0	0	0	