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HYDROGEN ENERGY CALIFORNIA
KERN COUNTY, CALIFORNIA

GENERAL CONFORMITY EVALUATION

Submitted to:

San Joaquin Valley Air Pollution Control District
and
United States Department of Energy

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List of Acronyms

AGR	Acid Gas Removal
BVWSD	Buena Vista Water Storage
CAA	Clean Air Act
CARB	California Air Resource Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CTG	Combustion Turbine Generator
DMV	Department of Motor Vehicles
EKAPCD	Eastern Kern Air Pollution Control District
EOR	Enhanced Oil Recovery
ERCs	Emission Reduction Credit
FHWA	Federal Highway Administration
FR	Federal Register
FTA	Federal Transit Administration
GAC	Granular-Activated Carbon
GCD	General Conformity Determination
GHG	Greenhouse Gases
HECA LLC	Hydrogen Energy California LLC
HHV	Higher Heating Value
HRSG	Heat Recovery Steam Generator
IGCC	Integrated Gasification Combined Cycle
LLC	Limited Liability Company
LTGC	Low Temperature Gas Cooling
MDAQMD	Mojave Desert Air Quality Management District
MHI	Mitsubishi Heavy Industries Ltd.
MPO	Metropolitan Planning Organization
MW	Megawatts
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NSR	New Source Review
O_3	Ozone
Petcoke	Petroleum Coke
PG&E	Pacific Gas and Electric Company
PM_{10}	Particulate Matter Less Than 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter Less Than 2.5 Microns in Diameter
PSA	Pressure Swing Adsorption
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SJVRR	San Joaquin Valley Railroad
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	Sulfur Dioxide
SRU	Sulfur Recovery Unit

Syngas	Synthesis Gas
tpy	Tons Per Year
U.S. DOE	United State Department of Energy
U.S. DOT	United State Department of Transportation
U.S. EPA	United State Environmental Protection Agency
UAN	Urea Ammonium Nitrate
VOC	Volatile Organic Compound
WKWD	West Kern Water District

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle (IGCC) polygeneration project located approximately 7 miles west of the outermost edge of the City of Bakersfield, and 1.5 miles northwest of the unincorporated community of Tupman, in western Kern County, California, as seen in Figure 1. The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR).

Section 176(c)(1) of the Clean Air Act (CAA) requires any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses, or permits, or approves any activity, to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) for achieving and maintaining the National Ambient Air Quality Standards (NAAQS) for criteria pollutants before the action is otherwise approved (General Conformity Rule). The HECA Project will receive financial support from the United States Department of Energy (U.S. DOE), and will be subject to the National Environmental Policy Act (NEPA) environmental review process by the U.S. DOE. Therefore, HECA will be subject to the requirements of the Federal Clean Air Act General Conformity Rule for all nonattainment and maintenance areas affected by the direct and indirect emissions from the Project.

An evaluation of General Conformity was performed for HECA for all the affected nonattainment and maintenance areas in the states of California, Arizona, and New Mexico. Criteria pollutant emissions generated in each Project-affected area from activities associated with Project construction and operation were estimated and compared to the General Conformity *de minimis* thresholds to assess whether a General Conformity Determination (GCD) is required.

The estimated emissions indicate that the total direct and indirect construction and operational emissions of carbon monoxide (CO), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2) are below the applicable General Conformity thresholds for all years of construction and operation in all nonattainment and maintenance areas. Construction and operational emissions of nitrogen oxides (NO_x) exceed the General Conformity threshold each year of construction and operation in the San Joaquin Valley Air Basin (SJVAB). Construction emissions of volatile organic compounds (VOCs) exceed the General Conformity threshold in years 2014 and 2015 in the SJVAB. This requires a General Conformity Evaluation and Determination in the SJVAB for NO_x for construction and operation; and for VOC during construction.

Because the total of direct and indirect emissions from the Project that are subject to the conformity evaluation result in a level of emissions which, together with all other emissions in the nonattainment area, would not exceed the emissions budgets specified in the applicable SIP, the HECA Project will conform to the approved SIP.

The HECA IGCC polygeneration project is located near the community of Tupman, as shown in Figure 1. The Project will gasify a fuel blend of 75 percent coal and 25 percent petroleum coke (petcoke) to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, and used to generate a nominal 300 megawatts (MW) of low-carbon baseload electricity in a Combined Cycle Power Block, low-carbon nitrogen-based products in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR). The HECA Project Site comprises a 453-acre parcel of land on which the HECA IGCC electrical generation facility, low-carbon nitrogen-based products Manufacturing Complex, and associated equipment and processes (excluding off-site portions of linear facilities), will be located. HECA has an Agreement to purchase the HECA Project Site, as well as an additional 653 acres adjacent to the HECA Project Site, herein referred to as the Controlled Area. HECA will have control over public access and future land use on this property. In addition, the HECA Project will include the following linear facilities, which extend off the Project Site.

- Electrical transmission line. An approximately 2-mile-long electrical transmission line will interconnect the Project to a future Pacific Gas and Electric Company (PG&E) switching station east of the Project Site.

- Natural gas supply pipeline. An approximately 13-mile-long natural gas interconnection will be made with PG&E natural gas pipelines north of the Project Site.

- Water supply pipelines and wells. An approximately 15-mile-long process water supply line and up to five new groundwater wells will be installed by the Buena Vista Water Storage District (BVWSD) to supply brackish groundwater from northwest of the Project Site. An approximately 1-mile-long water supply linear from the West Kern Water District (WKWD) east of the Project Site will provide potable water.

A fleet of trucks and trains will be used for the transportation of feedstock and product, to/from the Project Site on a regular basis during commercial operation. HECA is considering two alternatives for transporting the feedstock coal to the Project Site.

- Alternative 1, rail transportation. An approximately 5-mile-long new industrial railroad spur will connect the Project Site to the existing San Joaquin Valley Railroad (SJVRR) Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market.

- Alternative 2, truck transportation. An approximately 27-mile-long truck transport route via existing roads from an existing coal transloading facility northeast of the Project Site.

Based on the transportation alternatives, the Project impact area will include the states of California, Arizona, New Mexico, Oregon, and Washington. For the GCD purposes; however, only the areas that are currently designated by the United States Environmental Protection Agency (U.S. EPA) as nonattainment or maintenance areas are required to be analyzed.

The construction of HECA is anticipated to start in mid-2013 and to be completed in mid-2017. The anticipated Project commercial operation start date is September 2017. During calendar year 2017, both construction activities and operational activities will occur.

Section 176(c)(1) of the Clean Air Act (CAA) requires any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses, or permits, or approves any activity, to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) for achieving and maintaining the National Ambient Air Quality Standards (NAAQS) for criteria pollutants before the action is otherwise approved (General Conformity Rule).

A SIP is a state's compilation of its air quality control plans and rules that will be implemented to achieve compliance with the NAAQS. Criteria pollutants are six major air pollutants for which the U.S. EPA has established NAAQS. These pollutants are ozone (O_3), particulate matter (particulate matter less than 10 microns in diameter [PM_{10}] and particulate matter less than 2.5 microns in diameter [$PM_{2.5}$]), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. This analysis examines emissions from all criteria pollutants and their precursors except lead and ammonia (a $PM_{2.5}$ precursor), because these are not emitted from the non-exempt General Conformity sources (i.e., transportation sources).

Section 176(c)(1) also assigns primary oversight responsibility for conformity assurance to the agencies themselves, not to the U.S. EPA or the states. Specifically, for there to be conformity, a federal action must not contribute to new violations of standards for ambient air quality, increase the frequency or severity of existing violations, or delay timely attainment of standards in the area of concern.

Due to the financial support from the United States Department of Energy (U.S. DOE), the General Conformity Rule is applicable in the San Joaquin Valley Air Basin (SJVAB) and all other nonattainment and maintenance areas affected by the direct and indirect emissions from the Project. HECA has estimated annual Project emissions of nonattainment and maintenance pollutants and their precursors to determine if emissions of these pollutants are above the General Conformity *de minimis* thresholds, and thus subject to the General Conformity Rule, and to determine whether the proposed action conforms to the SIP. This General Conformity evaluation for HECA was prepared to confirm that the proposed action would conform to the SIP.

The General Conformity regulations establish certain procedural requirements that must be followed when preparing a General Conformity evaluation. This section addresses the regulatory background, requirements, and processes of the General Conformity Rule.

2.1 GENERAL CONFORMITY REGULATORY BACKGROUND

The U.S. EPA promulgated the General Conformity Rule on November 30, 1993, in Volume 58 of the Federal Register (FR) Page 63214 (58 FR 63214) to implement the conformity provision of Title I, Section 176(c) of the federal CAA (42 U.S.C. § 7506(c)). Section 176(c)(1) requires that the federal government not engage, support, or provide financial assistance for permit or license, or approve any activity that fails to conform to an approved SIP.

The General Conformity Rule is codified in 40 Code of Federal Regulations (CFR) Part 93 (40 CFR 93), Subpart B, "*Determining Conformity of General Federal Actions to State or Federal Implementation Plans*". The General Conformity Rule applies to all federal actions, except programs and projects that require funds or approval from the U.S. Department of Transportation (U.S. DOT), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), or the Metropolitan Planning Organization (MPO). In lieu of a General Conformity analysis, these latter types of programs and projects must comply with the Transportation Conformity Rule promulgated by U.S. DOT on November 24, 1993 (58 FR 62197).

The federal General Conformity Rule is often incorporated into the state and local regulations. For instance, the San Joaquin Valley Air Pollution Control District (SJVAPCD) has adopted the federal General Conformity regulations in its Rule 9110, "*General Conformity*."

2.2 GENERAL CONFORMITY REQUIREMENTS

As defined in the CAA, Title I, Section 176(c)(1), conformity means to uphold air quality goals through reduction or elimination of NAAQS violations. Accordingly, a proposed action or activity achieves conformity if the associated pollutant emissions would not:

- Cause or contribute to new violations of any NAAQS in any area;
- Increase the frequency or severity of any existing violation of any NAAQS; or
- Delay timely attainment of any NAAQS or interim emission reductions.

The General Conformity Rule establishes conformity in coordination with and as part of the NEPA environmental review process. The General Conformity Rule affects air pollutant emissions associated with actions that are federally funded, licensed, permitted, or approved; and ensures emissions do not contribute to air quality degradation, or prevent the achievement of state and federal air quality goals. In short, General Conformity, if applicable, refers to the process to evaluate plans, programs, and projects to determine and demonstrate that they satisfy the requirements of the CAA and applicable SIP. A positive GCD of a project can be shown through state emission budgets in the SIP, emission offsets, or air quality modeling.

In the SJVAPCD jurisdiction, U.S. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan for 1-hour ozone on March 8, 2010. However, this SIP is based on the revoked federal 1-hour ozone

standard and does not have any projected emissions for milestone years after 2010, as attainment was expected to be achieved by then. On August 30, 2012, U.S. EPA proposed to withdraw this approval 2004 ozone plan. This action will require SJVAPCD to develop new plans for attainment of the 1-hour ozone air quality standards. SJVAPCD is preparing this new 1-hour ozone plan currently and expects to finish and submit this to California Air Resources Board (CARB) and U.S. EPA by 2013. On the other hand, the SJVAPCD's Governing Board adopted the 2007 8-hour Ozone Plan and its amendments in 2007 and 2008, and 2011. This SIP has been approved by CARB and U.S. EPA on March 1, 2012. Therefore, the SJVAPCD's 2007 8-hourOzone Plan is the current applicable SIP to be used for the HECA Project.

SJVAPCD has adopted the 2008 $PM_{2.5}$ Plan, although this plan has not yet been approved by U.S. EPA. Therefore, it was determined that the current applicable SIPs to be used in the SJVAPCD jurisdiction area for this General Conformity analysis are the 2007 8-hour ozone plan, the 2008 $PM_{2.5}$ plan, the U.S. EPA-approved 2007 PM_{10} Maintenance Plan and Request for Re-designation, and the U.S. EPA-approved 1996 Carbon Monoxide Re-designation Request and Maintenance Plan for Ten Federal Planning Areas.

2.3 GENERAL CONFORMITY PROCESSES

This General Conformity analysis was prepared based on guidance from two documents: the U.S. EPA General Conformity Guidance (40 CFR 93, Subpart B) and the U.S. DOE CAA General Conformity Requirements and the NEPA Process (DOE, 2000).

The process to evaluate General Conformity for a proposed federal action involves two major phases or processes: the General Conformity Applicability Review process, and the GCD process. Applicability review process is required for any action that is federally funded, licensed, permitted, or approved, where the total direct and indirect emissions for criteria pollutants and precursors in a nonattainment or maintenance area exceed the General Conformity *de minimis* rates specified in 40 CFR 93.153(b)(1) and (2). If emissions exceed these rates, then a GCD is required.

Based on the definitions from 40 CFR 93.153 and U.S. EPA General Conformity Guidance, direct emissions are caused by the action itself, such as the emissions from the construction of a facility. Indirect emissions are also caused by the action, but are removed from the action in either time or space. For example, emissions from employees commuting to a facility are indirect emissions. Both direct and indirect emissions have to be reasonably foreseeable, meaning that the emissions can be estimated based on acceptable techniques using reasonable assumptions about the type and quantity of equipment used.

The General Conformity requirements and the NEPA Process Guide from the U.S. DOE provide four steps for the General Conformity Applicability process to determine whether the next phase of General Conformity evaluation requirements apply to a federal action, and therefore, that a GCD may be needed. The four steps are:

- Step 1 – Determine whether criteria pollutants and their precursors would be emitted.
- Step 2 – Determine whether emissions of criteria pollutants and precursors would occur in a nonattainment or maintenance area.
- Step 3 – Determine whether the action is exempt from the General Conformity Rule.

- Step 4 – Estimate emissions and compare them with the General Conformity *de minimis* threshold emissions rates.

After completing the General Conformity Applicability review process, if the General Conformity Rule is applicable for the proposed action, then a GCD process is required. The GCD process is an assessment of whether the proposed action conforms to the applicable SIP. Positive General Conformity can be shown through state emission budgets, emission offsets, air quality modeling, or any combination of these three processes.

Per 40 CFR 51.859(d) the Conformity Analysis must be based on the total direct and indirect emissions from the action for:

- for nonattainment areas, the year mandated in the CAA for attainment and for maintenance areas, the farthest year for which emissions are projected in the approved maintenance plan;
- the year during which the emissions for the proposed action are projected to be the greatest on an annual basis; and
- any year for which the applicable SIP specifies an emission budget.

2.4 EXEMPTION FROM GENERAL CONFORMITY ANALYSIS

As noted previously, the General Conformity requirements apply to a federal action if the net project emissions equal or exceed the General Conformity *de minimis* emission rates. The only exceptions to this applicability criterion are the topical exemptions included in 40 CFR 93.153 (c), (d), and (e). However, the emissions caused by HECA do not meet any of these exempt categories, except the portion of an action that includes major or minor new or modified stationary sources that require a permit under the new source review (NSR) program or the prevention of significant deterioration program (40 CFR 93.153 (d)(1)). In addition to these topical exemptions, the General Conformity regulations allow each federal agency to establish a list of activities that are presumed to conform (40 CFR 93.153 (f)). The U.S. DOE has not established any other exemption actions or activities for HECA.

Emissions from the operation of the HECA stationary sources will be permitted through the SJVAPCD under NSR, and are therefore exempt from GCD, and thus are not included in the total General Conformity evaluation emission analysis.

A Conformity Determination is required for each criteria pollutant and its precursors where the total of direct and indirect annual emissions of the criteria pollutant or its precursors in a federal nonattainment or maintenance area would equal or exceed the General Conformity *de minimis* thresholds. The CAA defines nonattainment areas as geographic regions designated as not meeting one or more of the NAAQS. It requires that a SIP be prepared for each nonattainment area, and a maintenance plan be prepared for each former nonattainment area that has subsequently demonstrated compliance with the standards. The nonattainment or maintenance status and the applicable General Conformity *de minimis* thresholds in all the areas potentially affected by HECA are shown in Table 1. The pollutant with the most nonattainment areas in the state of California is ozone; these areas are shown on Figure 1.

The *de minimis* thresholds are based on the severity of the nonattainment status. In the SJVAB, for example, U.S. EPA has designated the basin as extreme nonattainment for O_3, thus the applicable *de minimis* thresholds for O_3 precursors (VOC and nitrogen oxides (NO_x)) are set to 10 tons per year. For other pollutants (PM_{10}, SO_2, and $PM_{2.5}$), the thresholds are set at 100 tons per year. Although Project-related activities may occur in other regions than those listed in Table 1, those regions are in attainment for all pollutants, and thus are not included in the General Conformity evaluation.

Table 1
Nonattainment and Maintenance Status and General Conformity *De Minimis* Thresholds

Pollutant	Nonattainment/Maintenance Status	General Conformity *De Minimis* Thresholds (tons per year)
San Joaquin Valley Air Basin, California under the jurisdiction of San Joaquin Valley Air Pollution Control District (SJVAPCD)		
O_3	Nonattainment (Extreme)	NA
NO_x (as O_3 precursor)	NA	10
VOC (as O_3 precursor)	NA	10
CO	Maintenance	100
PM_{10} (direct emissions)	Maintenance	100
$PM_{2.5}$ (direct emissions)	Nonattainment	100
SO_2 (as $PM_{2.5}$ precursor)	NA	100
NO_x (as $PM_{2.5}$ precursor)	NA	100
Ammonia or VOC (as $PM_{2.5}$ precursor)	NA	SJVAPCD determined not significant for 2008 $PM_{2.5}$ Plan

Table 1
Nonattainment and Maintenance Status and General Conformity *De Minimis* Thresholds (Continued)

Pollutant	Nonattainment/Maintenance Status	General Conformity *De Minimis* Thresholds (tons per year)
Los Angeles-South Coast Air Basin, California under the jurisdiction of South Coast Air Quality Management District (SCAQMD)		
O_3	Nonattainment (Extreme)	NA
NO_x (as O_3 precursor)	NA	10
VOC (as O_3 precursor)	NA	10
NO_x	Maintenance	100
CO	Maintenance	100
PM_{10} (direct emissions)	Nonattainment (Serious)	70
$PM_{2.5}$ (direct emissions)	Nonattainment	100
SO_2 (as $PM_{2.5}$ precursor)	NA	100
NO_x (as $PM_{2.5}$ precursor)	NA	100
Ammonia or VOC (as $PM_{2.5}$ precursor)	NA	100
East Kern County, California under the jurisdiction of Eastern Kern Air Pollution Control District (EKAPCD)		
O_3	Nonattainment (Marginal)	NA
NO_x (as O_3 precursor)	NA	100
VOC (as O_3 precursor)	NA	100
PM_{10} (direct emissions)	Nonattainment (Serious)	70
Los Angeles-San Bernardino Counties (West Mojave Desert), California under the jurisdiction of Mojave Desert Air Quality Management District (MDAQMD)		
O_3	Nonattainment (Severe - Part of San Bernardino County)	NA
NO_x (as O_3 precursor)	NA	25
VOC (as O_3 precursor)	NA	25
San Bernardino Co (Mojave Desert), California under the jurisdiction of Mojave Desert Air Quality Management District (MDAQMD)		
PM_{10} (direct emissions)	Nonattainment (Moderate)	100
Sacramento Metro, California under the jurisdiction of Sacramento Metropolitan Air Quality Management District (SMAQMD)		
O_3	Nonattainment (Severe)	NA
NO_x (as O_3 precursor)	NA	25

Table 1
Nonattainment and Maintenance Status and General Conformity *De Minimis* Thresholds
(Continued)

Pollutant	Nonattainment/Maintenance Status	General Conformity *De Minimis* Thresholds (tons per year)
VOC (as O_3 precursor)	NA	25
CO	Maintenance	100
PM_{10} (direct emissions)	Nonattainment (Moderate)	100
$PM_{2.5}$ (direct emissions)	Nonattainment	100
SO_2 (as $PM_{2.5}$ precursor)	NA	100
NO_x (as $PM_{2.5}$ precursor)	NA	100
Ammonia or VOC (as $PM_{2.5}$ precursor)	NA	100
Yuba City-Marysville, California under the jurisdiction of Feather River Air Quality Management District (FRAQMD)		
O_3	Nonattainment (Marginal)	NA
NO_x (as O_3 precursor)	NA	100
VOC (as O_3 precursor)	NA	100
$PM_{2.5}$ (direct emissions)	Nonattainment	100
SO_2 (as $PM_{2.5}$ precursor)	NA	100
NO_x (as $PM_{2.5}$ precursor)	NA	100
Ammonia or VOC (as $PM_{2.5}$ precursor)	NA	100
Chico, California under the jurisdiction of Butte County Air Quality Management District (BCAQMD)		
O_3	Nonattainment (Marginal)	NA
NO_x (as O_3 precursor)	NA	100
VOC (as O_3 precursor)	NA	100
CO	Maintenance	100
$PM_{2.5}$ (direct emissions)	Nonattainment	100
SO_2 (as $PM_{2.5}$ precursor)	NA	100
NO_x (as $PM_{2.5}$ precursor)	NA	100
Ammonia or VOC (as $PM_{2.5}$ precursor)	NA	100

Table 1
Nonattainment and Maintenance Status and General Conformity *De Minimis* Thresholds (Continued)

Pollutant	Nonattainment/Maintenance Status	General Conformity *De Minimis* Thresholds (tons per year)
Arizona under the jurisdiction of Arizona Department of Environmental Quality (ADEQ)		
O_3	Nonattainment (Marginal) - Maricopa and Pinal Counties	NA
NO_x (as O_3 precursor)	NA	100
VOC (as O_3 precursor)	NA	100
CO	Maintenance – Maricopa and Pima Counties	100
SO_2	Nonattainment – Pinal county, Maintenance – 4 counties	100
PM_{10} (direct emissions)	Nonattainment or Maintenance – Moderate to Serious – 12 counties	70
$PM_{2.5}$ (direct emissions)	Nonattainment - Santa Cruz and Pinal Counties	100
SO_2 (as $PM_{2.5}$ precursor)	NA	100
NO_x (as $PM_{2.5}$ precursor)	NA	100
Ammonia or VOC (as $PM_{2.5}$ precursor)	NA	100
New Mexico under the jurisdiction of New Mexico Environment Department – Air Quality Bureau (NMED-AQB)		
CO	Maintenance (Bernalillo County)	100
SO_2	Maintenance – Grant County	100
PM_{10} (direct emissions)	Nonattainment (Moderate) - Dona Ana County	100

NA = Not Applicable
References: U.S. EPA Greenbook (U.S. EPA, July 20, 2012)

Nonattainment and maintenance criteria pollutant and precursor emissions were calculated for each calendar year of the construction and operation phases of the Project, as well as the year when construction and operational activities overlap. The calculations used methodologies recommended and approved by the CARB and the U.S. EPA. The following are calculation methodologies used for both the construction and operational emissions.

On-road construction and operational vehicles emissions were estimated by multiplying the emission factors generated from the CARB's EMFAC2007 (CARB, 2007a) model by the numbers of vehicles and the mileage driven. Although EMFAC2011 (CARB, 2011) was released in September 2011, it is not yet approved by U.S. EPA for use in federal projects for NEPA and federal conformity analyses; thus, emission factors from EMFAC2007 were applied. Fugitive dust emissions generated in both the construction and operation phases were estimated by using the emission factors obtained from the U.S. EPA AP-42 publication (U.S. EPA, 1995). It should be noted that all the calculated emissions are mitigated emissions that incorporate the Project-committed feasible emission control measures. Detailed construction and operational emissions calculation methodologies are discussed in Section 4.1 and 4.2.

4.1 CONSTRUCTION EMISSIONS

The primary emission sources during construction will include heavy construction equipment, construction vehicles, and fugitive dust from disturbed areas due to grading, excavating, and construction of project structures. Different areas within the Project Site will be disturbed at different times during the 49-month overall construction period, which includes site preparation, construction, and up to 18 months of commissioning. Each phase has some overlap, but all construction activities are included in the emission estimates. Construction activities will occur 22 days per month, with a single-shift 10-hour workday.

Construction emissions were calculated from sources in three different categories: on-site sources, sources associated with linear construction (e.g., pipelines, transmission line, rail spur, etc.), and off-site sources. On-site sources include construction equipment, delivery trucks entering and exiting the site, and commuter vehicles entering and exiting the site. Linear sources include all construction equipment required for the total linear construction. Off-site sources include worker commuting vehicles and delivery trucks while traveling off site. Trip distances were based on the assumption that worker commuting vehicles and delivery trucks would travel within Kern County.

The schedule of equipment needed during construction and the estimated number of pieces of equipment that would operate during each month of the construction effort are presented in Appendix A. Emissions from equipment will occur over a 49-month construction period. The list of fueled equipment needed during each month of the construction effort served as the basis for estimating pollutant emissions throughout the term of construction.

Construction equipment and vehicle exhaust emissions were estimated using equipment lists and construction scheduling information provided by the Project design engineering firm. The off-road construction equipment emissions were estimated by multiplying the emission factors generated from CARB's OFFROAD2007 model (CARB, 2007b) by the amount of power produced and by the operating hours, for each equipment type. Emission factors specific to Kern County in calendar year 2013 were used.

Fugitive dust emissions resulting from on-site soil disturbances were estimated using the U.S. EPA AP-42 emission factors for dirt piling, grading, bulldozing and dirt-pushing, and travel on unpaved roads. A dust control efficiency of 67 percent for Project Site and linear construction activities was assumed to be achieved for these activities by frequent watering and speed control.

Emissions from on-road delivery trucks and worker commute trips were estimated using trip generation information presented in Appendix A, and emission factors provided by the EMFAC2007 model for on-road vehicles. Construction workers were assumed to commute to the Project Site from within Kern County.

Table 2 presents the estimated construction emissions by calendar year, from the start of construction in June 2013 through the estimated completion in June 2017. Emissions were calculated for each year of construction to determine the year with the highest emissions for each pollutant. It is important to note that all the emissions in Table 2 are generated within SJVAB, because the Project is not expected to have delivery trucks or worker commuting vehicles traveling out of the boundary of SJVAB during construction. Emissions from commissioning of the stationary sources permitted under NSR are not included in the summary in Table 2, because these are exempt from GCD requirements, although emissions from worker commuter vehicles and delivery trucks associated with commissioning are included in the construction emissions. Detailed calculation spreadsheets are provided in Appendix A, which show the calculated emissions for all construction activities and equipment, as well as the data and assumptions used for the calculations.

4.2 OPERATIONAL EMISSIONS

The criteria pollutant emissions generated during operation of the Project will come from the onsite stationary, area, fugitive, mobile sources, and the offsite transportation sources. However, the onsite stationary, area, and fugitive sources will be required to obtain NSR permits from SJVAPCD, and therefore are exempt from the General Conformity analysis pursuant to 40 CFR 93.153.

4.2.1 Onsite Emissions Covered by NSR

The HECA Project will produce low-carbon baseload electricity, low-carbon nitrogen–based products in an integrated Manufacturing Complex, and CO_2 for EOR. The Gasification Block will feature Mitsubishi Heavy Industries, Ltd. (MHI) oxygen-blown dry-feed gasifier, Shift, Low Temperature Gas Cooling (LTGC), Mercury Removal, Acid Gas Removal (AGR), Sulfur Recovery, Tail Gas Treating, EOR CO_2 Compression Units, and associated utilities to produce hydrogen-rich fuel. Sulfur and mercury components will be removed, and CO_2 will be captured and compressed for EOR and resulting sequestration.

The Combined Cycle Power Block will generate approximately 405 MW of gross power, and will provide approximately 300 MW output of low-carbon baseload electricity. The Power Block will feature one MHI 501 GAC® (Granular-Activated Carbon) combustion turbine generator (CTG) that will be fueled with hydrogen-rich fuel from the gasification plant, and natural gas as a backup fuel; a heat recovery steam generator (HRSG) with duct firing on a combination of hydrogen-rich fuel and Pressure Swing Adsorption (PSA) off-gas; and a condensing steam turbine-generator.

Table 2
Estimated Criteria Pollutant Construction Emissions

Year		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
		Annual Emissions (tons per year)					
2013 (June – December)							
Onsite	Construction Equipment	12.4	23.7	8.9	2.8	0.0	3.8
	Trucks	1.0	2.3	9.1	1.0	0.0	0.6
	Vehicles	0.0	0.0	0.6	0.1	0.0	0.0
	Onsite Total	**13.4**	**26.0**	**18.6**	**3.8**	**0.0**	**4.4**
Offsite	Linears Equipment	0.0	0.0	0.0	0.0	0.0	0.0
	Trucks	4.8	23.7	1.9	1.0	0.0	1.1
	Vehicles	1.8	0.2	0.1	0.0	0.0	0.1
	Offsite Total	**6.6**	**23.9**	**2.0**	**1.0**	**0.0**	**1.1**
2013 Total		**20.0**	**49.9**	**20.6**	**4.9**	**0.1**	**5.5**
2014							
Onsite	Construction Equipment	21.8	35.9	9.4	3.3	0.0	7.0
	Trucks	0.3	0.7	1.6	0.2	0.0	0.2
	Vehicles	0.3	0.0	3.6	0.4	0.0	0.0
	Onsite Total	**22.4**	**36.6**	**14.6**	**3.8**	**0.0**	**7.2**
Offsite	Linears Equipment	11.8	19.7	2.4	1.2	0.0	3.5
	Trucks	2.0	10.3	0.8	0.4	0.0	0.4
	Vehicles	20.2	2.4	0.7	0.2	0.0	0.6
	Offsite Total	**34.0**	**32.4**	**3.9**	**1.9**	**0.1**	**4.6**
2014 Total		**56.4**	**69.0**	**18.5**	**5.7**	**0.1**	**11.9**
2015							
Onsite	Construction Equipment	28.6	47.4	8.5	3.4	0.1	9.4
	Trucks	0.3	0.7	1.4	0.2	0.0	0.2
	Vehicles	0.7	0.1	8.1	0.8	0.0	0.1
	Onsite Total	**29.6**	**48.1**	**18.0**	**4.4**	**0.1**	**9.6**
Offsite	Linears Equipment	2.4	3.9	0.5	0.3	0.0	0.8
	Trucks	2.0	10.3	0.8	0.4	0.0	0.4
	Vehicles	52.2	6.3	1.7	0.6	0.1	1.6
	Offsite Total	**56.7**	**20.5**	**3.0**	**1.3**	**0.1**	**2.8**
2015 Total		**86.3**	**68.6**	**21.1**	**5.7**	**0.1**	**12.4**

Table 2
Estimated Criteria Pollutant Construction Emissions
(Continued)

Year		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
		Annual Emissions (tons per year)					
2016							
Onsite	Construction Equipment	19.1	29.4	6.7	2.3	0.0	6.3
	Trucks	0.3	0.7	1.3	0.2	0.0	0.2
	Vehicles	0.6	0.0	6.6	0.7	0.0	0.0
	Onsite Total	**20.0**	**30.2**	**14.6**	**3.2**	**0.0**	**6.6**
Offsite	Linears Equipment	0.0	0.0	0.0	0.0	0.0	0.0
	Trucks	2.0	10.3	0.8	0.4	0.0	0.4
	Vehicles	44.4	5.3	1.5	0.5	0.1	1.4
	Offsite Total	**46.5**	**15.6**	**2.3**	**0.9**	**0.1**	**1.8**
2016 Total		**66.4**	**45.8**	**16.9**	**4.1**	**0.1**	**8.4**
2017 (January – June)							
Onsite	Construction Equipment	2.7	3.8	1.2	0.3	0.0	0.8
	Trucks	0.1	0.3	0.8	0.1	0.0	0.1
	Vehicles	0.1	0.0	1.0	0.1	0.0	0.0
	Onsite Total	**2.9**	**4.2**	**3.0**	**0.5**	**0.0**	**0.9**
Offsite	Linears Equipment	0.0	0.0	0.0	0.0	0.0	0.0
	Trucks	1.0	5.2	0.4	0.2	0.0	0.2
	Vehicles	6.0	0.7	0.2	0.1	0.0	0.2
	Offsite Total	**7.0**	**5.9**	**0.6**	**0.3**	**0.0**	**0.4**
2017 Total		**9.9**	**10.1**	**3.7**	**0.8**	**0.0**	**1.3**

The Manufacturing Complex is an integrated complex that will produce approximately 1 million tons per year of nitrogen-based products, including urea, urea ammonium nitrate (UAN), and anhydrous ammonia, to be used as fertilizer. Process units used in producing the low-carbon, nitrogen-based products are the PSA, Carbon Dioxide Purification, and Compression, Ammonia Synthesis, Urea, Urea Pastillation and Storage, Nitric Acid, Ammonium Nitrate, UAN Units, and associated utilities.

The operational emissions from the Project are mainly generated from the combustion of the hydrogen-rich fuel in the Combined Cycle Power Block. Other emission sources are outlined in Table 3. Each emission source can be categorized as part of the Power Block, Gasification Block, Manufacturing Complex, or ancillary equipment as shown in Table 3. Annual emissions from the operation of the sources listed in Table 3 are presented in Table 4.

Table 3
Operational NSR Permitted Emissions Sources

Power Block	Gasification Block	Manufacturing Complex	Ancillary Equipment
• Combustion Turbine (MHI 501GAC®) • Power Block Cooling Tower	• Coal Dryer • Auxiliary Boiler • Gasification Flare • Sulfur Recovery Unit (SRU) Flare • Rectisol® Flare • Tail Gas Thermal Oxidizer • Air Separation Unit (ASU) and Process Cooling Towers • CO_2 Vent • Material Handling Dust collection (Feedstock) • Fugitive leaks from piping	• Nitric Acid Unit • Urea Absorbers • Urea Pastillation • Ammonium Nitrate Unit • Ammonia Synthesis Unit Start-Up Heater • Material Handling Dust collection (Urea) • Fugitive leaks from piping	• Two Emergency Diesel Generators • Emergency Diesel Firewater Pump

Emissions from the operation of the stationary sources at HECA will be permitted through the SJVAPCD under NSR, and therefore are exempt from GCD, and thus are not included in the total General Conformity evaluation emission analysis. These emissions are presented in Table 4 for reference, at the request of SJVAPCD.

4.2.2 Transportation Emissions

The on-site and off-site mobile sources include the trucks and trains delivering feedstock and removing products that would travel from and to the Project Site on a regular basis, plus the worker commuter vehicles. The emissions from these transportation sources are considered indirect emissions, and are required to be included in the General Conformity analysis. Therefore, all the operational transportation-related emissions of the Project were quantified using similar concepts and techniques used in the construction emissions estimations. These emissions were evaluated for the first full year of operation, as this year will have the highest operational emissions, as more stringent transportation related standards and emission controls will be mandated in later years.

HECA evaluated two alternatives for the transportation of the feedstock and products to and from the Project Site. Alternative 1, the rail alternative, will transport coal to the Project Site along a new industrial railroad spur that will connect the Project Site to the existing SJVRR Buttonwillow railroad line, north of the Project Site. This railroad spur will also be used to transport some HECA products to market. Alternative 2, the truck alternative, would transport coal to an existing transloading facility in Wasco, then transfer it onto trucks for delivery to the Project Site. In Alternative 2, all products would be transported by truck, and the railroad spur would not be developed.

Table 4
Operational Criteria Pollutant Emissions from the NSR Permitted Sources

Equipment \ Pollutant	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC
	tons per year					
HRSG/CTG	92.9	109.7	54.6	54.6	17.1	15.3
Coal Dryer	13.3	17.4	5.6	5.6	2.8	2.4
Auxiliary Boiler	8.6	1.4	1.2	1.2	0.5	0.9
Tail Gas Thermal Oxidizer	11.2	13.4	0.4	0.4	8.3	0.3
CO_2 Vent	124.1	N/A	N/A	N/A	N/A	2.8
Gasification Flare	18.5	3.2	0.03	0.03	0.02	0.01
Rectisol® Flare	0.8	1.2	0.03	0.03	0.3	0.01
SRU Flare	0.2	0.2	0.006	0.006	0.4	0.003
Cooling Towers[1]	N/A	N/A	25.5	15.3	N/A	N/A
Emergency Generators[2]	0.8	0.2	0.02	0.02	0.001	0.1
Fire Water Pump	0.2	0.09	0.001	0.001	0.0003	0.01
Nitric Acid Unit	N/A	17	N/A	N/A	N/A	N/A
Urea Pastillation Unit	N/A	N/A	0.2	0.2	N/A	N/A
Ammonium Nitrate Unit	N/A	N/A	0.8	0.8	N/A	N/A
Ammonia Start-Up Heater	0.1	0.04	0.02	0.02	0.01	0.02
Material Handling[3]	N/A	N/A	1.9	1.9	N/A	N/A
Fugitives	4.6	N/A	N/A	N/A	N/A	13.4
Total Annual Emissions[4]	**275.2**	**163.7**	**90.3**	**80.2**	**29.4**	**35.4**

Source: HECA AFC Amendment, April 2012

Notes:

1 Includes contributions from all three cooling towers

2 Includes contributions from both emergency generators

3 Material handling emissions are shown as the contribution of all dust collection points.

4 Total annual emissions represent the maximum annual emissions during operations plus start-up and shut-down emissions

HRSG = Heat Recovery Steam Generator

CTG = combustion turbine generator

CO = carbon monoxide

N/A = not applicable

NO_X = nitrogen oxides

PM_{10} = particulate matter less than 10 microns in diameter

$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter ($PM_{2.5}$ is assumed to equal PM_{10})

SO_2 = sulfur dioxide

VOC = volatile organic compound

The main difference between Alternatives 1 and 2 is the approximately 5-mile railroad spur that would connect the Project Site to the existing SJVRR Buttonwillow railroad line, north of the Project Site, would not be built; thus, no feedstock or product would be transported to or from the site via train. The coal would still be transported from New Mexico via train, but would be offloaded at the transloading facility in Wasco, then trucked to the site. There would be no changes to the stationary sources.

Detailed operational emission estimation techniques are described below for Alternatives 1 and 2, separately. The detailed calculations can be found in Appendices B and C for Alternatives 1 and 2, respectively.

Alternative 1

The petcoke trucks will enter the plant from Station Road, at Tupman Road, and then proceed south to the truck-unloading station. At the truck-unloading area, each truck will idle for no more than 5 minutes while unloading, and then loop back around through the truck scales and wash rack to exit the plant onto Station Road. The product trucks and trains are loaded in the product loading area in the center of the Project Site. The product trucks will also enter and exit the plant from Station Road at Tupman Road, and pass through the truck scales and wash rack.

Coal will be transported to the site by train, and a portion of the product will be transported off-site via train. The trains will enter and exit the northwestern corner of the site near Dairy Road and Adohr Road. The train feedstock unloading and product loading stations will be located in the center of the Project Site. In addition to the feedstock and product trains, there will be one dedicated switching engine on site to move either the feedstock or product rail cars.

Emissions associated with the truck movement were calculated using heavy-heavy duty diesel truck emission factors for all trucks, except the operations and maintenance trucks, which were calculated with the light-heavy-duty gasoline and diesel emission factors from EMFAC2007. EMFAC2007 factors vary depending on the calendar year for which the model is run, because the emission factors reflect adopted CARB engine and fuel standards, and are also based on the vehicle fleet age and composition. The vehicle fleet used by EMFAC2007 is based on an analysis of California Department of Motor Vehicles (DMV) registration data, which vary by calendar year and geographic area. Thus, EMFAC2007 runs for earlier calendar years will produce higher emission factors because of older, higher-polluting vehicles still in the vehicle fleet. In addition, the anticipated Project commercial operation date is late 2017. HECA has committed to use a fleet mix of delivery trucks that meets the emission standards from 2010; thus, EMFAC2007 emissions factors for the fleet vehicles for calendar year 2010 were used here in the operational emission calculations.

The fleet mix of line-haul engines that will be used to move feedstock and products for HECA will meet or exceed the U.S. EPA Tier 2+ or 3 standards. Tier 2+ engines are remanufactured engines that meet the revised 2008 standards, and have the same emission limits as new Tier 3 engines. The emissions factors for criteria pollutants for line-haul and switch locomotives were obtained from the U.S. EPA document "Technical Highlights: Emission Factors for Locomotives" for Tier 2+ or 3 engines (U.S. EPA, 2009). The trains' emissions were calculated by multiplying the locomotive emission factors by the numbers of locomotive engines, hours of operations, horsepower, and engine load factor.

On-site feedstock and product train emissions were calculated on the basis that the line-haul engines will operate in Notch 1 or idling mode while on-site; therefore, emissions were conservatively estimated for Notch 1 horsepower. The percentage of total engine horsepower used at Notch 1 was obtained from the "Port of Long Beach Air Emissions Inventory for 2007" (Port of Long Beach, 2010), which was based on data derived from the U.S. EPA (U.S EPA, 1998). Emissions from the switching engine were based on U.S. EPA Tier 3 emission factors and maximum switching engine horsepower of 260 hp.

The off-site feedstock transportation-related emissions are associated with coal transportation by rail, and petcoke transportation by truck. The Project will gasify a blend of 75 percent coal and 25 percent petcoke to produce a hydrogen-rich gas that will be used to produce low-carbon nitrogen-based products and electricity in a Combined Cycle Power Block. Western sub-bituminous coal will be supplied from mines in New Mexico and transported by rail. The coal trains will travel through New Mexico, Arizona, Mojave Desert Air Quality Management District (MDAQMD), and Eastern Kern Air Pollution Control District (EKAPCD), to the HECA facility in SJVAPCD. Off-site feedstock and product train emissions were calculated based on an average locomotive load factor from the Port of Long Beach study. Off-site emissions are based on an average travel speed of 40 miles per hour and the distance of the train route. Empty trains require 76 percent of the horsepower that full trains require. Petcoke most likely will be supplied from refineries in the Los Angeles or Santa Maria areas and transported by trucks. Therefore, the petcoke trucks will travel in SJVAPCD and South Coast Air Quality Management District (SCAQMD).

As a polygeneration facility, the Project is designed to produce several types of products. The products that will be shipped off site by either truck or train include:

- Degassed liquid sulfur: Most of the sulfur will be transported by truck to existing buyers, but some will also be transported by rail (approximately 75 percent by truck and 25 percent by rail). Rail is expected to travel on routes only within SJVAPCD, and trucks would travel in both SJVAPCD and SCAQMD.

- Gasification solids: Most of the gasifier solids will be transported by rail for beneficial reuse by regional industries. A smaller portion can be transported to nearby industries by truck. It is estimated that movements would be approximately 75 percent by rail and 25 percent by truck. Rail is expected to travel on routes in SJVAPCD, EKAPCD, and MDAQMD; and trucks would travel within SJVAPCD.

- Ammonia: Although ammonia is an intermediate for the on-site production of urea pastilles and UAN, some may be sold directly, rather than using it for urea or UAN production. It is estimated that 75 percent will be transported by truck and 25 percent by rail. Both rail and trucks would be routed only within SJVAPCD.

- Urea pastilles: Urea pastilles are small, solid “pellets” of urea. The estimated movements are 75 percent by rail and 25 percent by truck. Rail is expected to travel through SJVAPCD, Sacramento Metro area, Yuba City-Marysville area, Chico area, and other areas in northern California, Oregon, and Washington. Trucks would be routed only within SJVAPCD.

- UAN: The UAN solution is expected to be sold to regional users. The estimated movements are 50 percent by rail and 50 percent by truck. Both rail and trucks would be routed only within SJVAPCD.

In addition, trucks carrying chemical shipments, the zero-liquid-discharge solids and miscellaneous equipment would travel to and from the Project Site to various facilities in Kern County. All truck and train routes are calculated to be round-trip routes, and are differentiated by the air basin in which they occur to aid in the conformity evaluation calculations, which are presented in Appendix B. For purposes of the General Conformity evaluation, it should be noted that not all of the affected air districts are

nonattainment or maintenance for the same pollutants. Because the General Conformity Rule does not apply to attainment areas, only emissions generated in nonattainment or maintenance areas were calculated.

As expected, the majority of the transportation-related emissions are in the SJVAB. The Project-related transportation emissions in this air basin, as well as in the other Project-affected nonattainment or maintenance areas, are summarized in Table 5. The detailed on-site and off-site transportation emission calculations are included in Appendix B.

Alternative 2

Under the truck alternative, coal would be transported via existing roads from the existing coal transloading facility in Wasco. Under this alternative, the on-site railroad spur would not be developed. Therefore, there would be no trains on-site for feedstock delivery or product removal. All products would be transported by truck.

Compared to Alternative 1, the coal train under Alternative 2 will travel approximately 7 more miles extra in SJVAPCD in order to get to the transloading facility. The coal truck route distance from the transloading facility in Wasco to HECA is 26.5 miles. All product truck routes will remain the same as Alternative 1, with increased truck volume to account for the lack of trains. Emissions were estimated for the on-site and off-site vehicles transporting feedstock and products. Emission factors and calculation techniques described in Alternative 1 were also used to estimate the emissions from the vehicles for Alternative 2.

Table 6 presents the on-site and off-site transportation emissions of criteria pollutants for Alternative 2 in all Project-affected nonattainment or maintenance areas. Detailed transportation emissions and calculations for Alternative 2 are included in Appendix C.

4.3 CONSTRUCTION AND OPERATION OVERLAP YEAR EMISSIONS

Commercial operation of HECA will start in September 2017, and the construction phase of the Project is expected to end in June 2017. Therefore, during 2017, both construction and operation activities are expected to occur. To estimate the construction and operation overlap year emissions, the full-year operational emissions were scaled to 4 months, and resulting emissions were added to the 2017 construction emissions. Because there are no construction emissions outside of the SJVAB, and operational emissions in all other nonattainment and maintenance areas are less than the General Conformity thresholds, only emissions in SJVAB are presented in Tables 7 and 8. These tables show the estimated construction and operation overlap year emissions in the SJVAB for Alternatives 1 and 2, respectively. Detailed transportation emissions and calculations for Alternatives 1 and 2 are included in Appendices B and C, respectively.

Table 5
Estimated Criteria Pollutant Operational Emissions for Alternative 1

Nonattainment and Maintenance Area	Emission Sources	Annual Emission Rates (tons per year)					
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
San Joaquin Valley, CA	Offsite Train	6.17	23.85	0.39	0.37	0.44	0.66
	Offsite Truck	5.29	8.71	2.39	0.72	0.06	0.74
	Offsite Workers Commuting	4.17	0.48	1.05	0.28	0.01	0.13
	Onsite Train	0.85	2.38	0.04	0.04	0.06	0.12
	Onsite Truck	0.63	0.99	0.15	0.05	0.01	0.16
	Total Emissions	**17.11**	**36.40**	**4.01**	**1.46**	**0.57**	**1.80**
Los Angeles-South Coast Air Basin, CA	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
	Offsite Truck	4.14	6.82	1.87	0.56	0.05	0.58
	Total Emissions	**4.14**	**6.82**	**1.87**	**0.56**	**0.05**	**0.58**
Kern County (East Kern), CA	Offsite Train		13.98	0.23			0.39
	Offsite Truck		0.00	0.00			0.00
	Total Emissions		**13.98**	**0.23**			**0.39**
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	Offsite Train		23.11				0.64
	Offsite Truck		0.00				0.00
	Total Emissions		**23.11**				**0.64**
San Bernardino County, CA (Mojave Desert)	Offsite Train			0.65			
	Offsite Truck			0.00			
	Total Emissions			**0.65**			
Sacramento Metro, CA	Offsite Train	0.33	1.27	0.02	0.02	0.02	0.04
	Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total Emissions	**0.33**	**1.27**	**0.02**	**0.02**	**0.02**	**0.04**
Yuba City-Marysville, CA	Offsite Train		0.80		0.01	0.01	0.02
	Offsite Truck		0.00		0.00	0.00	0.00
	Total Emissions		**0.80**		**0.01**	**0.01**	**0.02**

Table 5
Estimated Criteria Pollutant Operational Emissions for Alternative 1 (Continued)

Nonattainment and Maintenance Area	Emission Sources	Annual Emission Rates (tons per year)					
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Chico, CA	Offsite Train	0.21	0.80		0.01	0.01	0.02
	Offsite Truck	0.00	0.00		0.00	0.00	0.00
	Total Emissions	**0.21**	**0.80**		**0.01**	**0.01**	**0.02**
Arizona	Offsite Train	18.13	70.10	1.13	1.10	1.28	1.94
	Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total Emissions	**18.13**	**70.10**	**1.13**	**1.10**	**1.28**	**1.94**
New Mexico	Offsite Train	5.05		0.32		0.36	
	Offsite Truck	0.00		0.00		0.00	
	Total Emissions	**5.05**		**0.32**		**0.36**	

Notes:

The grey cells are for pollutants that are attainment in that area, thus no emissions are presented.

CO = carbon monoxide
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter ($PM_{2.5}$ is assumed to equal PM_{10})
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 6
Estimated Criteria Pollutant Operational Emissions for Alternative 2

Nonattainment and Maintenance Area	Emission Sources	Annual Emission Rates (tons per year)					
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
San Joaquin Valley, CA	Offsite Train	3.49	13.48	0.22	0.21	0.25	0.37
	Offsite Truck	14.22	23.42	6.43	1.94	0.17	1.98
	Offsite Workers Commuting	4.17	0.48	1.05	0.28	0.01	0.13
	Onsite Train	0.00	0.00	0.00	0.00	0.00	0.00
	Onsite Truck	1.42	2.76	0.28	0.09	0.01	0.41
	Total Emission	**23.29**	**40.14**	**7.98**	**2.52**	**0.44**	**2.90**
Los Angeles-South Coast Air Basin, CA	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
	Offsite Truck	4.23	6.96	1.91	0.58	0.05	0.59
	Total Emission	**4.23**	**6.96**	**1.91**	**0.58**	**0.05**	**0.59**
Kern County (East Kern), CA	Offsite Train		11.94	0.19			0.33
	Offsite Truck		0.00	0.00			0.00
	Total Emission		**11.94**	**0.19**			**0.33**
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	Offsite Train		23.11				0.64
	Offsite Truck		0.00				0.00
	Total Emission		**23.11**				**0.64**
San Bernardino County, CA (Mojave Desert)	Offsite Train			0.63			
	Offsite Truck			0.00			
	Total Emission			**0.63**			
Sacramento Metro, CA	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
	Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total Emission	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Yuba City-Marysville, CA	Offsite Train		0.00		0.00	0.00	0.00
	Offsite Truck		0.00		0.00	0.00	0.00
	Total Emission		**0.00**		**0.00**	**0.00**	**0.00**

Table 6
Estimated Criteria Pollutant Operational Emissions for Alternative 2
(Continued)

Nonattainment and Maintenance Area	Emission Sources	Annual Emission Rates (tons per year)					
		CO	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOC**
Chico, CA	Offsite Train	0.00	0.00		0.00	0.00	0.00
	Offsite Truck	0.00	0.00		0.00	0.00	0.00
	Total Emission	**0.00**	**0.00**		**0.00**	**0.00**	**0.00**
Arizona	Offsite Train	18.13	70.10	1.13	1.10	1.28	1.94
	Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total Emission	**18.13**	**70.10**	**1.13**	**1.10**	**1.28**	**1.94**
New Mexico	Offsite Train	5.05		0.32		0.36	
	Offsite Truck	0.00		0.00		0.00	
	Total Emission	**5.05**		**0.32**		**0.36**	

Notes:

The grey cells are for pollutants that are attainment in that area, thus no emissions are presented.

CO = carbon monoxide
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter ($PM_{2.5}$ is assumed to equal PM_{10})
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 7
Estimated Criteria Pollutant Emissions during the Construction and Operation Overlap Year (2017) in San Joaquin Valley Air Basin for Alternative 1

Type	Emission Sources	Annual Emission Rates (tons per year)					
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Construction	Onsite Construction Equipment	2.65	3.84	1.23	0.35	0.00	0.83
	Onsite Trucks	0.15	0.34	0.77	0.09	0.00	0.09
	Onsite Vehicles	0.08	0.01	1.04	0.10	0.00	0.01
	Onsite Total	2.88	4.18	3.04	0.55	0.01	0.93
	Offsite Linears Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	Offsite Trucks	1.02	5.16	0.42	0.21	0.00	0.22
	Offsite Vehicles	5.98	0.72	0.20	0.07	0.01	0.18
	Offsite Total	6.99	5.87	0.61	0.28	0.01	0.41
	Total Construction Emissions	**9.87**	**10.06**	**3.66**	**0.82**	**0.02**	**1.34**
Operation	Offsite Train	2.06	7.95	0.13	0.12	0.15	0.22
	Offsite Truck	1.76	2.90	0.80	0.24	0.02	0.25
	Offsite Workers Commuting	1.39	0.16	0.35	0.09	0.00	0.04
	Onsite Train	0.28	0.79	0.01	0.01	0.02	0.04
	Onsite Truck	0.21	0.33	0.05	0.02	0.00	0.05
	Total Operational Emissions	**5.70**	**12.13**	**1.34**	**0.49**	**0.19**	**0.60**
Total Construction and Operation Overlap Emissions		**15.57**	**22.19**	**4.99**	**1.31**	**0.21**	**1.94**

Notes:

CO = carbon monoxide
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter ($PM_{2.5}$ is assumed to equal PM_{10})
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 8
Estimated Criteria Pollutant Emissions during the Construction and Operation Overlap Year (2017) in San Joaquin Valley Air Basin for Alternative 2

Type	Emission Sources	Annual Emission Rates (tons per year)					
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Construction	Onsite Construction Equipment	2.65	3.84	1.23	0.35	0.00	0.83
	Onsite Trucks	0.15	0.34	0.77	0.09	0.00	0.09
	Onsite Vehicles	0.08	0.01	1.04	0.10	0.00	0.01
	Onsite Total	2.88	4.18	3.04	0.55	0.01	0.93
	Offsite Linears Equipment	0.00	0.00	0.00	0.00	0.00	0.00
	Offsite Trucks	1.02	5.16	0.42	0.21	0.00	0.22
	Offsite Vehicles	5.98	0.72	0.20	0.07	0.01	0.18
	Offsite Total	6.99	5.87	0.61	0.28	0.01	0.41
	Total Construction Emissions	**9.87**	**10.06**	**3.66**	**0.82**	**0.02**	**1.34**
Operation	Offsite Train	1.16	4.49	0.07	0.07	0.08	0.12
	Offsite Truck	4.74	7.81	2.14	0.65	0.06	0.66
	Offsite Workers Commuting	1.39	0.16	0.35	0.09	0.00	0.04
	Onsite Train	0.00	0.00	0.00	0.00	0.00	0.00
	Onsite Truck	0.47	0.92	0.09	0.03	0.00	0.14
	Total Operational Emissions	**7.76**	**13.38**	**2.66**	**0.84**	**0.15**	**0.97**
Total Construction and Operation Overlap Emissions		**17.63**	**23.44**	**6.32**	**1.66**	**0.16**	**2.30**

Notes:

CO = carbon monoxide
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter ($PM_{2.5}$ is assumed to equal PM_{10})
SO_2 = sulfur dioxide
VOC = volatile organic compound

The general conformity applicability reviews for Alternatives 1 and 2 from HECA are presented below in Tables 9 and 10, respectively. These tables summarize and compare the emissions by year associated with HECA, with the different applicable General Conformity *de minimis* thresholds in each of the affected nonattainment and maintenance areas.

As shown in Tables 9 and 10, for both Alternatives 1 and 2, the annual emissions from the HECA Project are below the applicable General Conformity *de minimis* thresholds for CO, PM_{10}, $PM_{2.5}$, and SO_2 for each year of construction, construction and operation overlap, and operation, in all nonattainment and maintenance areas. Construction emissions of NO_x exceed the General Conformity *de minimis* threshold each year of construction in the SJVAB. Construction emissions of VOC exceed the General Conformity *de minimis* threshold in years 2014 and 2015 of construction in the SJVAB. Operational emissions of NO_x exceed the General Conformity *de minimis* threshold each year of operation in the SJVAB. NO_x emissions also exceed the General Conformity *de minimis* threshold during the construction and operation overlap year. Therefore, a GCD is required for NO_x for construction and operation in the SJVAB. A GCD in the SJVAB is also required for VOC during construction.

Table 9
Comparison of the Emissions from HECA with the General Conformity *De Minimis* Thresholds – Construction and Operation Alternative 1

Year/Type	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
	Annual emissions (tons per year)					
San Joaquin Valley Air Basin, CA						
2013 – Construction	20.0	49.9	20.6	4.9	0.1	5.5
2014 – Construction	56.4	69.0	18.5	5.7	0.1	11.9
2015 – Construction	86.3	68.6	21.1	5.7	0.1	12.4
2016 – Construction	66.4	45.8	16.9	4.1	0.1	8.4
2017 – Construction and Operation Overlap	15.6	22.2	5.0	1.3	0.2	1.9
2018 and Beyond – Operation	17.1	36.4	4.0	1.5	0.6	1.8
Applicable general conformity threshold	100	10	100	100	100	10
Maximum emissions	86.3	69.0	21.1	5.7	0.6	12.4

Table 9
Comparison of the Emissions from HECA with the General Conformity *De Minimis* Thresholds – Construction and Operation Alternative 1
(Continued)

Year/Type	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
	Annual emissions (tons per year)					
Exceed threshold?	No	Yes (all years)	No	No	No	Yes (2014 and 2015)
Los Angeles-South Coast Air Basin, CA						
2017 – Operation	1.38	2.27	0.62	0.19	0.02	0.19
2018 and Beyond – Operation	4.14	6.82	1.87	0.56	0.05	0.58
Applicable general conformity threshold	100	10	70	100	100	10
Maximum emissions	4.14	6.82	1.87	0.56	0.05	0.58
Exceed threshold?	No	No	No	No	No	No
East Kern County, CA						
2017 – Operation	NA	4.66	0.08	NA	NA	0.13
2018 and Beyond – Operation	NA	13.98	0.23	NA	NA	0.39
Applicable general conformity threshold	NA	100	70	NA	NA	100
Maximum emissions	NA	13.98	0.23	NA	NA	0.39
Exceed threshold?	NA	No	No	NA	NA	No
Los Angeles-San Bernardino Counties (West Mojave Desert), CA						
2017 – Operation	NA	7.70	NA	NA	NA	0.21
2018 and Beyond – Operation	NA	23.11	NA	NA	NA	0.64
Applicable general conformity threshold	NA	25	NA	NA	NA	25
Maximum emissions	NA	23.11	NA	NA	NA	0.64
Exceed threshold?	NA	No	NA	NA	NA	No
San Bernardino Co, CA (Mojave Desert)						
2017 – Operation	NA	NA	0.22	NA	NA	NA
2018 and Beyond – Operation	NA	NA	0.65	NA	NA	NA
Applicable general conformity threshold	NA	NA	100	NA	NA	NA
Maximum emissions	NA	NA	0.65	NA	NA	NA
Exceed threshold?	NA	NA	No	NA	NA	NA

Table 9
Comparison of the Emissions from HECA with the General Conformity *De Minimis* Thresholds – Construction and Operation Alternative 1
(Continued)

Year/Type	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
	Annual emissions (tons per year)					
Sacramento Metro, CA						
2017 – Operation	0.11	0.42	0.01	0.01	0.01	0.01
2018 and Beyond – Operation	0.33	1.27	0.02	0.02	0.02	0.04
Applicable general conformity threshold	100	25	100	100	100	25
Maximum emissions	0.33	1.27	0.02	0.02	0.02	0.04
Exceed threshold?	No	No	No	No	No	No
Yuba City-Marysville, CA						
2017 – Operation	NA	0.27	NA	0.004	0.005	0.007
2018 and Beyond – Operation	NA	0.80	NA	0.01	0.01	0.02
Applicable general conformity threshold	NA	100	NA	100	100	100
Maximum emissions	NA	0.80	NA	0.01	0.01	0.02
Exceed threshold?	NA	No	NA	No	No	No
Chico, CA						
2017 – Operation	0.07	0.27	NA	0.004	0.005	0.007
2018 and Beyond – Operation	0.21	0.80	NA	0.01	0.01	0.02
Applicable general conformity threshold	100	100	NA	100	100	100
Maximum emissions	0.21	0.80	NA	0.01	0.01	0.02
Exceed threshold?	No	No	NA	No	No	No
Arizona						
2017 – Operation	6.04	23.37	0.38	0.37	0.44	0.65
2018 and Beyond – Operation	18.13	70.10	1.13	1.10	1.28	1.94
Applicable general conformity threshold	100	100	70	100	100	100
Maximum emissions	18.13	70.10	1.13	1.10	1.28	1.94
Exceed threshold?	No	No	No	No	No	No
New Mexico						

Table 9
Comparison of the Emissions from HECA with the General Conformity *De Minimis* Thresholds – Construction and Operation Alternative 1
(Continued)

Year/Type	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
	Annual emissions (tons per year)					
2017 – Operation	1.68	NA	0.11	NA	0.12	NA
2018 and Beyond – Operation	5.05	NA	0.32	NA	0.36	NA
Applicable general conformity threshold	100	NA	100	NA	100	NA
Maximum emissions	5.05	NA	0.32	NA	0.36	NA
Exceed threshold?	No	NA	No	NA	No	NA

Notes:
CO = carbon monoxide
NA = Not Applicable
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter ($PM_{2.5}$ is assumed to equal PM_{10})
SO_2 = sulfur dioxide
VOC = volatile organic compound

Table 10
Comparison of the Emissions from HECA with the General Conformity *De Minimis* Thresholds – Construction and Operation Alternative 2

Year	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
	Annual emissions (tons per year)					
San Joaquin Valley Air Basin, CA						
2013 – Construction	20.0	49.9	20.6	4.9	0.1	5.5
2014 – Construction	56.4	69.0	18.5	5.7	0.1	11.9
2015 – Construction	86.3	68.6	21.1	5.7	0.1	12.4
2016 – Construction	66.4	45.8	16.9	4.1	0.1	8.4
2017 – Construction Operation Overlap	17.6	23.4	6.3	1.7	0.2	2.4
2018 and Beyond – Operation	23.3	40.1	8.0	2.5	0.4	2.9
Applicable general conformity threshold	100	10	100	100	100	10
Maximum emissions	86.3	69.0	21.1	5.7	0.4	12.4
Exceed threshold?	No	Yes (all years)	No	No	No	Yes (2014 and 2015)
Los Angeles-South Coast Air Basin, CA						
2017 – Operation	1.41	2.32	0.64	0.19	0.02	0.20
2018 and Beyond – Operation	4.23	6.96	1.91	0.58	0.05	0.59
Applicable general conformity threshold	100	10	70	100	100	10
Maximum emissions	4.23	6.96	1.91	0.58	0.05	0.59
Exceed threshold?	No	No	No	No	No	No
East Kern County, CA						
2017 – Operation	NA	3.98	0.06	NA	NA	0.11
2018 and Beyond – Operation	NA	11.94	0.19	NA	NA	0.33
Applicable general conformity threshold	NA	100	70	NA	NA	100
Maximum emissions	NA	11.94	0.19	NA	N	0.33
Exceed threshold?	NA	No	No	NA	NA	No

Table 10
Comparison of the Emissions from HECA with the General Conformity *De Minimis* Thresholds – Construction and Operation Alternative 2
(Continued)

Year	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
	Annual emissions (tons per year)					
Los Angeles-San Bernardino Counties (West Mojave Desert), CA						
2017 – Operation	NA	7.70	NA	NA	NA	0.21
2018 and Beyond – Operation	NA	23.11	NA	NA	NA	0.64
Applicable general conformity threshold	NA	25	NA	NA	NA	25
Maximum emissions	NA	23.11	NA	NA	NA	0.64
Exceed threshold?	NA	No	NA	NA	NA	No
San Bernardino Co, CA (Mojave Desert)						
2017 – Operation	NA	NA	0.21	NA	NA	NA
2018 and Beyond – Operation	NA	NA	0.63	NA	NA	NA
Applicable general conformity threshold	NA	NA	100	NA	NA	NA
Maximum emissions	NA	NA	0.63	NA	NA	NA
Exceed threshold?	NA	NA	No	NA	NA	NA
Sacramento Metro, CA						
2017 – Operation	0	0	0	0	0	0
2018 and Beyond – Operation	0	0	0	0	0	0
Applicable general conformity threshold	100	25	100	100	100	25
Maximum emissions	0	0	0	0	0	0
Exceed threshold?	No	No	No	No	No	No
Yuba City-Marysville, CA						
2017 – Operation	NA	0	NA	0	0	0
2018 and Beyond – Operation	NA	0	NA	0	0	0
Applicable general conformity threshold	NA	100	NA	100	100	100
Maximum emissions	NA	0	NA	0	0	0
Exceed threshold?	NA	No	NA	No	No	No
Chico, CA						
2017 – Operation	0	0	NA	0	0	0

Table 10
Comparison of the Emissions from HECA with the General Conformity *De Minimis* Thresholds – Construction and Operation Alternative 2
(Continued)

Year	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
	Annual emissions (tons per year)					
2018 and Beyond – Operation	0	0	NA	0	0	0
Applicable general conformity threshold	100	100	NA	100	100	100
Maximum emissions in this area	0	0	NA	0	0	0
Exceed threshold?	No	No	NA	No	No	No
Arizona						
2017 – Operation	6.04	23.37	0.38	0.37	0.43	0.65
2018 and Beyond – Operation	18.13	70.10	1.13	1.10	1.28	1.94
Applicable general conformity threshold	100	100	70	100	100	100
Maximum emissions	18.13	70.10	1.13	1.10	1.28	1.94
Exceed threshold?	No	No	No	No	No	No
New Mexico						
2017 – Operation	1.68	NA	0.11	NA	0.12	NA
2018 and Beyond – Operation	5.05	NA	0.32	NA	0.36	NA
Applicable general conformity threshold	100	NA	100	NA	100	NA
Maximum emissions	5.05	NA	0.32	NA	0.36	NA
Exceed threshold?	No	NA	No	NA	No	NA

Notes:

CO = carbon monoxide
NA = Not Applicable
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter ($PM_{2.5}$ is assumed to equal PM_{10})
SO_2 = sulfur dioxide
VOC = volatile organic compound

As indicated in Section 5, a GCD is required for NO_x for construction and operation, and for VOCs during construction in the SJVAB, for both Alternatives 1 and 2.

According to the U.S. EPA and U.S. DOE General Conformity Guidance, a full GCD is only required for the federal agency approved alternative. As of the writing of this GCD report, the U.S. DOE has not approved an alternative yet. Therefore, a General Conformity evaluation was conducted for both alternatives. Both Alternatives 1 and 2 have identical NO_x and VOC construction emissions for all calendar years of the construction phase. NO_x emissions during the construction and operation overlap year and the operation years are different for Alternatives 1 and 2. Alternative 2 NO_x emissions are higher than those of Alternative 1 in SJVAB. Regardless of the Alternative, HECA has identified the criteria and options that can be used to demonstrate that the federal action conforms to the applicable SIP.

As discussed in Section 2.2, the most recent and applicable SJVAPCD O_3 SIP is the adopted 2007 8-hour O_3 Plan, which was prepared to accommodate growth, to reduce the high levels of pollutants within the SJVAB, to meet state and federal air quality standards, and to minimize the fiscal impact that pollution control measures have on the local economy. Projects found to be consistent with the growth assumptions upon which the attainment plan forecasts are based are deemed to be consistent with the plan, and would not impede attainment of the ambient air quality standards. Once fully developed and occupied, the projects being proposed and developed in the area are expected to be within the growth forecasts that form the basis for the land use and transportation control portions of the SJVAPCD attainment plan.

The 2007 8-hour O_3 Plan contains emission budgets for off-road equipment used in construction projects and transportation sources in the SJVAB. Not all of these emissions are designated to specific projects; some are associated with the projected regional growth. SJVAPCD staff indicated that the HECA Project was not specifically identified in the SIP, although HECA believes that the emissions from the construction and operation of the Project should be covered in the off-road equipment and transportation emission budgets allocated in the O_3 Plan associated with regional growth.

Tables 11, 12, and 13 present the SJVAPCD 2007 8-hour O_3 Plan emission budgets compared to the emissions from HECA in each emission source category by each calendar year in the SIP. Peak construction emissions of NO_x occur in 2014 and for VOC occur in 2015. Since there is no emission budget for 2015 in the O_3 Plan, peak VOC construction emissions were compared to the budget for 2014. Peak operational emissions will occur in 2018, as transportation related state and federal regulations will ensure emission decreases into the future. These peak operational emissions are compared to the SJVAPCD NO_x inventory for 2018, 2020 and 2023, without taking into account potential transportation emission reductions in 2020 and 2023.

Table 11
Comparison of NO_x Emission Budgets in SJVAPCD 2007 O_3 Plan with Emissions from HECA by Source Category and Calendar Year for Alternative 1

Category Name / Year	SJVAPCD SIP - Total On-road Motor Vehicles Emissions	HECA Total On-road Emissions	HECA to SIP - On-road Emission Fraction	SJVAPCD SIP – Train Emissions	HECA Train Emissions	HECA to SIP - Train Emission Fraction	SJVAPCD SIP - Off-road Equipment Emissions	HECA Off-road Equipment Emissions	HECA to SIP - Off-road Equipment Emission Fraction
	NO_x Daily Emissions (tons per day)								
2014	219.8	0.04	0.02%	20.7	-	0.00%	46.5	0.15	0.33%
2017	173.3	0.03	0.02%	21.0	0.02	0.11%	38.5	0.01	0.03%
2018	160.7	0.03	0.02%	21.2	0.07	0.34%	36.3	-	0.00%
2020	140.1	0.03	0.02%	21.5	0.07	0.33%	32.4	-	0.00%
2023	120.1	0.03	0.02%	22.0	0.07	0.33%	28.1	-	0.00%

Table 12
Comparison of NO_x Emission Budgets in SJVAPCD 2007 O_3 Plan with Emissions from HECA by Source Category and Calendar Year for Alternative 2

Category Name / Year	SJVAPCD SIP - Total On-road Motor Vehicles Emissions	HECA Total On-road Emissions	HECA to SIP - On-road Emission Fraction	SJVAPCD SIP – Train Emissions	HECA Train Emissions	HECA to SIP - Train Emission Fraction	SJVAPCD SIP - Off-road Equipment Emissions	HECA Off-road Equipment Emissions	HECA to SIP - Off-road Equipment Emission Fraction
	NO_x Daily Emissions (tons per day)								
2014	219.8	0.04	0.02%	20.7	-	0.00%	46.5	0.15	0.33%
2017	173.3	0.04	0.02%	21.0	0.01	0.06%	38.5	0.01	0.03%
2018	160.7	0.07	0.05%	21.2	0.04	0.17%	36.3	-	0.00%
2020	140.1	0.07	0.05%	21.5	0.04	0.17%	32.4	-	0.00%
2023	120.1	0.07	0.06%	22.0	0.04	0.17%	28.1	-	0.00%

Table 13
Comparison of VOC Emission Budgets in SJVAPCD 2007 O_3 Plan with Emissions from HECA by Source Category and Calendar Year for Alternatives 1 and 2

Category Name / Year	SJVAPCD SIP - Total On-road Motor Vehicles Emissions	HECA Total On-road Emissions	HECA to SIP - On-road Emission Fraction	SJVAPCD SIP – Train Emissions	HECA Train Emissions	HECA to SIP - Train Emission Fraction	SJVAPCD SIP - Off-road Equipment Emissions	HECA Off-road Equipment Emissions	HECA to SIP - Off-road Equipment Emission Fraction
	VOC Daily Emissions (tons per day)								
2014	61.1	0.01	0.01%	1.6	-	0.00%	14.2	0.03	0.20%

Note:

1. HECA emissions of VOCs are greater than the general conformity thresholds in 2014 and 2015, although only 2014 is a milestone year in the SIP, thus the highest VOC Project emissions which occur in 2015 are presented.

Emissions from the construction phase are represented in Tables 11, 12 and 13 under the off-road equipment category and these are limited to 0.3% of the NO_x inventory and 0.2% of the VOC inventory. Transportation related emissions during the construction phase represent 0.02% or less of the NO_x and VOC budgets. It is expected that due to economic reasons, many previously planned construction projects have been cancelled, thereby leaving room for HECA construction emissions. Operational NO_x emissions fall into two categories, on-road transportation (delivery trucks and commuter vehicles) and trains. Tables 11, 12 and 13 show that the transportation related HECA emissions for all years represent 0.02% of the total inventory for those sources. Trains servicing the HECA Project operational phase represent approximately 0.07% of the inventory. These operational emissions are a very small portion of the overall SJVAPCD inventory. As the inventory incorporates general growth in the basin, HECA believes that these emissions would be more than covered by this growth.

Therefore, HECA requests SJVAPCD to examine the emission budget in the 2007 O_3 Plan to determine that the emissions from the HECA are within this budget, thus the Project will conform. In addition, HECA requests that Project specific emissions be added to the SIP that will be developed to address the re-designation status. This SIP will need to be revised to reflect to the more stringent 8-hour ozone standard effective in March 2008 and its re-designation effective in April 2012 and submitted to U.S. EPA by 2015.

As required by 40 CFR 93 Subpart B, an evaluation of the General Conformity was performed for HECA for all the affected nonattainment and maintenance areas in the states of California, Arizona, and New Mexico. Criteria pollutant emissions generated in each Project-affected area from activities associated with the Project construction and operation were estimated and compared to the General Conformity *de minimis* thresholds to assess whether a GCD is required.

The estimated emissions indicate that the total direct and indirect construction and operational emissions of CO, PM_{10}, $PM_{2.5}$, and SO_2 are below the applicable General Conformity thresholds for all years of construction and operation in all nonattainment and maintenance areas. Construction and operational emissions of NO_x exceed the General Conformity threshold during construction and operation in the SJVAB. Construction emissions of VOC exceed the General Conformity threshold in the SJVAB. Thus a GCD for NO_x for during construction and operation and for VOC during construction in the SJVAB is required.

The SJVAPCD, as the agency responsible for the SIP, will make a formal GCD in response to this evaluation in accordance with SJVAPCD Rule 9110 that they will provide to DOE for the final GCD.

Because the total of direct and indirect emissions from the Project that are subject to the conformity evaluation result in a level of emissions which, together with all other emissions in the nonattainment area, would not exceed the emissions budgets specified in the 2007 O_3 Plan, the HECA Project will conform to the approved SIP, and positive conformity will be achieved.

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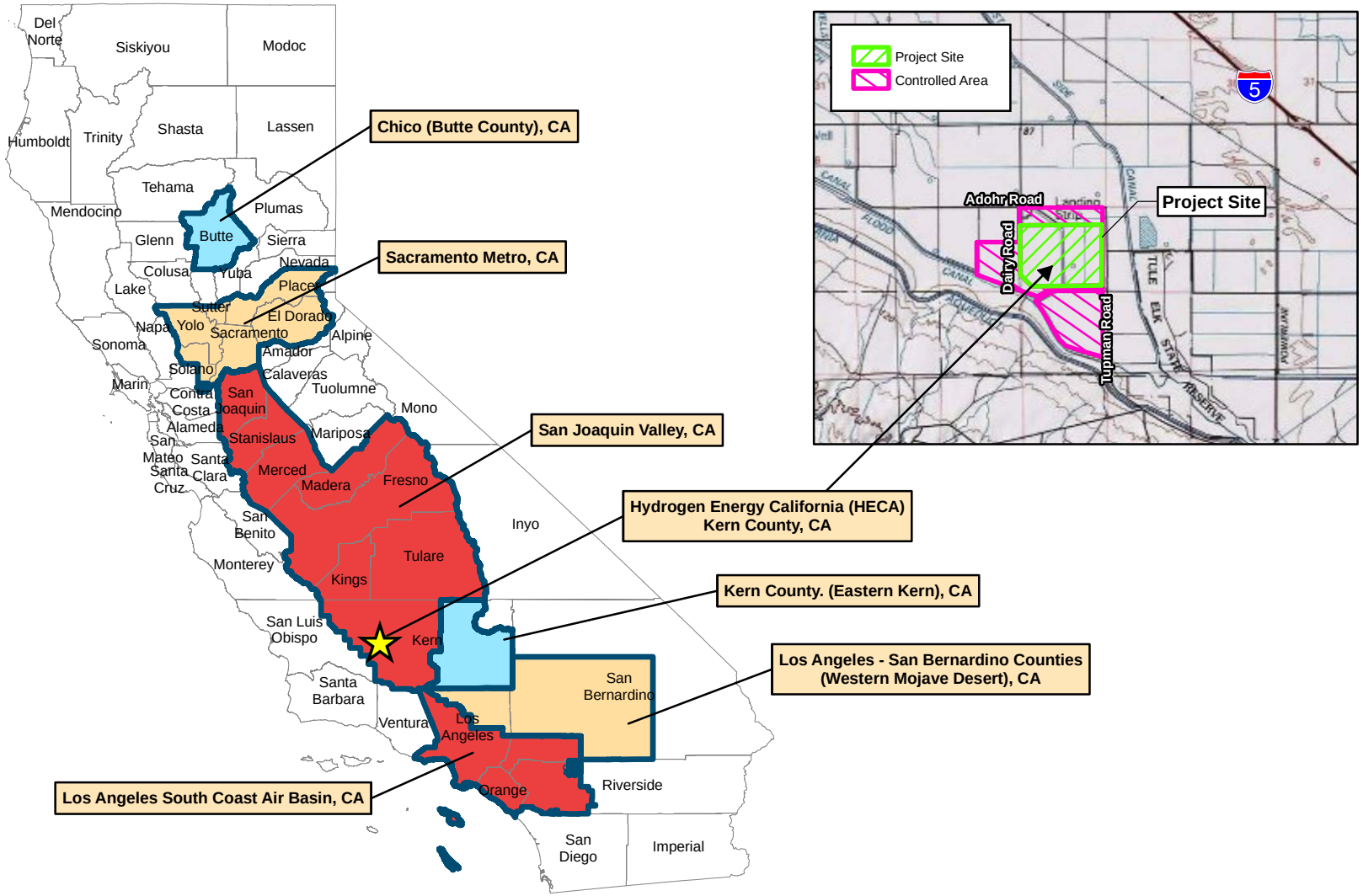
FIGURES



SOURCES: ESRI, EPA.

PROJECT LOCATION AND PROJECT AFFECTED OZONE NONATTAINMENT AREAS IN CALIFORNIA

URS

75 0 75 150 Miles

SCALE: 1" = 150 miles (1:9,504,000)
SCALE CORRECT WHEN PRINTED AT 8.5X11

CREATED BY: PM	DATE: 8/23/2012	FIG. NO: 1
PM: JM	PROJ. NO: 28068052.50501	

Path: G:\gis\projects\1577\28068052\map_docs\mxd\EPA_8_Hour_Zones.mxd, paul_moreno, 8/23/2012, 2:41:34 PM

APPENDIX A

DETAILED CONSTRUCTION EMISSION CALCULATIONS

Estimated Annual Calendar Year Construction Emissions of Criteria Pollutants (tons/yr)											
Year		CO	NO_x	PM_{10} - Exhaust	PM_{10} - Fugitives	PM_{10} - Total	$PM_{2.5}$ - Exhaust	$PM_{2.5}$ - Fugitives	$PM_{2.5}$ - Total	SO_2	VOC
2013 (June - Dec)											
Onsite	Construction Equipment	12.4	23.7	1.3	7.6	8.9	1.2	1.5	2.8	0.0	3.8
	Trucks	1.0	2.3	0.1	9.0	9.1	0.1	0.9	1.0	0.0	0.6
	Vehicles	0.0	0.0	0.0	0.6	0.6	0.0	0.1	0.1	0.0	0.0
	Onsite Total	**13.4**	**26.0**	**1.5**	**17.1**	**18.6**	**1.4**	**2.5**	**3.8**	**0.0**	**4.4**
Offsite	Linears Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Trucks	4.8	23.7	0.8	1.1	1.9	0.7	0.3	1.0	0.0	1.1
	Vehicles	1.8	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
	Offsite Total	**6.6**	**23.9**	**0.9**	**1.1**	**2.0**	**0.7**	**0.3**	**1.0**	**0.0**	**1.1**
	2013 Total	**20.0**	**49.9**	**2.4**	**18.2**	**20.6**	**2.1**	**2.8**	**4.9**	**0.1**	**5.5**
2014											
Onsite	Construction Equipment	21.8	35.9	2.4	7.0	9.4	2.2	1.1	3.3	0.0	7.0
	Trucks	0.3	0.7	0.0	1.6	1.6	0.0	0.2	0.2	0.0	0.2
	Vehicles	0.3	0.0	0.0	3.6	3.6	0.0	0.4	0.4	0.0	0.0
	Onsite Total	**22.4**	**36.6**	**2.5**	**12.1**	**14.6**	**2.2**	**1.6**	**3.8**	**0.0**	**7.2**
Offsite	Linears Equipment	11.8	19.7	1.2	1.1	2.4	1.1	0.1	1.2	0.0	3.5
	Trucks	2.0	10.3	0.4	0.5	0.8	0.3	0.1	0.4	0.0	0.4
	Vehicles	20.2	2.4	0.2	0.5	0.7	0.1	0.1	0.2	0.0	0.6
	Offsite Total	**34.0**	**32.4**	**1.8**	**2.1**	**3.9**	**1.5**	**0.3**	**1.9**	**0.1**	**4.6**
	2014 Total	**56.4**	**69.0**	**4.2**	**14.2**	**18.5**	**3.8**	**1.9**	**5.7**	**0.1**	**11.9**
2015											
Onsite	Construction Equipment	28.6	47.4	3.1	5.4	8.5	2.8	0.6	3.4	0.1	9.4
	Trucks	0.3	0.7	0.0	1.3	1.4	0.0	0.1	0.2	0.0	0.2
	Vehicles	0.7	0.1	0.0	8.1	8.1	0.0	0.8	0.8	0.0	0.1
	Onsite Total	**29.6**	**48.1**	**3.1**	**14.9**	**18.0**	**2.9**	**1.6**	**4.4**	**0.1**	**9.6**
Offsite	Linears Equipment	2.4	3.9	0.3	0.2	0.5	0.2	0.0	0.3	0.0	0.8
	Trucks	2.0	10.3	0.4	0.5	0.8	0.3	0.1	0.4	0.0	0.4
	Vehicles	52.2	6.3	0.5	1.2	1.7	0.3	0.3	0.6	0.1	1.6
	Offsite Total	**56.7**	**20.5**	**1.2**	**1.9**	**3.0**	**0.8**	**0.4**	**1.3**	**0.1**	**2.8**
	2015 Total	**86.3**	**68.6**	**4.3**	**16.8**	**21.1**	**3.7**	**2.0**	**5.7**	**0.1**	**12.4**
2016											
Onsite	Construction Equipment	19.1	29.4	2.1	4.6	6.7	1.9	0.5	2.3	0.0	6.3
	Trucks	0.3	0.7	0.0	1.3	1.3	0.0	0.1	0.2	0.0	0.2
	Vehicles	0.6	0.0	0.0	6.6	6.6	0.0	0.7	0.7	0.0	0.0
	Onsite Total	**20.0**	**30.2**	**2.1**	**12.5**	**14.6**	**1.9**	**1.2**	**3.2**	**0.0**	**6.6**
Offsite	Linears Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Trucks	2.0	10.3	0.4	0.5	0.8	0.3	0.1	0.4	0.0	0.4
	Vehicles	44.4	5.3	0.5	1.0	1.5	0.2	0.2	0.5	0.1	1.4
	Offsite Total	**46.5**	**15.6**	**0.8**	**1.5**	**2.3**	**0.5**	**0.4**	**0.9**	**0.1**	**1.8**
	2016 Total	**66.4**	**45.8**	**2.9**	**13.9**	**16.9**	**2.5**	**1.6**	**4.1**	**0.1**	**8.4**
2017 (Jan - June)											
Onsite	Construction Equipment	2.7	3.8	0.3	1.0	1.2	0.3	0.1	0.3	0.0	0.8
	Trucks	0.1	0.3	0.0	0.7	0.8	0.0	0.1	0.1	0.0	0.1
	Vehicles	0.1	0.0	0.0	1.0	1.0	0.0	0.1	0.1	0.0	0.0
	Onsite Total	**2.9**	**4.2**	**0.3**	**2.7**	**3.0**	**0.3**	**0.3**	**0.5**	**0.0**	**0.9**
Offsite	Linears Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Trucks	1.0	5.2	0.2	0.2	0.4	0.2	0.1	0.2	0.0	0.2
	Vehicles	6.0	0.7	0.1	0.1	0.2	0.0	0.0	0.1	0.0	0.2
	Offsite Total	**7.0**	**5.9**	**0.2**	**0.4**	**0.6**	**0.2**	**0.1**	**0.3**	**0.0**	**0.4**
	2017 Total	**9.9**	**10.1**	**0.5**	**3.1**	**3.7**	**0.5**	**0.4**	**0.8**	**0.0**	**1.3**

Hydrogen Energy California, Kern County Power Project
Carbon Monoxide (CO) Emissions by Month
8/17/2012

	CO	MONTHLY EMISSIONS (lbs/day)																																																					
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
ON-SITE	**On-Road Vehicles**																																																						
	18 cy fill mat'l haul truck	0	0	13	13	26	26	26	26	13	13	13	13	7	7	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	1	1	1	0	0	0	0	0	0	0
	Bus	3	3	3	3	4	4	4	4	4	4	4	7	7	7	7	7	9	9	9	13	13	13	13	18	18	18	18	18	18	18	18	18	18	18	18	16	16	16	13	13	7	7	4	4	3	3	3	1	1
	Concrete Pumper Truck	0	0	0	0	0	3	3	3	3	3	3	3	3	4	4	4	3	3	3	3	3	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dump Truck	4	5	5	4	4	4	4	4	4	4	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	3	3	3	4	4	4	3	1	1	1	1	1	1	0	0	0	0	0
	Diesel Tractor (Yard Dog)	0	0	0	0	0	3	3	3	3	3	3	6	6	6	6	6	12	12	12	12	12	12	12	15	15	15	15	15	15	15	15	15	15	15	15	6	6	6	6	6	6	6	0	0	0	0	0	0	0
	Service Truck - 1 ton	3	3	3	5	5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1
	Pile Driver Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck - Fuel/Lube	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
	Tractor Truck 5th Wheel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks - Pickup 3/4 ton	3	3	3	3	3	4	4	5	10	10	10	10	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	10	10	6	6	6	6	3
	Trucks - 3 ton	1	1	1	1	1	3	3	3	5	5	5	5	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	5	4	4	4	4	3	3	3	1	1	1	1	1	0	0
	Truck - Water	7	7	7	7	7	7	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1
	Off Road Vehicles																																																						
	Air Compressor 185 CFM	3	3	3	3	4	4	4	4	4	4	4	4	4	8	8	8	10	10	10	13	13	13	13	15	15	15	15	15	15	15	15	15	15	15	15	10	10	10	8	8	8	8	5	5	5	3	3	1	1
	Air Compressor 750 CFM	0	0	0	0	2	2	2	2	3	3	3	3	3	3	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Articulating Boom Platform	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bob cat loader	0	0	2	2	2	2	2	8	8	8	8	8	6	6	6	6	6	6	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	0	0	0	0	0	0	0
	Bulldozer D10R	17	17	17	11	11	11	11	11	11	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bulldozer D6C	9	9	9	9	6	6	6	6	6	6	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Concrete Trowel Machine	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0
	Concrete Vibrators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cranes - Mobile 35 ton	0	0	0	0	0	0	2	2	2	6	6	6	6	11	11	11	11	11	11	11	11	11	11	11	11	11	8	8	8	8	8	8	8	8	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2
	Cranes - Mobile 45 ton	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	4	8	8	8	8	8	8	8	8	8	8	8	4	4	4	4	4	4	4	4	4	4	4	2	2	0	0	0	0	0	0	0
	Crane - Mobile 65 ton	0	0	0	0	0	0	0	0	0	0	0	2	2	4	8	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	10	10	8	4	4	4	4	4	2	2	2	2	2	2	2	0	0	0	0
	Cranes 100 / 150 ton cap	0	0	0	0	0	0	0	0	0	0	1	1	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diesel Powered Welder	0	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	5	5	5	5	5	7	7	7	7	7	7	7	7	4	4	4	4	4	3	3	3	3	3	1	1	1	1	1	1	1
	Excavator - Backhoe/loader	3	3	5	7	7	7	7	7	7	7	7	3	3	3	3	3	3	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	2	2	2	0	0	0	0	0	0	0
	Excavator - Earth Scraper 637	56	56	56	56	32	32	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Excavator - loader	4	4	4	4	4	4	4	4	4	4	4	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0
	Excavator - Motor Grader (CAT140H)	0	3	3	3	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0	0	0	0	6	6	6	6	3	3	3	0	0	0	0	0	0	0
	Excavator - Trencher (CAT320)	0	0	0	0	0	7	7	7	7	7	7	7	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fired Heaters (2,000 BTU)	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
	Forklift	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1
	Fusion Welder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy Haul / 600 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy Haul / 1,000 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Plants	0	0	1	1	3	3	3	3	1	1	2	2	3	3	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	3	3	3	3	2	2	2	2	2	2	1	1	1	1
	Man lifts - telescoping	0	0	0	0	0	0	0	0	5	5	5	9	9	9	9	9	9	9	9	9	14	14	14	14	19	19	19	19	19	19	19	19	19	19	19	14	14	14	9	9	9	9	5	5	5	5	2	2	2
	Man lift - scissor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portable Compaction Roller	0	0	12	12	12	12	12	12	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	5	5	5	5	5	0	0	0	5	5	5	2	2	0	0	0	0	0	0	0
	Portable Compaction - Vibratory Plate	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portable Compaction - Ram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pumps	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Portable Power Generators	8	8	8	8	12	12	12	12	12	20	20	20	20	20	20	31	31	31	31	31	31	31	41	41	41	41	41	41	41	41	41	41	41	41	41	31	31	31	31	20	20	20	20	20	20	10	10	10	4
	Truck Crane - Greater than 300 ton	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	5	5	7	7	9	9	9	9	9	9	9	9	9	7	7	5	5	5	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0
	Truck Crane - Greater than 200 ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	3	3	3	4	4	4	4	4	4	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vibratory Roller Ingersol-Rand 20 ton	8	8	8	8	8	8	8	8	8	5	5	5	5	5	3	3	3	3	0	0	0	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0
	WORKER VEHICLES																																																						
	Personal commuting vehicles	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	3	3	3	3	4	4	4	4	5	5	5	6	6	6	6	6	6	6	6	6	5	5	5	4	3	3	2	1	1	1	1	1	1	1
	DELIVERY TRUCKS																																																						
	Light delivery truck (e.g. Fed-Ex)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Import fill trucks	10	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ONSITE TOTAL (lbs/day)	**146**	**151**	**180**	**181**	**185**	**200**	**175**	**153**	**145**	**150**	**155**	**158**	**159**	**171**	**174**	**185**	**193**	**196**	**195**	**211**	**214**	**212**	**223**	**239**	**230**	**225**	**219**	**236**	**237**	**226**	**220**	**201**	**196**	**190**	**175**	**157**	**158**	**166**	**154**	**130**	**113**	**109**	**65**	**65**	**61**	**43**	**36**	**33**	**23**
OFF-SITE	**WORKER VEHICLES**																																																						
	Personal commuting vehicles	7	12	16	20	30	38	45	60	67	80	100	112	132	155	187	211	230	244	257	272	286	320	344	370	393	398	437	468	483	486	491	484	479	458	433	420	381	369	313	255	202	137	110	109	109	101	86	79	59
	DELIVERY TRUCKS																																																						
	Light delivery truck (e.g. Fed-Ex)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	Import fill trucks	46	46	46	46	46	46	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LINEARS																																																						
	ON ROAD																																																						
	Dump Truck	0	0	0	0	0	0	0	0	0	0	5	5	8	8	8	8	8	8	8	8	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Service Truck (MHD-DSL)	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pipe Haul Truck and Trailer (HHDT-DSL)	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3/4 Ton Pickup (MHD-DSL)	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	6	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck - water	0	0	0	0	0	0	0	0	0	0	3	3	5	5	5	5	5	5	5	5	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	OFF ROAD																																																						
	Air Compressor (185 CFM)	0	0	0	0	0	0	0	0	0	0	3	3	5	5	8	8	8	8	5	5	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bore Machine (Hydraulic)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12 Ton Hydra Crane	0	0	0	0	0	0	0	0	0	0	3	5	5	8	8	8	8	8	8	8	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Backhoe/loader	0	0	0	0	0	0	0	0	0	0	10	10	16	16	16	16	16	16	16	16	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Excavator - Trencher	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Forklift	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Welding Generator	0	0	0	0	0	0	0	0	0	0	16	16	16	16	16	16	16	16	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3 to 5 Ton AC Roller	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pipe Bending Machine	0	0	0	0	0	0	0	0	0	0	3	3	7	7	7	7	7	7	7	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RAIL																																																						
	AIR COMPRESSOR 185	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Hydrogen Energy California, Kern County Power Project
Carbon Dioxide (CO2) Emissions by Month
8/17/2012

	CO2	MONTHLY EMISSIONS (lbs/day)																																																	
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
	On-Road Vehicles																																																			
	18 cy fill mat'l haul truck	0	0	2,861	2,861	5,722	5,722	5,722	5,722	2,861	2,861	2,861	2,861	1,431	1,431	1,431	1,431	1,431	1,431	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	858	858	858	858	286	286	286	0	0	0	0	0	0	0
	Bus	572	572	572	572	858	858	858	858	858	858	1,431	1,431	1,431	1,431	1,431	1,431	2,003	2,003	2,003	2,861	2,861	2,861	2,861	4,006	4,006	4,006	4,006	4,006	4,006	4,006	4,006	4,006	4,006	4,006	4,006	3,433	3,433	3,433	2,861	2,861	1,431	1,431	858	858	572	572	572	286	286
	Concrete Pumper Truck	0	0	0	0	0	572	572	572	572	572	572	572	572	858	858	858	572	572	572	572	572	0	0	0	0	0	0	286	286	286	286	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dump Truck	858	1,144	1,144	858	858	858	858	858	858	858	572	572	572	572	572	0	0	0	0	0	0	0	0	0	0	0	0	572	572	572	572	572	572	572	572	572	858	858	858	572	286	286	286	286	286	286	0	0	0	0
	Diesel Tractor (Yard Dog)	0	0	0	0	0	649	649	649	649	649	649	1,298	1,298	1,298	1,298	1,298	2,596	2,596	2,596	2,596	2,596	2,596	2,596	3,245	3,245	3,245	3,245	3,245	3,245	3,245	3,245	3,245	3,245	3,245	3,245	1,298	1,298	1,298	1,298	1,298	1,298	1,298	0	0	0	0	0	0	0	0
	Service Truck - 1 ton	572	572	572	1,144	1,144	1,144	1,144	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	286	286	286	286	286	286	286
	Pile Driver Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck - Fuel/Lube	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	136	136	136	136	136	136	136	0	0	0
	Tractor Truck 5th Wheel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks - Pickup 3/4 ton	680	680	680	680	680	816	952	1,088	2,041	2,041	2,041	2,041	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	3,401	2,041	2,041	1,360	1,360	1,360	1,360	680
	Trucks - 3 ton	286	286	286	286	286	572	572	572	1,144	1,144	1,144	1,144	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	858	858	858	858	572	572	572	286	286	286	286	286	0	0
	Truck - Water	1,431	1,431	1,431	1,431	1,431	1,431	858	858	858	858	858	858	858	858	858	858	858	858	858	858	858	858	858	572	858	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	572	286	286	286	286	286	286	286
	Off Road Vehicles																																																		
	Air Compressor 185 CFM	214	214	214	214	320	320	320	320	320	320	320	320	320	641	641	641	854	854	854	1,068	1,068	1,068	1,068	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	1,282	854	854	854	641	641	641	641	427	427	427	214	214	107	107
	Air Compressor 750 CFM	0	0	0	0	225	225	225	225	450	450	450	450	450	450	450	901	901	901	901	901	901	901	901	901	901	901	901	901	901	450	450	450	450	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
	Articulating Boom Platform	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bob cat loader	0	0	168	168	168	168	168	672	672	672	672	672	504	504	504	504	504	504	336	336	336	336	336	336	0	0	0	0	0	0	0	0	0	0	0	168	168	168	168	168	168	168	0	0	0	0	0	0	0
	Bulldozer D10R	4,584	4,584	4,584	3,056	3,056	3,056	3,056	3,056	3,056	1,528	1,528	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bulldozer D6C	1,164	1,164	1,164	1,164	776	776	776	776	776	776	388	388	388	388	388	0	0	0	0	0	0	0	0	0	0	0	0	0	388	388	388	388	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Concrete Trowel Machine	0	0	0	0	0	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	0	0	0	0	0	0	0	138	138	138	138	138	138	0	0	0	0	0	0	0
	Concrete Vibrators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cranes - Mobile 35 ton	0	0	0	0	0	0	215	215	215	862	862	862	862	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,508	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	431	431	431	431	431	431	431	431	431	431	431	215	215	215	215
	Cranes - Mobile 45 ton	0	0	0	0	0	0	0	0	0	0	690	690	690	690	690	690	690	690	1,381	1,381	1,381	1,381	1,381	1,381	1,381	1,381	1,381	1,381	1,381	690	690	690	690	690	690	690	690	690	690	690	345	345	345	0	0	0	0	0	0
	Crane - Mobile 65 ton	0	0	0	0	0	0	0	0	0	0	0	345	345	690	1,381	1,726	1,726	1,726	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	1,726	1,726	1,381	690	690	690	690	690	345	345	345	345	345	345	0	0	0	0	0
	Cranes 100 / 150 ton cap	0	0	0	0	0	0	0	0	0	0	482	482	964	964	1,446	1,446	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	1,927	964	964	482	482	482	482	482	482	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diesel Powered Welder	0	0	0	507	507	507	507	507	507	507	507	507	507	507	507	761	761	761	1,015	1,015	1,015	1,015	1,015	1,269	1,269	1,269	1,269	1,269	1,269	1,269	1,269	1,269	761	761	761	761	761	507	507	507	507	507	254	254	254	254	152	152	101
	Excavator - Backhoe/loader	481	481	721	961	961	961	961	961	961	961	961	481	481	481	481	481	240	240	240	240	240	240	240	240	0	0	0	0	0	0	0	0	0	0	0	481	481	481	481	240	240	240	0	0	0	0	0	0	0
	Excavator - Earth Scraper 637	14,837	14,837	14,837	14,837	8,478	8,478	8,478	4,239	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Excavator - loader	636	636	636	636	636	636	636	636	636	636	636	636	318	318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	318	318	318	318	0	0	0	0	0	318	318	318	0	0	0	0	0	0	0	0	0
	Excavator - Motor Grader (CAT140H)	0	431	431	431	1,292	1,292	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	431	431	431	431	0	0	0	861	861	861	861	431	431	431	0	0	0	0	0	0	0
	Excavator - Trencher (CAT320)	0	0	0	0	0	901	901	901	901	901	901	901	901	901	901	901	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fired Heaters (2,000 BTU)	0	0	0	0	327	327	327	327	246	246	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	409	246	246	246	164	164	164	164	164	164	164	164	164	164	82	82	82	82
	Forklift	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	352	352	352	352	352	352	352	352	352	352	352	264	264	264	264	264	264	264	264	264	264	264	264	264	264	264	88	88	88	88	44	44	44
	Fusion Welder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy Haul / 600 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,302	1,302	1,302	1,302	1,302	1,302	1,302	1,302	1,302	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy Haul / 1,000 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,302	1,302	1,302	1,302	1,302	1,302	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Plants	82	82	164	327	655	655	655	655	327	327	491	491	655	655	819	819	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	819	819	819	819	819	819	819	819	819	409	409	409	409	409	327	327	164	164
	Man lifts - telescoping	0	0	0	0	0	0	0	0	495	495	495	990	990	990	990	990	990	990	990	1,484	1,484	1,484	1,484	1,979	1,979	1,979	1,979	1,979	1,979	1,979	1,979	1,979	1,979	1,979	1,979	1,484	1,484	1,484	990	990	990	990	495	495	495	495	198	198	198
	Man lift - scissor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portable Compaction Roller	0	0	1,694	1,694	1,694	1,694	1,694	1,694	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	678	0	0	0	0	0	678	678	678	678	678	678	0	0	678	678	678	339	339	0	0	0	0	0	0	0
	Portable Compaction - Vibratory Plate	0	0	0	0	0	0	0	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	0	0	0	0	0	56	56	56	56	0	0	0	74	74	74	74	74	37	37	0	0	0	0	0	0	0
	Portable Compaction - Ram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pumps	246	246	246	491	491	491	491	491	491	491	491	491	491	491	491	491	491	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	246	164	164	164	164	164	164	164
	Portable Power Generators	906	906	906	906	1,358	1,358	1,358	1,358	1,358	2,264	2,264	2,264	2,264	2,264	2,264	3,396	3,396	3,396	3,396	3,396	3,396	3,396	4,528	4,528	4,528	4,528	4,528	4,528	4,528	4,528	4,528	4,528	4,528	4,528	4,528	3,396	3,396	3,396	3,396	2,264	2,264	2,264	2,264	2,264	2,264	1,132	1,132	1,132	453
	Truck Crane - Greater than 300 ton	0	0	0	0	0	0	0	0	0	0	0	774	774	774	774	774	1,547	1,547	2,321	2,321	3,095	3,095	3,095	3,095	3,095	3,095	3,095	3,095	3,095	2,321	2,321	1,547	1,547	1,547	774	774	774	774	774	0	0	0	0	0	0	0	0	0	0
	Truck Crane - Greater than 200 ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	482	482	482	482	482	964	964	964	1,446	1,446	1,446	1,446	1,446	1,446	1,446	964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vibratory Roller Ingersol-Rand 20 ton	1,394	1,394	1,394	1,394	1,394	1,394	1,394	1,394	1,394	929	929	929	929	929	465	465	465	465	0	0	0	0	0	0	0	0	0	0	929	929	929	929	0	0	0	0	0	465	465	465	465	0	0	0	0	0	0	0	0
	WORKER VEHICLES																																																		
	Personal commuting vehicles	15	25	34	44	65	82	98	131	146	175	218	243	288	338	407	460	502	533	561	594	623	697	749	806	857	867	954	1,021	1,054	1,060	1,071	1,055	1,045	998	945	915	832	805	683	555	440	299	239	238	238	221	187	171	129
	DELIVERY TRUCKS																																																		
	Light delivery truck (e.g. Fed-Ex)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424	424
	Import fill trucks	2,035	2,035	2,035	2,035	2,035	2,035	2,035	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ONSITE TOTAL (lbs/day)	**31,956**	**32,684**	**37,738**	**37,663**	**36,386**	**39,086**	**33,350**	**27,289**	**25,261**	**24,850**	**26,290**	**26,569**	**27,276**	**28,924**	**30,028**	**31,302**	**33,671**	**34,758**	**34,786**	**38,170**	**38,973**	**38,475**	**40,030**	**42,556**	**41,639**	**40,061**	**38,414**	**41,373**	**40,983**	**38,592**	**36,812**	**33,288**	**32,262**	**31,299**	**28,576**	**26,047**	**25,906**	**27,086**	**25,338**	**21,353**	**18,073**	**17,467**	**10,114**	**10,113**	**9,147**	**6,855**	**5,875**	**5,303**	**3,850**
OFF-SITE	**WORKER VEHICLES**																																																		
	Personal commuting vehicles	837	1,441	1,934	2,497	3,664	4,629	5,520	7,415	8,245	9,927	12,310	13,762	16,308	19,127	23,026	26,019	28,397	30,137	31,729	33,615	35,250	39,447	42,401	45,600	48,495	49,067	53,947	57,764	59,641	59,975	60,565	59,688	59,142	56,484	53,466	51,785	47,061	45,535	38,644	31,407	24,884	16,929	13,513	13,488	13,488	12,479	10,584	9,698	7,310
	DELIVERY TRUCKS																																																		
	Light delivery truck (e.g. Fed-Ex)	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182	7,182
	Import fill trucks	22,394	22,394	22,394	22,394	22,394	22,394	22,394	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LINEARS																																																		
	ON ROAD																																																		
	Dump Truck	0	0	0	0	0	0	0	0	0	0	1,144	1,144	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,144	1,144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Service Truck (MHD-DSL)	0	0	0	0	0	0	0	0	0	0	572	572	572	572	572	572	858	858	858	858	858	858	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pipe Haul Truck and Trailer (HHDT-DSL)	0	0	0	0	0	0	0	0	0	0	858	858	858	858	858	858	572	572	572	572	572	572	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3/4 Ton Pickup (MHD-DSL)	0	0	0	0	0	0	0	0	0	0	1,360	1,360	1,360	1,360	1,360	1,360	2,041	2,041	2,041	2,041	2,041	2,041	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck - water	0	0	0	0	0	0	0	0	0	0	572	572	1,144	1,144	1,144	1,144	1,144	1,144	1,144	1,144	1,144	572	572	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	OFF ROAD																																																		
	Air Compressor (185 CFM)	0	0	0	0	0	0	0	0	0	0	214	214	427	427	641	641	641	641	427	427	214	214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bore Machine (Hydraulic)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	233	233	233	233	233	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12 Ton Hydra Crane	0	0	0	0	0	0	0	0	0	0	964	1,927	1,927	2,891	2,891	2,891	2,891	2,891	2,891	2,891	1,927	1,927	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Backhoe/loader	0	0	0	0	0	0	0	0	0	0	1,442	1,442	2,403	2,403	2,403	2,403	2,403	2,403	2,403	2,403	1,442	1,442	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Excavator - Trencher	0	0	0	0	0	0	0	0	0	0	0	427	427

	CH4	MONTHLY EMISSIONS (lbs/day)																																																			
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
ON-SITE	**On-Road Vehicles**																																																				
	18 cy fill mat'l haul truck	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Pumper Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hydrogen Energy California, Kern County Power Project
Nitrous Oxide (N2O) Emissions by Month
8/17/2012

	N2O	MONTHLY EMISSIONS (lbs/day)																																																			
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
ON-SITE	**On-Road Vehicles**																																																				
	18 cy fill mat'l haul truck	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Pumper Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	NOx	MONTHLY EMISSIONS (lbs/day)																																																			
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
ON-SITE	**On-Road Vehicles**																																																				
	18 cy fill mat'l haul truck	0	0	28	28	57	57	57	57	28	28	28	28	14	14	14	14	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	9	9	3	3	3	0	0	0	0	0	0	0
	Bus	6	6	6	6	9	9	9	9	9	9	14	14	14	14	14	14	20	20	20	28	28	28	28	40	40	40	40	40	40	40	40	40	40	40	34	34	34	28	28	14	14	9	9	6	6	6	3	3
	Concrete Pumper Truck	0	0	0	0	0	6	6	6	6	6	6	6	6	9	9	9	6	6	6	6	6	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dump Truck	9	11	11	9	9	9	9	9	9	9	6	6	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	6	6	6	6	9	9	9	6	3	3	3	3	3	0	0	0	0
	Diesel Tractor (Yard Dog)	0	0	0	0	0	6	6	6	6	6	6	13	13	13	13	13	26	26	26	26	26	26	26	32	32	32	32	32	32	32	32	32	32	32	32	13	13	13	13	13	13	13	0	0	0	0	0	0	0
	Service Truck - 1 ton	6	6	6	11	11	11	11	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	3	3	3	3	3	3	3
	Pile Driver Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck - Fuel/Lube	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0	0	0
	Tractor Truck 5th Wheel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks - Pickup 3/4 ton	6	6	6	6	6	7	8	9	17	17	17	17	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	17	17	11	11	11	11	6
	Trucks - 3 ton	3	3	3	3	3	6	6	6	11	11	11	11	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	11	9	9	9	9	6	6	6	3	3	3	3	0	0	0
	Truck - Water	14	14	14	14	14	14	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	9	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	3	3	3	3	3	3	3
	Off Road Vehicles																																																			
	Air Compressor 185 CFM	2	2	2	2	3	3	3	3	3	3	3	3	3	7	7	7	9	9	9	11	11	11	11	13	13	13	13	13	13	13	13	13	13	13	9	9	9	7	7	7	7	4	4	4	2	2	1	1
	Air Compressor 750 CFM	0	0	0	0	3	3	3	3	5	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	5	5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Articulating Boom Platform	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bob cat loader	0	0	2	2	2	2	2	7	7	7	7	7	5	5	5	5	5	5	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	0	0	0	0	0	0	0
	Bulldozer D10R	40	40	40	26	26	26	26	26	26	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bulldozer D6C	14	14	14	14	9	9	9	9	9	9	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Concrete Trowel Machine	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0
	Concrete Vibrators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cranes - Mobile 35 ton	0	0	0	0	0	0	2	2	2	9	9	9	9	17	17	17	17	17	17	17	17	17	17	17	17	17	12	12	12	12	12	12	12	12	5	5	5	5	5	5	5	5	5	5	2	2	2	2	2
	Cranes - Mobile 45 ton	0	0	0	0	0	0	0	0	0	0	7	7	7	7	7	7	7	7	13	13	13	13	13	13	13	13	13	13	13	13	7	7	7	7	7	7	7	7	7	7	3	3	3	0	0	0	0	0	0
	Crane - Mobile 65 ton	0	0	0	0	0	0	0	0	0	0	0	3	3	7	13	17	17	17	20	20	20	20	20	20	20	20	20	20	20	20	17	17	13	7	7	7	7	7	3	3	3	3	3	3	3	0	0	0	0
	Cranes 100 / 150 ton cap	0	0	0	0	0	0	0	0	0	0	4	4	9	9	13	13	17	17	17	17	17	17	17	17	17	17	17	17	17	9	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diesel Powered Welder	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	7	7	7	9	9	9	9	9	12	12	12	12	12	12	12	12	12	7	7	7	7	7	5	5	5	5	5	2	2	2	2	1	1	1
	Excavator - Backhoe/loader	4	4	6	8	8	8	8	8	8	8	8	4	4	4	4	4	4	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	2	2	2	0	0	0	0	0	0	0
	Excavator - Earth Scraper 637	131	131	131	131	75	75	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Excavator - loader	6	6	6	6	6	6	6	6	6	6	6	6	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0	0	0	0	0	3	3	3	0	0	0	0	0	0	0	0	0
	Excavator - Motor Grader (CAT140H)	0	4	4	4	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	0	0	0	9	9	9	9	4	4	4	0	0	0	0	0	0	0
	Excavator - Trencher (CAT320)	0	0	0	0	0	11	11	11	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fired Heaters (2,000 BTU)	0	0	0	0	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Forklift	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	0	0	0
	Fusion Welder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy Haul / 600 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy Haul / 1,000 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	11	11	11	11	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Plants	1	1	1	3	5	5	5	5	3	3	4	4	5	5	6	6	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	6	6	6	6	6	6	6	6	3	3	3	3	3	3	3	3	1	1
	Man lifts - telescoping	0	0	0	0	0	0	0	0	5	5	5	9	9	9	9	9	9	9	9	9	14	14	14	14	19	19	19	19	19	19	19	19	19	19	19	14	14	14	9	9	9	9	5	5	5	5	2	2	2
	Man lift - scissor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portable Compaction Roller	0	0	18	18	18	18	18	18	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	0	0	0	7	7	7	4	4	0	0	0	0	0	0
	Portable Compaction - Vibratory Plate	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Portable Compaction - Ram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pumps	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
	Portable Power Generators	9	9	9	9	13	13	13	13	13	22	22	22	22	22	22	32	32	32	32	32	32	32	43	43	43	43	43	43	43	43	43	43	43	43	32	32	32	32	32	22	22	22	22	22	22	11	11	11	4
	Truck Crane - Greater than 300 ton	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	12	12	18	18	24	24	24	24	24	24	24	24	24	18	18	12	12	12	6	6	6	6	6	0	0	0	0	0	0	0	0	0	0
	Truck Crane - Greater than 200 ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	9	9	9	13	13	13	13	13	13	13	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vibratory Roller Ingersol-Rand 20 ton	13	13	13	13	13	13	13	13	13	9	9	9	9	9	4	4	4	4	0	0	0	0	0	0	0	0	0	9	9	9	0	0	0	0	0	0	0	4	4	4	4	0	0	0	0	0	0	0	0
	WORKER VEHICLES																																																			
	Personal commuting vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	DELIVERY TRUCKS																																																			
	Light delivery truck (e.g. Fed-Ex)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Import fill trucks	24	24	24	24	24	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ONSITE TOTAL (lbs/day)	**298**	**305**	**356**	**355**	**348**	**376**	**324**	**263**	**242**	**240**	**252**	**255**	**259**	**275**	**284**	**296**	**314**	**323**	**321**	**351**	**358**	**352**	**366**	**390**	**381**	**367**	**352**	**381**	**378**	**356**	**340**	**307**	**298**	**289**	**263**	**238**	**238**	**250**	**234**	**198**	**168**	**163**	**94**	**94**	**85**	**63**	**54**	**49**	**36**
OFF-SITE	**WORKER VEHICLES**																																																			
	Personal commuting vehicles	1	1	2	2	4	4	5	7	8	10	12	13	16	19	22	25	28	29	31	33	34	38	41	44	47	48	52	56	58	58	59	58	57	55	52	50	46	44	37	30	24	16	13	13	13	12	10	9	7
	DELIVERY TRUCKS																																																			
	Light delivery truck (e.g. Fed-Ex)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
	Import fill trucks	229	229	229	229	229	229	229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LINEARS																																																			
	ON ROAD																																																			
	Dump Truck	0	0	0	0	0	0	0	0	0	0	11	11	17	17	17	17	17	17	17	17	11	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Service Truck (MHD-DSL)	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	6	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pipe Haul Truck and Trailer (HHDT-DSL)	0	0	0	0	0	0	0	0	0	0	9	9	9	9	9	9	6	6	6	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3/4 Ton Pickup (MHD-DSL)	0	0	0	0	0	0	0	0	0	0	11	11	11	11	11	11	17	17	17	17	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck - water	0	0	0	0	0	0	0	0	0	0	6	6	11	11	11	11	11	11	11	11	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	OFF ROAD																																																			
	Air Compressor (185 CFM)	0	0	0	0	0	0	0	0	0	0	2	2	4	4	7	7	7	7	4	4	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bore Machine (Hydraulic)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12 Ton Hydra Crane	0	0	0	0	0	0	0	0	0	0	9	17	17	26	26	26	26	26	26	26	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Backhoe/loader	0	0	0	0	0	0	0	0	0	0	13	13	21	21	21	21	21	21	21	21	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Excavator - Trencher	0	0	0	0	0	0	0	0	0	0	0	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Forklift	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Welding Generator	0	0	0	0	0	0	0	0	0	0	17	17	17	17	17	17	17	17	17	17	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3 to 5 Ton AC Roller	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pipe Bending Machine	0	0	0	0	0	0	0	0	0	0	3	3	6	6	6	6	6	6	6	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RAIL																																																			
	AIR COMPRESSOR 185	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BOOM T

Hydrogen Energy California, Kern County Power Project
PM10 Combustion Emissions by Month
8/17/2012

	PM10 - Combustion	MONTHLY EMISSIONS (lbs/day)																																																			
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
ON-SITE	**On-Road Vehicles**																																																				
	18 cy fill mat'l haul truck	0.00	0.00	1.77	1.77	3.53	3.53	3.53	3.53	1.77	1.77	1.77	1.77	0.88	0.88	0.88	0.88	0.88	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.53	0.53	0.53	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bus	0.35	0.35	0.35	0.35	0.53	0.53	0.53	0.53	0.53	0.53	0.88	0.88	0.88	0.88	0.88	0.88	1.24	1.24	1.24	1.77	1.77	1.77	1.77	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.12	2.12	2.12	1.77	1.77	0.88	0.88	0.53	0.53	0.35	0.35	0.35	0.18	0.18
	Concrete Pumper Truck	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.53	0.53	0.53	0.35	0.35	0.35	0.35	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Truck	0.53	0.71	0.71	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.35	0.35	0.35	0.35	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.53	0.53	0.53	0.35	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.00	0.00
	Diesel Tractor (Yard Dog)	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.40	0.40	0.40	0.80	0.80	0.80	0.80	0.80	1.60	1.60	1.60	1.60	1.60	1.60	1.60	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Service Truck - 1 ton	0.35	0.35	0.35	0.71	0.71	0.71	0.71	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.18	0.18	0.18	0.18	0.18	0.18	0.18
	Pile Driver Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Truck - Fuel/Lube	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.00	0.00	0.00
	Tractor Truck 5th Wheel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Trucks - Pickup 3/4 ton	0.34	0.34	0.34	0.34	0.34	0.41	0.48	0.55	1.03	1.03	1.03	1.03	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.03	1.03	0.69	0.69	0.69	0.69	0.34
	Trucks - 3 ton	0.18	0.18	0.18	0.18	0.35	0.35	0.35	0.71	0.71	0.71	0.71	0.71	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	0.53	0.53	0.53	0.53	0.35	0.35	0.35	0.18	0.18	0.18	0.18	0.18	0.00	0.00
	Truck - Water	0.88	0.88	0.88	0.88	0.88	0.88	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.35	0.53	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.18	0.18	0.18	0.18	0.18	0.18	0.18
	Off Road Vehicles																																																			
	Air Compressor 185 CFM	0.23	0.23	0.23	0.23	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.69	0.69	0.69	0.92	0.92	0.92	1.15	1.15	1.15	1.15	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	0.92	0.92	0.92	0.69	0.69	0.69	0.69	0.46	0.46	0.46	0.23	0.23	0.11	0.11
	Air Compressor 750 CFM	0.00	0.00	0.00	0.00	0.24	0.24	0.24	0.24	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.48	0.48	0.48	0.48	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
	Articulating Boom Platform	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bob cat loader	0.00	0.00	0.16	0.16	0.16	0.16	0.16	0.63	0.63	0.63	0.63	0.63	0.47	0.47	0.47	0.47	0.47	0.47	0.31	0.31	0.31	0.31	0.31	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bulldozer D10R	1.54	1.54	1.54	1.02	1.02	1.02	1.02	1.02	1.02	0.51	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bulldozer D6C	1.19	1.19	1.19	1.19	0.80	0.80	0.80	0.80	0.80	0.80	0.40	0.40	0.40	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Concrete Trowel Machine	0.00	0.00	0.00	0.00	0.00	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.12	0.12	0.12	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Concrete Vibrators	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cranes - Mobile 35 ton	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.21	0.21	0.85	0.85	0.85	0.85	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.21	0.21	0.21	0.21
	Cranes - Mobile 45 ton	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.19	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00
	Crane - Mobile 65 ton	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.19	0.38	0.76	0.95	0.95	0.95	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	0.95	0.95	0.76	0.38	0.38	0.38	0.38	0.38	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.00	0.00	0.00	0.00
	Cranes 100 / 150 ton cap	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.30	0.30	0.45	0.45	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.30	0.30	0.15	0.15	0.15	0.15	0.15	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel Powered Welder	0.00	0.00	0.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.45	0.45	0.45	0.60	0.60	0.60	0.60	0.60	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.45	0.45	0.45	0.45	0.45	0.30	0.30	0.30	0.30	0.30	0.15	0.15	0.15	0.15	0.09	0.09	0.06
	Excavator - Backhoe/loader	0.35	0.35	0.53	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.35	0.35	0.35	0.35	0.35	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.35	0.35	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Excavator - Earth Scraper 637	5.08	5.08	5.08	5.08	2.90	2.90	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Excavator - loader	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Excavator - Motor Grader (CAT140H)	0.00	0.39	0.39	0.39	1.16	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.39	0.39	0.39	0.00	0.00	0.00	0.00	0.77	0.77	0.77	0.77	0.39	0.39	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Excavator - Trencher (CAT320)	0.00	0.00	0.00	0.00	0.00	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Fired Heaters (2,000 BTU)	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.08	0.08	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.08	0.08	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.03	0.03	0.03
	Forklift	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.08	0.08	0.08	0.08	0.04	0.04	0.04
	Fusion Welder	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heavy Haul / 600 tn Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heavy Haul / 1,000 tn Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Light Plants	0.03	0.03	0.05	0.10	0.20	0.20	0.20	0.20	0.10	0.10	0.15	0.15	0.20	0.20	0.25	0.25	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.13	0.13	0.13	0.13	0.13	0.10	0.10	0.05	0.05
	Man lifts - telescoping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.42	0.42	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	1.27	1.27	1.27	1.27	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.27	1.27	1.27	0.85	0.85	0.85	0.85	0.42	0.42	0.42	0.42	0.17	0.17	0.17
	Man lift - scissor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Portable Compaction Roller	0.00	0.00	1.53	1.53	1.53	1.53	1.53	1.53	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.00	0.00	0.00	0.00	0.61	0.61	0.61	0.61	0.61	0.61	0.00	0.00	0.00	0.61	0.61	0.61	0.31	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Portable Compaction - Vibratory Plate	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Portable Compaction - Ram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pumps	0.08	0.08	0.08	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	Portable Power Generators	0.75	0.75	0.75	0.75	1.12	1.12	1.12	1.12	1.12	1.87	1.87	1.87	1.87	1.87	1.87	2.80	2.80	2.80	2.80	2.80	2.80	2.80	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	2.80	2.80	2.80	2.80	1.87	1.87	1.87	1.87	1.87	1.87	1.87	0.93	0.93	0.93	0.37
	Truck Crane - Greater than 300 ton	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.22	0.22	0.22	0.22	0.45	0.45	0.67	0.67	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.67	0.67	0.45	0.45	0.45	0.22	0.22	0.22	0.22	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Truck Crane - Greater than 200 ton	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.15	0.15	0.15	0.15	0.15	0.30	0.30	0.30	0.45	0.45	0.45	0.45	0.45	0.45	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vibratory Roller Ingersol-Rand 20 ton	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.47	0.47	0.47	0.47	0.47	0.24	0.24	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.47	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.24	0.24	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	WORKER VEHICLES																																																			
	Personal commuting vehicles	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.06	0.06	0.05	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01
	DELIVERY TRUCKS																																																			
	Light delivery truck (e.g. Fed-Ex)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
	Import fill trucks	1.51	1.51	1.51	1.51	1.51	1.51	1.51	0.00	0.00	0.00	0.00	0.00

PM2.5 - Combustion

MONTHLY EMISSIONS (lbs/day)

	CONSTRUCTION VEHICLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
ON-SITE	**On-Road Vehicles**																																																	
	18 cy fill mat'l haul truck	0.0	0.0	1.6	1.6	3.2	3.2	3.2	3.2	1.6	1.6	1.6	1.6	0.8	0.8	0.8	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bus	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.8	0.8	0.8	1.1	1.1	1.1	1.6	1.6	1.6	1.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	1.9	1.9	1.9	1.6	1.6	0.8	0.8	0.5	0.5	0.3	0.3	0.3	0.2	0.2
	Concrete Pumper Truck	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Dump Truck	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
	Diesel Tractor (Yard Dog)	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.7	0.7	0.7	0.7	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Service Truck - 1 ton	0.3	0.3	0.3	0.6	0.6	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Pile Driver Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Truck - Fuel/Lube	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
	Tractor Truck 5th Wheel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Trucks - Pickup 3/4 ton	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.9	0.9	0.9	0.9	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	0.9	0.9	0.6	0.6	0.6	0.6	0.3
	Trucks - 3 ton	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.6	0.6	0.6	0.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.6	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.0	0.0
	Truck - Water	0.8	0.8	0.8	0.8	0.8	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Off Road Vehicles																																																	
	Air Compressor 185 CFM	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.6	0.6	0.8	0.8	0.8	1.1	1.1	1.1	1.1	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.8	0.8	0.8	0.6	0.6	0.6	0.6	0.4	0.4	0.4	0.2	0.2	0.1	0.1
	Air Compressor 750 CFM	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Articulating Boom Platform	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bob cat loader	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.6	0.6	0.6	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bulldozer D10R	1.4	1.4	1.4	0.9	0.9	0.9	0.9	0.9	0.9	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bulldozer D6C	1.1	1.1	1.1	1.1	0.7	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Trowel Machine	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Vibrators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Cranes - Mobile 35 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.8	0.8	0.8	0.8	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2
	Cranes - Mobile 45 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
	Crane - Mobile 65 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.7	0.9	0.9	0.9	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.9	0.9	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0
	Cranes 100 / 150 ton cap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Diesel Powered Welder	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Excavator - Backhoe/loader	0.3	0.3	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Excavator - Earth Scraper 637	4.7	4.7	4.7	4.7	2.7	2.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Excavator - loader	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Excavator - Motor Grader (CAT140H)	0.0	0.4	0.4	0.4	1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0
	Excavator - Trencher (CAT320)	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fired Heaters (2,000 BTU)	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Forklift	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0
	Fusion Welder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Heavy Haul / 600 tn Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Heavy Haul / 1,000 tn Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Light Plants	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
	Man lifts - telescoping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.2	1.2	1.2	1.2	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.2	1.2	1.2	0.8	0.8	0.8	0.8	0.4	0.4	0.4	0.4	0.2	0.2	0.2
	Man lift - scissor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Portable Compaction Roller	0.0	0.0	1.4	1.4	1.4	1.4	1.4	1.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.6	0.6	0.6	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Portable Compaction - Vibratory Plate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Portable Compaction - Ram	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pumps	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Portable Power Generators	0.7	0.7	0.7	0.7	1.0	1.0	1.0	1.0	1.0	1.7	1.7	1.7	1.7	1.7	1.7	2.6	2.6	2.6	2.6	2.6	2.6	2.6	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	2.6	2.6	2.6	2.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	0.9	0.9	0.9	0.3
	Truck Crane - Greater than 300 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.6	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.6	0.6	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Truck Crane - Greater than 200 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Vibratory Roller Ingersol-Rand 20 ton	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	WORKER VEHICLES																																																	
	Personal commuting vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DELIVERY TRUCKS																																																	
	Light delivery truck (e.g. Fed-Ex)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Import fill trucks	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hydrogen Energy California, Kern County Power Project
Sulfur Dioxide (SO2) Emissions by Month
8/17/2012

	SO2	MONTHLY EMISSIONS (lbs/day)																																																		
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
ON-SITE	**On-Road Vehicles**																																																			
	18 cy fill mat'l haul truck	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	ROG	MONTHLY EMISSIONS (lbs/day)																																																			
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
ON-SITE	**On-Road Vehicles**																																																				
	18 cy fill mat'l haul truck	0.0	0.0	6.2	6.2	12.4	12.4	12.4	12.4	6.2	6.2	6.2	6.2	3.1	3.1	3.1	3.1	3.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.9	1.9	1.9	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bus	1.2	1.2	1.2	1.2	1.9	1.9	1.9	1.9	1.9	1.9	3.1	3.1	3.1	3.1	3.1	3.1	4.3	4.3	4.3	6.2	6.2	6.2	6.2	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	7.4	7.4	7.4	6.2	6.2	3.1	3.1	1.9	1.9	1.2	1.2	1.2	0.6	0.6
	Concrete Pumper Truck	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.9	1.9	1.9	1.2	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Dump Truck	1.9	2.5	2.5	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.2	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.9	1.9	1.9	1.2	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0
	Diesel Tractor (Yard Dog)	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4	1.4	1.4	2.8	2.8	2.8	2.8	2.8	5.6	5.6	5.6	5.6	5.6	5.6	5.6	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	2.8	2.8	2.8	2.8	2.8	2.8	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Service Truck - 1 ton	1.2	1.2	1.2	2.5	2.5	2.5	2.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Pile Driver Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Truck - Fuel/Lube	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0
	Tractor Truck 5th Wheel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Trucks - Pickup 3/4 ton	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.9	0.9	0.9	0.9	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.9	0.9	0.6	0.6	0.6	0.6	0.3
	Trucks - 3 ton	0.6	0.6	0.6	0.6	0.6	1.2	1.2	1.2	2.5	2.5	2.5	2.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	2.5	1.9	1.9	1.9	1.9	1.2	1.2	1.2	0.6	0.6	0.6	0.6	0.6	0.0	0.0
	Truck - Water	3.1	3.1	3.1	3.1	3.1	3.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.2	1.9	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Off Road Vehicles																																																			
	Air Compressor 185 CFM	1.0	1.0	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.9	2.9	2.9	3.9	3.9	3.9	4.9	4.9	4.9	4.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	3.9	3.9	3.9	2.9	2.9	2.9	2.9	2.0	2.0	2.0	1.0	1.0	1.0	0.5	0.5
	Air Compressor 750 CFM	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	0.9	0.9	0.9	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Articulating Boom Platform	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bob cat loader	0.0	0.0	0.6	0.6	0.6	0.6	0.6	2.6	2.6	2.6	2.6	2.6	1.9	1.9	1.9	1.9	1.9	1.9	1.3	1.3	1.3	1.3	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bulldozer D10R	4.5	4.5	4.5	3.0	3.0	3.0	3.0	3.0	3.0	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bulldozer D6C	2.3	2.3	2.3	2.3	1.5	1.5	1.5	1.5	1.5	1.5	0.8	0.8	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Trowel Machine	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Vibrators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Cranes - Mobile 35 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	1.6	1.6	1.6	1.6	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.4	0.4	0.4	0.4
	Cranes - Mobile 45 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Crane - Mobile 65 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.9	1.8	2.2	2.2	2.2	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.2	2.2	1.8	0.9	0.9	0.9	0.9	0.9	0.4	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0
	Cranes 100 / 150 ton cap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.9	0.9	1.3	1.3	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.9	0.9	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Diesel Powered Welder	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	1.5	1.5	1.5	1.5	1.5	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	0.3	0.3	0.2
	Excavator - Backhoe/loader	0.6	0.6	1.0	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.6	0.6	0.6	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Excavator - Earth Scraper 637	14.7	14.7	14.7	14.7	8.4	8.4	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Excavator - loader	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Excavator - Motor Grader (CAT140H)	0.0	0.7	0.7	0.7	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	0.0	0.0	0.0	1.4	1.4	1.4	1.4	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Excavator - Trencher (CAT320)	0.0	0.0	0.0	0.0	0.0	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Fired Heaters (2,000 BTU)	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
	Forklift	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.3	0.3	0.3	0.3	0.1	0.1	0.1
	Fusion Welder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Heavy Haul / 600 tn Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Heavy Haul / 1,000 tn Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Light Plants	0.1	0.1	0.2	0.4	0.8	0.8	0.8	0.8	0.4	0.4	0.6	0.6	0.8	0.8	1.0	1.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.2	0.2
	Man lifts - telescoping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.6	1.6	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	4.9	4.9	4.9	4.9	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	4.9	4.9	4.9	3.3	3.3	3.3	3.3	1.6	1.6	1.6	1.6	0.7	0.7	0.7
	Man lift - scissor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Portable Compaction Roller	0.0	0.0	2.8	2.8	2.8	2.8	2.8	2.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1	1.1	1.1	0.0	0.0	0.0	1.1	1.1	1.1	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Portable Compaction - Vibratory Plate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Portable Compaction - Ram	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pumps	0.3	0.3	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Portable Power Generators	2.9	2.9	2.9	2.9	4.3	4.3	4.3	4.3	4.3	7.2	7.2	7.2	7.2	7.2	7.2	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	10.7	10.7	10.7	10.7	10.7	7.2	7.2	7.2	7.2	7.2	7.2	3.6	3.6	3.6	1.4
	Truck Crane - Greater than 300 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	1.3	1.3	2.0	2.0	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.0	2.0	1.3	1.3	1.3	0.7	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Truck Crane - Greater than 200 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.9	0.9	0.9	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Vibratory Roller Ingersol-Rand 20 ton	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.1	1.1	1.1	1.1	1.1	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	1.1	1.1	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	WORKER VEHICLES																																																			
	Personal commuting vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	DELIVERY TRUCKS																																																			
	Light delivery truck (e.g. Fed-Ex)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	Import fill trucks	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.0

	CO2e	MONTHLY EMISSIONS (lbs/day)																																																
	CONSTRUCTION VEHICLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
	On-Road Vehicles																																																		
	18 cy fill mat'l haul truck	0	0	2,876	2,876	5,753	5,753	5,753	5,753	2,876	2,876	2,876	2,876	1,438	1,438	1,438	1,438	1,438	1,438	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	863	863	863	863	288	288	288	0	0	0	0	0	0	0
	Bus	575	575	575	575	863	863	863	863	863	863	1,438	1,438	1,438	1,438	1,438	1,438	2,013	2,013	2,013	2,876	2,876	2,876	2,876	4,027	4,027	4,027	4,027	4,027	4,027	4,027	4,027	4,027	4,027	4,027	4,027	3,452	3,452	3,452	2,876	2,876	1,438	1,438	863	863	575	575	575	288	288
	Concrete Pumper Truck	0	0	0	0	0	575	575	575	575	575	575	575	575	863	863	863	575	575	575	575	575	0	0	0	0	0	0	288	288	288	288	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dump Truck	863	1,151	1,151	863	863	863	863	863	863	863	575	575	575	575	575	0	0	0	0	0	0	0	0	0	0	0	0	575	575	575	575	575	575	575	575	575	863	863	863	575	288	288	288	288	288	0	0	0	0
	Diesel Tractor (Yard Dog)	0	0	0	0	0	652	652	652	652	652	652	1,305	1,305	1,305	1,305	1,305	2,610	2,610	2,610	2,610	2,610	2,610	2,610	3,262	3,262	3,262	3,262	3,262	3,262	3,262	3,262	3,262	3,262	3,262	3,262	1,305	1,305	1,305	1,305	1,305	1,305	1,305	0	0	0	0	0	0	0
	Service Truck - 1 ton	575	575	575	1,151	1,151	1,151	1,151	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	288	288	288	288	288	288	288
	Pile Driver Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck - Fuel/Lube	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	274	137	137	137	137	137	137	137	0	0	0
	Tractor Truck 5th Wheel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trucks - Pickup 3/4 ton	684	684	684	684	684	821	958	1,095	2,053	2,053	2,053	2,053	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	3,422	2,053	2,053	1,369	1,369	1,369	1,369	684
	Trucks - 3 ton	288	288	288	288	288	575	575	575	1,151	1,151	1,151	1,151	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,151	863	863	863	863	575	575	575	288	288	288	288	0	0	0
	Truck - Water	1,438	1,438	1,438	1,438	1,438	1,438	863	863	863	863	863	863	863	863	863	863	863	863	863	863	863	863	863	575	863	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	575	288	288	288	288	288	288	288
	Off Road Vehicles																																																	
	Air Compressor 185 CFM	217	217	217	217	326	326	326	326	326	326	326	326	326	651	651	651	869	869	869	1,086	1,086	1,086	1,086	1,303	1,303	1,303	1,303	1,303	1,303	1,303	1,303	1,303	1,303	1,303	1,303	869	869	869	651	651	651	651	434	434	434	217	217	109	109
	Air Compressor 750 CFM	0	0	0	0	228	228	228	228	456	456	456	456	456	456	456	912	912	912	912	912	912	912	912	912	912	912	912	912	912	456	456	456	456	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
	Articulating Boom Platform	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bob cat loader	0	0	170	170	170	170	170	681	681	681	681	681	511	511	511	511	511	511	340	340	340	340	340	340	0	0	0	0	0	0	0	0	0	0	0	170	170	170	170	170	170	170	0	0	0	0	0	0	0
	Bulldozer D10R	4,624	4,624	4,624	3,082	3,082	3,082	3,082	3,082	3,082	1,541	1,541	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bulldozer D6C	1,176	1,176	1,176	1,176	784	784	784	784	784	784	392	392	392	392	392	0	0	0	0	0	0	0	0	0	0	0	0	392	392	392	392	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Concrete Trowel Machine	0	0	0	0	0	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	0	0	0	0	0	0	0	141	141	141	141	141	141	0	0	0	0	0	0	0
	Concrete Vibrators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cranes - Mobile 35 ton	0	0	0	0	0	0	218	218	218	872	872	872	872	1,526	1,526	1,526	1,526	1,526	1,526	1,526	1,526	1,526	1,526	1,526	1,526	1,526	1,090	1,090	1,090	1,090	1,090	1,090	1,090	1,090	436	436	436	436	436	436	436	436	436	436	218	218	218	218
	Cranes - Mobile 45 ton	0	0	0	0	0	0	0	0	0	0	697	697	697	697	697	697	697	697	1,395	1,395	1,395	1,395	1,395	1,395	1,395	1,395	1,395	1,395	1,395	697	697	697	697	697	697	697	697	697	697	697	697	697	0	0	0	0	0	0	0
	Crane - Mobile 65 ton	0	0	0	0	0	0	0	0	0	0	0	349	349	697	1,395	1,743	1,743	1,743	2,092	2,092	2,092	2,092	2,092	2,092	2,092	2,092	2,092	2,092	2,092	2,092	1,743	1,743	1,395	697	697	697	697	697	349	349	349	349	349	349	0	0	0	0
	Cranes 100 / 150 ton cap	0	0	0	0	0	0	0	0	0	0	486	486	973	973	1,459	1,459	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946	973	973	486	486	486	486	486	486	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diesel Powered Welder	0	0	0	513	513	513	513	513	513	513	513	513	513	513	513	770	770	770	1,026	1,026	1,026	1,026	1,026	1,283	1,283	1,283	1,283	1,283	1,283	1,283	1,283	1,283	770	770	770	770	770	513	513	513	513	513	257	257	257	257	154	154	103
	Excavator - Backhoe/loader	486	486	729	972	972	972	972	972	972	972	972	486	486	486	486	486	243	243	243	243	243	243	243	243	0	0	0	0	0	0	0	0	0	0	0	486	486	486	486	243	243	243	0	0	0	0	0	0	0
	Excavator - Earth Scraper 637	14,945	14,945	14,945	14,945	8,540	8,540	4,270	0	0	0	0	0	0	0	0	0	0	0	0	0	0	540	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Excavator - loader	642	642	642	642	642	642	642	642	642	642	642	642	321	321	0	0	0	0	0	0	0	0	0	0	0	0	0	321	321	321	321	0	0	0	0	0	0	321	321	321	0	0	0	0	0	0	0	0	0
	Excavator - Motor Grader (CAT140H)	0	434	434	434	1,303	1,303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	434	434	434	434	0	0	0	0	869	869	869	869	434	434	434	0	0	0	0	0	0	0
	Excavator - Trencher (CAT320)	0	0	0	0	0	910	910	910	910	910	910	910	910	910	910	910	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fired Heaters (2,000 BTU)	0	0	0	0	330	330	330	330	248	248	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	248	248	248	165	165	165	165	165	165	165	165	165	165	165	165	83	83	83
	Forklift	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	358	358	358	358	358	358	358	358	358	358	358	269	269	269	269	269	269	269	269	269	269	269	269	269	269	269	90	90	90	90	45	45	45
	Fusion Welder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy Haul / 600 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,315	1,315	1,315	1,315	1,315	1,315	1,315	1,315	1,315	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Heavy Haul / 1,000 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,315	1,315	1,315	1,315	1,315	1,315	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Light Plants	83	83	165	330	661	661	661	661	330	330	330	496	496	661	661	826	826	1,156	1,156	1,156	1,156	1,156	1,156	1,156	1,156	1,156	1,156	1,156	1,156	1,156	1,156	826	826	826	826	826	826	826	826	826	413	413	413	413	413	330	330	165	165
	Man lifts - telescoping	0	0	0	0	0	0	0	0	502	502	502	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,507	1,507	1,507	1,507	2,009	2,009	2,009	2,009	2,009	2,009	2,009	2,009	2,009	2,009	2,009	2,009	1,507	1,507	1,507	1,005	1,005	1,005	1,005	502	502	502	502	201	201	201
	Man lift - scissor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portable Compaction Roller	0	0	1,712	1,712	1,712	1,712	1,712	1,712	685	685	685	685	685	685	685	685	685	685	685	685	685	685	685	685	0	0	0	0	685	685	685	685	685	685	0	0	685	685	685	342	342	0	0	0	0	0	0	0	0
	Portable Compaction - Vibratory Plate	0	0	0	0	0	0	0	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	0	0	0	0	0	56	56	56	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portable Compaction - Ram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	75	75	75	75	38	38	0	0	0	0	0	0	0
	Pumps	248	248	248	496	496	496	496	496	496	496	496	496	496	496	496	496	496	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	248	165	165	165	165	165	165	165
	Portable Power Generators	916	916	916	916	1,374	1,374	1,374	1,374	1,374	2,291	2,291	2,291	2,291	2,291	2,291	3,436	3,436	3,436	3,436	3,436	3,436	3,436	4,581	4,581	4,581	4,581	4,581	4,581	4,581	4,581	4,581	4,581	4,581	4,581	3,436	3,436	3,436	3,436	2,291	2,291	2,291	2,291	2,291	2,291	1,145	1,145	1,145	458
	Truck Crane - Greater than 300 ton	0	0	0	0	0	0	0	0	0	0	783	783	783	783	783	1,565	1,565	2,348	2,348	3,130	3,130	3,130	3,130	3,130	3,130	3,130	3,130	3,130	3,130	2,348	2,348	1,565	1,565	1,565	783	783	783	783	783	0	0	0	0	0	0	0	0	0	0
	Truck Crane - Greater than 200 ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	486	486	486	486	486	973	973	973	1,459	1,459	1,459	1,459	1,459	1,459	1,459	973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Vibratory Roller Ingersol-Rand 20 ton	1,405	1,405	1,405	1,405	1,405	1,405	1,405	1,405	1,405	937	937	937	937	937	468	468	468	468	0	0	0	0	0	0	0	0	0	937	937	937	937	0	0	0	0	0	0	468	468	468	468	0	0	0	0	0	0	0	0
	WORKER VEHICLES																																																	
	Personal commuting vehicles	15	26	35	45	66	83	99	133	148	178	220	246	292	342	412	466	508	540	568	602	631	706	759	817	868	879	966	1,034	1,068	1,074	1,085	1,069	1,059	1,011	957	927	843	815	692	562	446	303	242	242	242	223	190	174	131
	DELIVERY TRUCKS																																																	
	Light delivery truck (e.g. Fed-Ex)	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426	426
	Import fill trucks	2,044	2,044	2,044	2,044	2,044	2,044	2,044	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ONSITE TOTAL (lbs/day)	**32,197**	**32,930**	**38,023**	**37,949**	**36,661**	**39,382**	**33,604**	**27,509**	**25,471**	**25,062**	**26,515**	**26,800**	**27,512**	**29,178**	**30,294**	**31,587**	**33,975**	**35,073**	**35,110**	**38,528**	**39,340**	**38,840**	**40,412**	**42,960**	**42,032**	**40,439**	**38,775**	**41,757**	**41,362**	**38,946**	**37,148**	**33,592**	**32,555**	**31,582**	**28,832**	**26,280**	**26,137**	**27,327**	**25,560**	**21,538**	**18,233**	**17,622**	**10,207**	**10,206**	**9,234**	**6,917**	**5,927**	**5,350**	**3,884**

ON-SITE

OFF-SITE

	WORKER VEHICLES																																																	
	Personal commuting vehicles	872	1,501	2,014	2,601	3,817	4,822	5,751	7,725	8,589	10,342	12,824	14,337	16,989	19,926	23,987	27,106	29,583	31,396	33,055	35,019	36,722	41,095	44,172	47,505	50,521	51,116	56,200	60,177	62,133	62,480	63,095	62,181	61,612	58,843	55,699	53,948	49,027	47,437	40,258	32,719	25,924	17,636	14,077	14,052	14,052	13,000	11,026	10,103	7,616
	DELIVERY TRUCKS																																																	
	Light delivery truck (e.g. Fed-Ex)	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465
	Heavy delivery truck (e.g. flat beds carrying construction eqp)	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256	7,256
	Import fill trucks	22,624	22,624	22,624	22,624	22,624	22,624	22,624	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LINEARS																																																	
	ON ROAD																																																	
	Dump Truck	0	0	0	0	0	0	0	0	0	0	1,151	1,151	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,726	1,151	1,151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Service Truck (MHD-DSL)	0	0	0	0	0	0	0	0	0	0	575	575	575	575	575	575	863	863	863	863	863	863	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pipe Haul Truck and Trailer (HHDT-DSL)	0	0	0	0	0	0	0	0	0	0	863	863	863	863	863	863	575	575	575	575	575	575	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3/4 Ton Pickup (MHD-DSL)	0	0	0	0	0	0	0	0	0	0	1,376	1,376	1,376	1,376	1,376	1,376	2,064	2,064	2,064	2,064	2,064	2,064	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Truck - water	0	0	0	0	0	0	0	0	0	0	575	575	1,151	1,151	1,151	1,151	1,151	1,151	1,151	1,151	575	575	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	OFF ROAD																																																	
	Air Compressor (185 CFM)	0	0	0	0	0	0	0	0	0	0	217	217	434	434	651	651	651	651	434	434	217	217	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bore Machine (Hydraulic)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234	234	234	234	234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	12 Ton Hydra Crane	0	0	0	0	0	0	0	0	0	0	973	1,946	1,946	2,919	2,919	2,919	2,919	2,919	2,919	2,919	1,946	1,946	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Backhoe/loader	0	0	0	0	0	0	0	0	0	0	1,457	1,457	2,429	2,429	2,429	2,429	2,429	2,429	2,429	2,429	1,457	1,457	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM10 - Fugitives

MONTHLY EMISSIONS (lbs/day)

	Round Trips per day per unit	Round Trip Distance (miles/vehicle/day)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
ON-SITE																																																			
CONSTRUCTION VEHICLES																																																			
On-Road Vehicles																																																			
18 cy fill mat'l haul truck	1	1.8	0.0	0.0	7.0	6.8	13.1	12.8	12.5	8.9	4.2	4.1	4.0	4.0	1.9	1.9	1.9	1.8	1.8	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9	0.9	1.0	0.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bus	1	0.75	0.6	0.6	0.6	0.6	0.8	0.8	0.8	0.6	0.5	0.5	0.8	0.8	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.5	1.5	1.4	1.4	2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.5	1.6	1.6	1.3	1.3	0.7	0.7	0.4	0.4	0.3	0.3	0.3	0.2	0.2
Concrete Pumper Truck	2	0.75	0.0	0.0	0.0	0.0	1.1	1.0	0.7	0.7	0.7	0.7	0.6	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Truck	8	0.75	7.4	9.6	9.4	6.8	6.6	6.4	6.3	4.5	4.2	4.1	2.7	2.7	2.5	2.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	3.1	3.1	3.2	2.2	1.1	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0
Diesel Tractor (Yard Dog)	2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Service Truck - 1 ton	10	0.5	4.1	4.0	3.9	7.6	7.3	7.1	7.0	2.5	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.9	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Pile Driver Truck	2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Truck - Fuel/Lube	8	0.75	4.9	4.8	4.7	4.5	4.4	4.3	4.2	3.0	2.8	2.7	2.7	2.7	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	1.1	1.1	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0
Tractor Truck 5th Wheel	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trucks - Pickup 3/4 ton	10	0.5	10.2	10.0	9.8	9.4	9.1	10.7	12.2	9.9	17.5	17.0	16.6	16.6	26.4	26.1	25.7	25.0	25.0	24.9	24.6	24.8	24.7	24.0	23.8	23.6	23.4	23.2	22.6	22.4	22.1	21.8	21.4	21.3	21.3	21.3	21.2	21.3	21.5	21.7	22.1	22.5	23.1	24.7	15.0	15.0	10.0	10.0	10.3	10.5	5.6
Trucks - 3 ton	2	0.5	0.4	0.4	0.4	0.4	0.4	0.7	0.7	0.5	0.9	0.9	0.9	0.9	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.7	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0
Truck - Water	4	1	8.2	8.0	7.8	7.6	7.3	7.1	4.2	3.0	2.8	2.7	2.7	2.7	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	1.5	2.2	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.5	1.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9
Off Road Vehicles																																																			
Air Compressor 185 CFM	1	0.01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Air Compressor 750 CFM	1	0.01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Articulating Boom Platform	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bob cat loader	0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulldozer D10R	0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulldozer D6C	0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Concrete Trowel Machine	1	0.25	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Concrete Vibrators	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes - Mobile 35 ton	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes - Mobile 45 ton	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crane - Mobile 65 ton	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes 100 / 150 ton cap	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diesel Powered Welder	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator - Backhoe/loader	0	0.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator - Earth Scraper 637	0	0.909	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator - loader	0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator - Motor Grader (CAT140H)	0	1.439	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator - Trencher (CAT320)	0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fired Heaters (2,000 BTU)	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklift	5	0.5	6.1	6.0	5.9	5.7	5.5	5.3	5.2	3.7	3.5	3.4	3.3	3.3	3.2	3.1	3.1	3.0	4.0	4.0	3.9	4.0	3.9	3.8	3.8	3.8	3.7	3.7	3.6	2.7	2.6	2.6	2.6	2.6	2.6	2.5	2.6	2.6	2.6	2.6	2.7	2.8	3.0	1.0	1.0	1.0	1.0	0.5	0.5	0.6
Fusion Welder	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Heavy Haul / 600 tn Crane	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Heavy Haul / 1,000 tn Crane	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Plants	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Man lifts - telescoping	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Man lift - scissor	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Portable Compaction Roller	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Portable Compaction - Vibratory Plate	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Portable Compaction - Ram	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pumps	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Portable Power Generators	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Truck Crane - Greater than 300 ton	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Truck Crane - Greater than 200 ton	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vibratory Roller Ingersol-Rand 20 ton	2	0.25	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WORKER VEHICLES																																																			
Personal commuting vehicles			2.4	4.0	5.2	6.5	9.2	11.3	13.2	12.6	13.3	15.5	18.8	20.9	23.7	27.4	32.5	35.8	39.0	41.3	43.0	45.8	47.8	52.1	55.6	59.1	62.4	62.5	67.0	71.2	72.4	71.9	71.3	69.9	69.3	66.1	62.4	60.6	55.8	54.4	46.9	38.9	31.7	23.0	18.5	18.5	18.5	17.2	15.0	14.0	11.2
DELIVERY TRUCKS																																																			
Light delivery truck (e.g. Fed-Ex)			2.0	2.0	2.0	1.9	1.8	1.8	1.7	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8

PM2.5 - Fugitives

MONTHLY EMISSIONS (lbs/day)

	CONSTRUCTION VEHICLES	Round Trips per day per unit	Round Trip Distance (miles/vehicle/day)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
ON-SITE	**On-Road Vehicles**																																																				
	18 cy fill mat'l haul truck	1	1.8	0.0	0.0	0.7	0.7	1.3	1.3	1.3	0.9	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bus	1	0.75	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Pumper Truck	2	0.75	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Dump Truck	8	0.75	0.7	1.0	0.9	0.7	0.7	0.6	0.6	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
	Diesel Tractor (Yard Dog)	2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Hydrogen Energy California, Kern
County Power Project

Calculation of maximum short-term
(daily) and annual emissions
8/17/2012

Highlighted cells indicate the highest monthly or 12-month rolling emissions for the construction period.

PROJECT MONTHLY EMISSIONS (lbs/month)

PROJECT EMISSIONS (on-site + linears)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
CO	3,222	3,320	3,952	3,991	4,067	4,408	3,847	3,371	3,186	3,290	4,650	4,916	6,641	7,324	7,225	7,394	7,670	6,382	6,299	6,551	6,233	6,091	4,903	5,250	5,061	4,949	4,808
CO2	703,040	719,044	830,245	828,597	800,494	859,890	733,697	600,356	555,736	546,695	784,578	827,886	1,247,557	1,329,371	1,356,321	1,356,399	1,413,544	1,114,617	1,110,530	1,172,230	1,117,660	1,097,139	880,652	936,225	916,053	881,339	845,114
CH4	62	64	73	73	70	75	63	58	57	61	87	94	127	139	139	147	150	127	127	133	128	125	104	111	106	103	100
N2O	13	13	15	15	15	16	14	12	11	11	16	17	20	21	22	23	24	25	25	27	25	25	20	21	21	20	19
NOx	6,550	6,711	7,829	7,819	7,657	8,282	7,121	5,796	5,326	5,286	7,469	7,879	11,316	12,114	12,101	12,084	12,612	10,347	10,259	10,813	10,275	10,061	8,056	8,590	8,374	8,080	7,745
PM10 - comb + fug	5,342.5	5,363.5	5,562.0	5,305.9	5,227.0	5,302.4	5,126.5	2,586.3	2,572.4	2,410.9	2,496.3	2,412.4	3,003.2	3,183.9	3,238.8	3,019.6	3,136.6	2,941.8	2,914.4	3,027.8	2,987.7	3,011.1	2,813.8	2,920.8	2,976.0	2,939.5	2,992.2
PM2.5 - comb + fug	1,073.8	1,086.2	1,171.2	1,107.0	1,074.3	1,118.3	1,051.8	748.8	720.3	672.3	754.4	725.9	932.6	1,000.8	991.0	932.2	963.7	850.1	837.6	873.5	838.7	829.0	700.7	742.3	730.9	717.3	708.2
SO2	7	7	8	8	8	9	8	6	6	6	9	9	14	14	15	15	15	12	12	13	12	12	10	10	10	10	9
ROG	1,017	1,046	1,268	1,289	1,384	1,507	1,350	1,134	1,032	1,076	1,511	1,615	2,074	2,240	2,228	2,264	2,361	2,047	1,986	2,095	1,985	1,932	1,574	1,715	1,669	1,630	1,589
CO2e	708,343	724,467	836,506	834,869	806,541	866,396	739,285	605,201	560,370	551,369	791,452	835,251	1,256,345	1,338,945	1,366,145	1,366,549	1,424,275	1,124,895	1,120,929	1,183,254	1,128,243	1,107,556	889,059	945,130	924,702	889,662	853,056

12-month Rolling Emissions (tons/yr)

PROJECT EMISSIONS (on-site + linears)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
CO	-	-	-	-	-	-	-	-	-	-	-	23	25	27	28	30	32	33	34	36	37	39	39	38.98	38.19	37.00	36
CO2	-	-	-	-	-	-	-	-	-	-	-	4395	4667	4973	5236	5499	5806	5933	6122	6408	6689	6964	7012	7066	6900	6676	6421
CH4	-	-	-	-	-	-	-	-	-	-	-	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
N2O	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx	-	-	-	-	-	-	-	-	-	-	-	42	44	47	49	51	54	55	56	59	61	64	64	64	63	61	59
PM10 - comb + fug	-	-	-	-	-	-	-	-	-	-	-	24.9	23.7	22.6	21.4	20.3	19.2	18.1	17.0	17.2	17.4	17.7	17.8	18.1	18.1	18.0	17.8
PM2.5 - comb + fug	-	-	-	-	-	-	-	-	-	-	-	5.7	5.6	5.5	5.4	5.4	5.3	5.2	5.1	5.1	5.2	5.3	5.2	5.2	5.1	5.0	4.9
SO2	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROG	-	-	-	-	-	-	-	-	-	-	-	8	8	9	9	10	10	10	11	11	12	12	12.20	12.25	12.05	11.74	11.42
CO2e	-	-	-	-	-	-	-	-	-	-	-	4430	4704	5011	5276	5542	5851	5980	6171	6460	6744	7022	7071	7126	6960	6735	6479

Construction days per month: 22

ONSITE MONTHLY EMISSIONS (lbs/month)

ONSITE EMISSIONS (no linears)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
CO	3,222	3,320	3,952	3,991	4,067	4,408	3,847	3,371	3,186	3,290	3,411	3,481	3,491	3,759	3,822	4,078	4,251	4,317	4,291	4,653	4,706	4,659	4,903	5,250	5,061	4,949	4,808
CO2	703,040	719,044	830,245	828,597	800,494	859,890	733,697	600,356	555,736	546,695	578,374	584,527	600,074	636,327	660,620	688,647	740,771	764,687	765,299	839,744	857,402	846,445	880,652	936,225	916,053	881,339	845,114
CH4	62	64	73	73	70	75	63	58	57	61	63	64	63	69	71	80	82	84	86	95	96	96	104	111	106	103	100
N2O	13	13	15	15	15	16	14	12	11	11	12	12	12	13	14	15	16	17	17	19	20	19	20	21	21	20	19
NOx	6,550	6,711	7,829	7,819	7,657	8,282	7,121	5,796	5,326	5,286	5,545	5,616	5,694	6,058	6,254	6,503	6,914	7,105	7,066	7,732	7,867	7,742	8,056	8,590	8,374	8,080	7,745
PM10 - comb + fug	5,342.5	5,363.5	5,562.0	5,305.9	5,227.0	5,302.4	5,126.5	2,586.3	2,572.4	2,410.9	2,260.5	2,133.5	2,345.6	2,449.6	2,548.1	2,371.1	2,477.9	2,535.1	2,512.7	2,633.6	2,678.9	2,723.5	2,813.8	2,920.8	2,976.0	2,939.5	2,992.2
PM2.5 - comb + fug	1,073.8	1,086.2	1,171.2	1,107.0	1,074.3	1,118.3	1,051.8	748.8	720.3	672.3	621.4	571.9	591.7	626.3	640.1	597.4	619.5	630.7	622.9	665.7	674.3	672.6	700.7	742.3	730.9	717.3	708.2
SO2	7	7	8	8	8	9	8	6	6	6	6	6	6	7	7	8	8	8	8	9	9	9	10	10	10	10	9
ROG	1,017	1,046	1,268	1,289	1,384	1,507	1,350	1,134	1,032	1,076	1,112	1,156	1,117	1,200	1,220	1,295	1,386	1,405	1,365	1,499	1,514	1,488	1,574	1,715	1,669	1,630	1,589
CO2e	708,343	724,467	836,506	834,869	806,541	866,396	739,285	605,201	560,370	551,369	583,325	589,594	605,257	641,919	666,468	694,913	747,446	771,617	772,428	847,622	865,481	854,479	889,059	945,130	924,702	889,662	853,056

12-month Rolling Emissions (tons/yr)

ONSITE EMISSIONS (no linears)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
CO	-	-	-	-	-	-	-	-	-	-	-	22	22	22	22	22	22	22	22	23	24	24	25	26.09	26.88	27.47	28
CO2	-	-	-	-	-	-	-	-	-	-	-	4170	4119	4078	3993	3923	3893	3845	3861	3981	4132	4281	4433	4608	4766	4889	4981
CH4	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
N2O	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx	-	-	-	-	-	-	-	-	-	-	-	40	39	39	38	38	37	37	37	38	39	40	41	43	44	45	46
PM10 - comb + fug	-	-	-	-	-	-	-	-	-	-	-	24.6	23.1	21.6	20.1	18.7	17.3	15.9	14.6	14.6	14.7	14.8	15.1	15.5	15.8	16.1	16.3
PM2.5 - comb + fug	-	-	-	-	-	-	-	-	-	-	-	5.5	5.3	5.0	4.8	4.5	4.3	4.0	3.8	3.8	3.8	3.8	3.8	3.9	4.0	4.0	4.0
SO2	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROG	-	-	-	-	-	-	-	-	-	-	-	7	7	7	7	7	7	7	7	7	8	8	8.11	8.39	8.66	8.88	9.06
CO2e	-	-	-	-	-	-	-	-	-	-	-	4203	4152	4110	4025	3955	3926	3878	3895	4016	4169	4320	4473	4651	4811	4935	5028

Construction days per month: 22

TOTAL MONTHLY EMISSIONS (lbs/month)

TOTAL EMISSIONS (onsite + linears + offsite)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
CO	4,731	4,936	5,656	5,795	6,079	6,592	6,191	5,032	4,995	5,399	7,183	7,708	9,887	11,073	11,669	12,372	13,072	12,094	12,295	12,883	12,857	13,463	12,802	13,720	14,046	14,036	14,765
CO2	1,382,170	1,411,470	1,533,501	1,544,240	1,541,815	1,622,449	1,515,858	931,547	905,178	933,158	1,223,453	1,298,709	1,774,386	1,918,227	2,030,943	2,096,875	2,206,334	1,945,691	1,976,634	2,079,830	2,061,216	2,133,033	1,981,527	2,107,495	2,151,011	2,128,874	2,200,002
CH4	98	103	114	118	120	130	123	104	107	120	159	173	220	246	266	289	305	291	299	315	318	338	332	355	365	366	387
N2O	35	37	40	42	44	48	48	36	38	42	54	59	68	77	88	96	104	109	113	120	123	133	136	146	153	153	165
NOx	13,334	13,507	14,635	14,638	14,501	15,146	14,004	7,674	7,222	7,217	9,451	9,892	13,384	14,242	14,312	14,359	14,937	12,709	12,656	13,250	12,747	12,623	10,680	11,282	11,129	10,847	10,616
PM10 - comb + fug	5,895.1	5,919.6	6,121.0	5,868.2	5,796.1	5,877.1	5,706.4	2,769.1	2,760.1	2,608.5	2,707.8	2,632.4	3,238.1	3,435.3	3,513.1	3,311.4	3,442.4	3,257.8	3,239.6	3,364.0	3,333.5	3,381.5	3,201.5	3,327.2	3,399.5	3,366.3	3,447.5
PM2.5 - comb + fug	1,358.2	1,371.7	1,457.7	1,394.7	1,364.2	1,410.1	1,345.4	833.9	807.0	762.3	849.0	823.3	1,035.0	1,108.7	1,106.5	1,053.5	1,089.7	979.5	970.1	1,009.6	978.1	976.5	854.0	901.8	896.1	883.6	884.0
SO2	14	14	15	15	15	16	15	10	9	10	13	14	19	20	21	22	23	20	20	21	21	22	20	21	22	22	22
ROG	1,322	1,355	1,579	1,603	1,705	1,833	1,680	1,250	1,152	1,206	1,653	1,765	2,239	2,420	2,429	2,481	2,591	2,287	2,235	2,354	2,254	2,223	1,881	2,040	2,009	1,974	1,960
CO2e	1,395,116	1,425,091	1,548,413	1,559,680	1,558,102	1,640,082	1,533,392	945,013	919,195	948,761	1,243,445	1,320,527	1,799,966	1,947,183	2,063,732	2,132,741	2,244,965	1,985,469	2,017,996	2,123,550	2,105,997	2,181,504	2,030,702	2,160,109	2,206,028	2,184,092	2,259,321

12-month Rolling Emissions (tons/yr)

TOTAL EMISSIONS (onsite + linears + offsite)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
CO	-	-	-	-	-	-	-	-	-	-	-	35	38	41	44	47	51	53	56	60	64	68	71	74.09	76.17	77.65	79
CO2	-	-	-	-	-	-	-	-	-	-	-	7922	8118	8371	8620	8896	9229	9390	9621	10195	10773	11373	11752	12156	12344	12450	12534
CH4	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
N2O	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
NOx	-	-	-	-	-	-	-	-	-	-	-	71	71	71	71	71	71	70	69	72	75	77	78	79	77	76	74
PM10 - comb + fug	-	-	-	-	-	-	-	-	-	-	-	27.3	26.0	24.8	23.5	22.2	21.0	19.7	18.5	18.8	19.0	19.4	19.7	20.0	20.1	20.1	20.0
PM2.5 - comb + fug	-	-	-	-	-	-	-	-	-	-	-	6.9	6.7	6.6	6.4	6.2	6.1	5.9	5.7	5.8	5.9	6.0	6.0	6.0	6.0	5.8	5.7
SO2	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROG	-	-	-	-	-	-	-	-	-	-	-	9	10	10	10	11	11	12	12	12	12	13	13.58	13.72	13.60	13.38	13.14
CO2e	-	-	-	-	-	-	-	-	-	-	-	8018	8221	8482	8740	9026	9369	9542	9784	10374	10967	11584	11977	12397	12600	12718	12816

Hydrogen Energy California, Kern County Power Project

Calculation of maximum short-term (daily) and annual emissions
8/17/2012

PROJECT EMISSIONS (on-site + linears)

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
CO	5,185	5,206	4,968	4,840	4,426	4,305	4,173	3,853	3,464	3,485	3,662	3,384	2,860	2,484	2,407	1,437	1,437	1,338	939	800	726	510
CO2	910,216	901,616	849,028	809,862	732,331	709,759	688,585	628,670	573,042	569,938	595,888	557,441	469,766	397,598	384,283	222,503	222,493	201,234	150,808	129,251	116,660	84,708
CH4	106	105	100	96	88	85	82	76	66	66	69	63	51	46	45	30	30	30	18	15	14	9
N2O	20	20	18	17	16	15	15	13	12	12	12	12	10	8	8	5	5	4	3	3	2	2
NOx	8,382	8,324	7,837	7,482	6,761	6,557	6,354	5,780	5,241	5,238	5,511	5,159	4,367	3,691	3,595	2,058	2,058	1,870	1,383	1,188	1,074	795
PM10 - comb + fug	3,365.9	3,380.5	3,325.1	3,278.9	2,982.3	2,956.7	2,872.3	2,737.8	2,699.7	2,634.0	2,633.7	2,449.6	2,155.1	1,940.8	1,808.7	1,263.5	1,263.1	1,136.6	1,043.7	951.1	927.6	761.1
PM2.5 - comb + fug	825.2	830.2	802.5	786.3	676.0	663.7	644.0	597.8	563.6	559.4	577.1	537.1	462.7	405.9	388.3	246.6	246.5	224.7	183.6	163.1	154.7	121.3
SO2	10	10	9	9	8	8	7	7	6	6	6	6	5	4	4	2	2	2	2	1	1	1
ROG	1,693	1,688	1,625	1,586	1,480	1,444	1,415	1,322	1,130	1,143	1,181	1,084	911	783	770	458	458	438	304	257	228	172
CO2e	918,660	909,963	856,806	817,263	739,019	716,209	694,806	634,294	578,153	575,014	601,197	562,328	473,842	401,124	387,689	224,549	224,539	203,152	152,170	130,393	117,693	85,447

PROJECT EMISSIONS (on-site + linears)

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
CO	35	33	33	32	31	30	29	29	28	27	26	25	24	23	22	20	18	17	15	14	12	11
CO2	6198	5942	5809	5659	5439	5235	5030	4904	4723	4550	4407	4263	4043	3791	3559	3265	3010	2756	2487	2237	2009	1766
CH4	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
N2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx	57	55	53	52	50	48	46	45	43	42	41	39	37	35	33	30	28	25	23	21	19	16
PM10 - comb + fug	18.0	18.1	18.3	18.5	18.5	18.5	18.4	18.4	18.3	18.1	17.9	17.7	17.1	16.3	15.6	14.6	13.7	12.8	11.9	11.0	10.1	9.2
PM2.5 - comb + fug	4.8	4.7	4.7	4.7	4.6	4.5	4.4	4.4	4.3	4.2	4.1	4.0	3.9	3.6	3.4	3.2	2.9	2.7	2.5	2.3	2.1	1.9
SO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROG	11.14	10.80	10.59	10.39	10.08	10	10	9	9	9	9	8	8	8	7	7	6	6	5	4	4	4
CO2e	6255	5998	5864	5712	5490	5284	5077	4950	4766	4591	4447	4302	4079	3825	3590	3294	3037	2780	2509	2257	2027	1782

Construction days per month:

ONSITE EMISSIONS (no linears)

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
CO	5,185	5,206	4,968	4,840	4,426	4,305	4,173	3,853	3,464	3,485	3,662	3,384	2,860	2,484	2,407	1,437	1,437	1,338	939	800	726	510
CO2	910,216	901,616	849,028	809,862	732,331	709,759	688,585	628,670	573,042	569,938	595,888	557,441	469,766	397,598	384,283	222,503	222,493	201,234	150,808	129,251	116,660	84,708
CH4	106	105	100	96	88	85	82	76	66	66	69	63	51	46	45	30	30	30	18	15	14	9
N2O	20	20	18	17	16	15	15	13	12	12	12	12	10	8	8	5	5	4	3	3	2	2
NOx	8,382	8,324	7,837	7,482	6,761	6,557	6,354	5,780	5,241	5,238	5,511	5,159	4,367	3,691	3,595	2,058	2,058	1,870	1,383	1,188	1,074	795
PM10 - comb + fug	3,365.9	3,380.5	3,325.1	3,278.9	2,982.3	2,956.7	2,872.3	2,737.8	2,699.7	2,634.0	2,633.7	2,449.6	2,155.1	1,940.8	1,808.7	1,263.5	1,263.1	1,136.6	1,043.7	951.1	927.6	761.1
PM2.5 - comb + fug	825.2	830.2	802.5	786.3	676.0	663.7	644.0	597.8	563.6	559.4	577.1	537.1	462.7	405.9	388.3	246.6	246.5	224.7	183.6	163.1	154.7	121.3
SO2	10	10	9	9	8	8	7	7	6	6	6	6	5	4	4	2	2	2	2	1	1	1
ROG	1,693	1,688	1,625	1,586	1,480	1,444	1,415	1,322	1,130	1,143	1,181	1,084	911	783	770	458	458	438	304	257	228	172
CO2e	918,660	909,963	856,806	817,263	739,019	716,209	694,806	634,294	578,153	575,014	601,197	562,328	473,842	401,124	387,689	224,549	224,539	203,152	152,170	130,393	117,693	85,447

ONSITE EMISSIONS (no linears)

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
CO	29	29	29	30	29	29	29	29	28	27	26	25	24	23	22	20	18	17	15	14	12	11
CO2	5092	5172	5215	5237	5183	5109	5030	4904	4723	4550	4407	4263	4043	3791	3559	3265	3010	2756	2487	2237	2009	1766
CH4	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
N2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx	47	48	48	48	48	47	46	45	43	42	41	39	37	35	33	30	28	25	23	21	19	16
PM10 - comb + fug	16.8	17.2	17.6	18.0	18.2	18.3	18.4	18.4	18.3	18.1	17.9	17.7	17.1	16.3	15.6	14.6	13.7	12.8	11.9	11.0	10.1	9.2
PM2.5 - comb + fug	4.2	4.3	4.3	4.4	4.4	4.4	4.4	4.4	4.3	4.2	4.1	4.0	3.9	3.6	3.4	3.2	2.9	2.7	2.5	2.3	2.1	1.9
SO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROG	9.26	9.41	9.52	9.64	9.63	10	10	9	9	9	9	8	8	8	7	7	6	6	5	4	4	4
CO2e	5140	5221	5264	5286	5232	5157	5077	4950	4766	4591	4447	4302	4079	3825	3590	3294	3037	2780	2509	2257	2027	1782

Construction days per month:

TOTAL EMISSIONS (onsite + linears + offsite)

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
CO	15,823	16,179	16,000	15,978	15,407	15,188	14,582	13,724	13,036	12,214	12,120	10,613	8,799	7,259	5,764	4,185	4,181	4,082	3,503	3,026	2,794	2,152
CO2	2,349,090	2,381,788	2,336,529	2,310,359	2,213,533	2,178,940	2,099,283	1,972,980	1,880,368	1,773,350	1,765,726	1,575,658	1,328,783	1,113,117	924,789	687,847	687,296	666,038	593,410	530,157	498,072	413,595
CH4	413	422	418	418	405	399	382	361	342	318	313	271	222	183	141	108	107	107	91	78	72	55
N2O	176	181	180	181	177	175	167	158	153	140	137	118	97	79	57	45	45	45	41	36	33	26
NOx	11,335	11,316	10,837	10,494	9,755	9,539	9,280	8,641	8,066	7,962	8,202	7,703	6,757	5,942	5,675	4,066	4,066	3,877	3,369	3,134	3,001	2,671
PM10 - comb + fug	3,843.6	3,869.2	3,815.7	3,773.0	3,471.2	3,442.4	3,342.5	3,190.3	3,142.4	3,049.0	3,039.8	2,815.3	2,478.5	2,226.0	2,047.2	1,482.1	1,481.6	1,355.0	1,256.2	1,152.5	1,123.8	943.4
PM2.5 - comb + fug	1,008.5	1,017.2	990.1	975.0	863.0	849.6	824.8	772.7	735.2	721.8	736.5	683.0	594.5	525.0	491.9	343.5	343.4	321.6	278.5	254.4	244.2	206.1
SO2	24	24	24	23	22	22	21	20	19	18	18	16	13	11	9	7	7	7	6	5	5	4
ROG	2,085	2,090	2,029	1,993	1,882	1,844	1,800	1,690	1,489	1,476	1,505	1,371	1,158	994	937	607	607	587	447	390	356	287
CO2e	2,412,420	2,446,746	2,401,224	2,375,220	2,276,874	2,241,540	2,159,212	2,029,540	1,934,869	1,823,476	1,814,684	1,617,862	1,363,524	1,141,316	945,557	704,117	703,543	682,157	608,046	542,832	509,823	422,858

TOTAL EMISSIONS (onsite + linears + offsite)

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
CO	81	82	84	86	88	89	89	90	89	88	88	85	82	77	72	66	61	55	50	44	39	34
CO2	12660	12748	12944	13110	13177	13236	13219	13215	13101	12913	12731	12419	11909	11274	10568	9757	8994	8238	7485	6763	6072	5392
CH4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1
N2O	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
NOx	72	71	70	69	67	65	64	63	61	59	58	57	54	52	49	46	43	40	37	34	32	29
PM10 - comb + fug	20.3	20.5	20.8	21.1	21.1	21.2	21.1	21.1	21.1	20.9	20.7	20.4	19.7	18.9	18.0	16.9	15.9	14.8	13.8	12.8	11.8	10.7
PM2.5 - comb + fug	5.7	5.7	5.7	5.7	5.6	5.5	5.5	5.4	5.3	5.3	5.2	5.1	4.9	4.6	4.4	4.1	3.8	3.5	3.3	3.0	2.8	2.5
SO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROG	12.95	12.70	12.57	12.45	12.21	12	12	12	11	11	11	11	10	10	9	8	8	7	6	6	5	5
CO2e	12956	13057	13265	13443	13520	13588	13577	13576	13464	13272	13088	12767	12242	11590	10862	10026	9240	8460	7684	6941	6228	5528

Hydrogen Energy California, Kern County Power Project
Emission Factors for Onroad Vehicles
8/17/2012

ONSITE - 5 MPH							EF (lbs/mile)									
Onroad Vehicle	Fuel Type	Vehicle Type	Daily Vehicle Count	Round Trip Distance (miles/vehicle/day)	Trips per day	VMT (Daily Total)	TOC	CO	NOx	PM_{10}	SO_2	$PM_{2.5}$	CO_2	N_2O	CH_4	CO_2e
Personal Commuting Vehicles	G/D	LDA/ LDT		0.2	1	-	0.0012	0.0154	0.0012	0.0002	2.43E-05	0.0001	2.57E+00	9.55E-05	1.90E-04	2.604
Light delivery truck (e.g. Fed-Ex)	D	LHDT	10	0.5	1	5	0.0011	0.0073	0.0174	0.0003	1.10E-05	0.0003	1.16E+00	6.61E-05	2.20E-05	1.178
Heavy delivery truck (e.g. flat beds carrying construction eqp)	D	HHDT	50	1	1	50	0.0271	0.0434	0.1010	0.0063	8.16E-05	0.0057	8.48E+00	1.10E-04	1.76E-04	8.515
Import Fill Trucks - gravel	D	HHDT	160	1	1	160	0.0271	0.0434	0.1010	0.0063	0.0001	0.0057	8.4774	0.0001	0.0002	8.5153
Import Fill Trucks - dirt	D	HHDT	160	0.5	1	80	0.0271	0.0434	0.1010	0.0063	0.0001	0.0057	8.4774	0.0001	0.0002	8.5153

OFFSITE - 50 MPH							EF (lbs/mile)									
Onroad Vehicle	Fuel Type	Vehicle Type	Daily Vehicle Count	Round Trip Distance (miles/vehicle/day)	Trips per day	VMT (Daily Total)	TOC	CO	NOx	PM_{10}	SO_2	$PM_{2.5}$	CO_2	N_2O	CH_4	CO_2e
Personal Commuting Vehicles	G/D	LDA/ LDT		39.8	1	-	0.0002	0.0065	0.0008	0.0001	7.72E-06	0.0000	8.04E-01	9.55E-05	1.90E-04	0.838
Light delivery truck (e.g. Fed-Ex)	D	LHDT	10	39.5	1	395	0.0003	0.0013	0.0116	0.0001	1.10E-05	0.0001	1.16E+00	6.61E-05	2.20E-05	1.178
Heavy delivery truck (e.g. flat beds carrying construction eqp)	D	HHDT	50	39.0	1	1950	0.0017	0.0076	0.0377	0.0014	3.53E-05	0.0012	3.68E+00	1.10E-04	1.76E-04	3.721
Import Fill Trucks	D	HHDT	160	38	1	6080	0.0017	0.0076	0.0377	0.0014	0.0000	0.0012	3.6832	0.0001	0.0002	3.7210

Onsite distance for worker vehicles based on parking areas of 100m x 250 m. Assume average one way trip is 175m, round trip of 350 m, or 0.22 miles.
Emission factors from EMFAC2007 (version 2.3) for year 2010
Emission factors for personal commuting vehicles are based on the assumption 50% LDA and 50% LDT
CH_4 and N_2O emission factor for personal commuting vehicles is based on the average factor for gasoline and diesel passenger vehicles from CCAR, GRP Version 3.0, Table C.5
CH_4 and N_2O emission factor for light delivery trucks is based on the factor for diesel light duty trucks from CCAR, GRP Version 3.0, Table C.5
CH_4 and N_2O emission factor for heavy duty tucks is based on the factor for diesel heavy duty trucks from CCAR, GRP Version 3.0, Table C.5

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Number of Worker/ Day	34	59	79	101	149	188	224	301	335	403	500	559	663	777	935	1057
Avg Daily Vehicles/ Day	26	45	60	78	114	145	173	232	258	310	385	430	510	598	720	813
Light delivery trucks	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Heavy delivery trucks	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Import fill trucks	160	160	160	160	160	160	160	0	0	0	0	0	0	0	0	0

Month	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Number of Worker/ Day	1154	1224	1289	1366	1432	1603	1723	1853	1970	1993	2192	2347	2423	2437	2461	2425
Avg Daily Vehicles/ Day	887	942	992	1051	1102	1233	1325	1425	1516	1533	1686	1805	1864	1874	1893	1865
Light delivery trucks	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Heavy delivery trucks	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Import fill trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Month	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Number of Worker/ Day	2403	2295	2172	2104	1912	1850	1570	1276	1011	688	549	548	548	507	430	394	297
Avg Daily Vehicles/ Day	1848	1765	1671	1618	1471	1423	1208	982	778	529	422	422	422	390	331	303	228
Light delivery trucks	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Heavy delivery trucks	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Import fill trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Number of workers per commuter vehicle = 1.3
Actual worker schedule data updated 4/3/12 with data from Table 2-28 HECA Manpower R5 04 02 12.xls
Vehicle occupancy rate is based on information from Section 2.0 Project Description.

Assumptions:
Assumed average distance traveled off site for all employees commuting will be 20 miles
times 2 for return trip = 40 miles
22 days per month of construction, average

CO_2 GWP (SAR, 1996) = 1
CH_4 GWP (SAR, 1996) = 21
N_2O GWP (SAR, 1996) = 310

(2) grams to pounds conversion = 0.00220459

Hydrogen Energy California, Kern County Power Project
Onsite Fugitive Dust Emissions
8/17/2012

ASSUMPTIONS:

1 month of dirt moving
22 construction days per month
10 construction hours per day

Dirt Piling or Material Handling

$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$ USEPA AP42 Chapter 13.2.4 (Aggregate Handling And Storage Piles)

0.35 k for PM_{10}
0.053 k for $PM_{2.5}$
6.25 U = Mean Wind speed (mph) average for Bakersfield Airport 2000-2004
19 M = Moisture content of surface material (%) (average of soil borings taken onsite at 5 ft)
0.00006 lb of PM_{10}/ ton of material
0.00001 lb of $PM_{2.5}$/ ton of material

MATERIAL HANDLED (tons/day)	Mitigation Efficiency[1]	MONTH:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		# pieces of equip:	4	4	6	7	7	9	9	12	12	12	12	10	8	8	7	7
Bob cat loader	67%	tons/day material handled:	0	0	1,207	1,034	1,034	805	805	2,414	2,414	2,414	2,414	2,896	2,715	2,715	3,103	3,103
Excavator - Trencher (CAT320)	67%		0	0	0	0	0	1,609	1,609	1,207	1,207	1,207	1,207	1,448	1,810	1,810	2,069	2,069
Excavator - Backhoe/loader	67%		3,620	3,620	3,620	4,138	4,138	3,218	3,218	2,414	2,414	2,414	2,414	1,448	1,810	1,810	2,069	2,069
Excavator - loader	67%		3,620	3,620	2,414	2,069	2,069	1,609	1,609	1,207	1,207	1,207	1,207	1,448	905	905	0	0
TOTAL material handled			7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241

MATERIAL HANDLED (tons/day)	Mitigation Efficiency[1]	MONTH:	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		# pieces of equip:	4	4	3	3	3	3	3	3	0	0	0	1	1	1	1	0
Bob cat loader	67%	tons/day material handled:	5,431	5,431	4,827	4,827	4,827	4,827	4,827	4,827	0	0	0	0	0	0	0	0
Excavator - Trencher (CAT320)	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Backhoe/loader	67%		1,810	1,810	2,414	2,414	2,414	2,414	2,414	2,414	0	0	0	0	0	0	0	0
Excavator - loader	67%		0	0	0	0	0	0	0	0	0	0	0	7,241	7,241	7,241	7,241	0
TOTAL material handled			7,241	7,241	7,241	7,241	7,241	7,241	7,241	7,241	0	0	0	7,241	7,241	7,241	7,241	0

MATERIAL HANDLED (tons/day)	Mitigation Efficiency[1]	MONTH:	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
		# pieces of equip:	0	0	0	3	3	4	4	3	2	2	0	0	0	0	0	0	0
Bob cat loader	67%	tons/day material handled:	0	0	0	2,414	2,414	1,810	1,810	2,414	3,620	3,620	0	0	0	0	0	0	0
Excavator - Trencher (CAT320)	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Backhoe/loader	67%		0	0	0	4,827	4,827	3,620	3,620	2,414	3,620	3,620	0	0	0	0	0	0	0
Excavator - loader	67%		0	0	0	0	0	1,810	1,810	2,414	0	0	0	0	0	0	0	0	0
TOTAL material handled			0	0	0	7,241	7,241	7,241	7,241	7,241	7,241	7,241	0	0	0	0	0	0	0

Do not include capacity factor because emissions are based on material handled.

6,136 yd^3/day 7,241 ton/day 2,360 density of soil (lb/yd^3)
135,000 yd^3 159,300 tons (USDA NRCS Physical Soil Properties from Kern County for Lockern-Buttonwillow clay)

Excavation 850,000 Cubic yds
Imported Fill 500,000 Cubic yds

(assume 10% of entire site in any given month; with equipment present over 35 months, this is a conservative estimate of the max amount of material handled)

Grading Emissions Factor — **To be used for all scraping and grading activities**

$E = 0.051(S)^{2.0}$ for particles ≤ 15 um — USEPA AP42 Chapter 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 - refers to

$E = 0.040(S)^{2.5}$ for TSP ≤ 30 um — USEPA AP42 Chapter 11.9 (Western Surface Coal Mining), Table 11.9-1

multiply by 0.60 for PM_{10}

multiply TSP equation by 0.031 for $PM_{2.5}$

S = mean vehicle speed (mph)

S = 7.1 mph — * this is the average speed outlined in AP-42 Section 11.9 and CalEEMod manual for scrapers and graders

5.37 lb ≤ 30 µm/VMT

2.57 lb ≤ 15 µm/VMT

PM_{10} = 1.54 lb PM_{10}/VMT

$PM_{2.5}$ = 0.17 lb $PM_{2.5}$/VMT

Mitigated PM_{10} = 0.51 lb PM_{10}/VMT

Mitigated $PM_{2.5}$ = 0.05 lb $PM_{2.5}$/VMT

Equipment	Daily VMT	Mitigation Efficiency[1]	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)
Excavator - Earth Scraper 637	0.909	67%	0.463	0.050
Excavator - Motor Grader (CAT140H)	1.439	67%	0.733	0.079
		Total	**1.20**	**0.13**

Formula based on lbs per VMT, not hours, so no capacity factor included.

Bulldozing/Earth clearing

$E = 1.0(s)^{1.5}/(M)^{1.4}$ for particles ≤ 15 um — USEPA AP42 Chapter 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 - refers to

$E = 5.7(s)^{1.2}/(M)^{1.3}$ for TSP ≤ 30 um — USEPA AP42 Chapter 11.9 (Western Surface Coal Mining), Table 11.9-1, 11.9-3

multiply by 0.75 for PM_{10}

multiply TSP equation by 0.105 for $PM_{2.5}$

50 s = Silt content (%) (from soil boring B-4)

19 M = Moisture content of surface material (%) (average of soil borings taken onsite at 5 ft)

4.30 lb/hr of PM_{10}

1.42 lb/hr of $PM_{2.5}$

1.42 lb/hr of PM_{10} (mitigated)

0.47 lb/hr of $PM_{2.5}$ (mitigated)

Equipment	Hours per day	Activity Factor	Mitigation Efficiency[1]	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (lb/day)
Bulldozer D10R	6	100.0%	67%	1.42	8.51	0.47	2.82
Bulldozer D6C	6	100.0%	67%	1.42	8.51	0.47	2.82
			Total	**2.84**	**17.02**	**0.94**	**5.64**

Cover Storage Pile

SCAQMD Table A9-9-E

E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J

PM10 Emission factor from wind erosion of storage piles per day per acre

50 G = Silt content (%) (from soil boring B-4)

37 H = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Bakersfield Airport Station)

0.3 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height (wind speed percentage and average based on 2000-04 (5 yrs) of wind speed data as recorded at Bakersfield Airport station)

0.5 J = Fraction of TSP that is PM_{10} = 0.5

0.791 lb PM_{10}/acre/day

0.26 Mitigated lb PM_{10}/acre/day

Source	Quantity	Size of Pile (acre)	Hours/Day	Mitigation Efficiency[1]	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (lb/day)
Cover Storage Pile	25	0.25	24	67%	0.07	1.63	0.014	0.339

Pile size and number are assumed

Travel on unpaved roads

E = k * (s/12)^a * (W/3)^b USEPA AP42 Chapter 13.2.2 (Unpaved Roads)

Size specific emission factor for vehicle travel on unpaved roads at industrial sites (eqn 1a; lb/VMT)

Constants:	PM2.5	PM10	TSP
k (lb/VMT)	0.15	1.5	4.9
a	0.9	0.9	0.7
b	0.45	0.45	0.45

4 s = Surface material silt content (%) (value for gravel road)

50 s = Surface material silt content (%) (value for dirt surfaces)

value listed in table W = Mean vehicle weight (ton) * weighted mean based on monthly equipment schedule in "onsite equipment" tab

UNMITIGATED EMISSION FACTORS FOR VEHICLES, BY MONTH

Month	Mitigation Efficiency[1]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Weighted Mean Vehicle Weight (tons)		17.68	16.69	16.05	14.79	13.67	12.91	12.39	5.79	5.10	4.76	4.53	4.50	4.08	3.96	3.83	3.61	3.59	3.58
PM10 EF (lbs/VMT) - Gravel	67%	1.24	1.21	1.19	1.14	1.10	1.08	1.06	0.75	0.71	0.69	0.67	0.67	0.64	0.63	0.62	0.61	0.60	0.60
PM2.5 EF (lbs/VMT) - Gravel		0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.08	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06
PM10 EF (lbs/VMT) - DIRT	96%	12.04	11.73	11.52	11.11	10.72	10.45	10.26	7.29	6.88	6.67	6.53	6.51	6.22	6.14	6.05	5.89	5.87	5.87
PM2.5 EF (lbs/VMT) - DIRT		1.20	1.17	1.15	1.11	1.07	1.05	1.03	0.73	0.69	0.67	0.65	0.65	0.62	0.61	0.60	0.59	0.59	0.59

Month	Mitigation Efficiency[1]	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Weighted Mean Vehicle Weight (tons)		3.49	3.53	3.50	3.30	3.24	3.16	3.11	3.04	2.87	2.82	2.74	2.65	2.55	2.52	2.52	2.52	2.50	2.52
PM10 EF (lbs/VMT) - Gravel	67%	0.60	0.60	0.60	0.58	0.58	0.57	0.57	0.56	0.55	0.54	0.54	0.53	0.52	0.52	0.52	0.52	0.51	0.52
PM2.5 EF (lbs/VMT) - Gravel		0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
PM10 EF (lbs/VMT) - DIRT	96%	5.80	5.83	5.81	5.66	5.61	5.55	5.50	5.45	5.31	5.27	5.20	5.13	5.04	5.01	5.01	5.01	5.00	5.01
PM2.5 EF (lbs/VMT) - DIRT		0.58	0.58	0.58	0.57	0.56	0.56	0.55	0.55	0.53	0.53	0.52	0.51	0.50	0.50	0.50	0.50	0.50	0.50

Month	Mitigation Efficiency[1]	37	38	39	40	41	42	43	44	45	46	47	48	49
Weighted Mean Vehicle Weight (tons)		2.59	2.63	2.73	2.85	3.03	3.51	3.59	3.59	3.58	3.61	3.84	3.99	4.62
PM10 EF (lbs/VMT) - Gravel	67%	0.52	0.53	0.53	0.55	0.56	0.60	0.60	0.61	0.60	0.61	0.62	0.63	0.68
PM2.5 EF (lbs/VMT) - Gravel		0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07
PM10 EF (lbs/VMT) - DIRT	96%	5.07	5.11	5.19	5.29	5.44	5.82	5.87	5.88	5.86	5.89	6.05	6.16	6.58
PM2.5 EF (lbs/VMT) - DIRT		0.51	0.51	0.52	0.53	0.54	0.58	0.59	0.59	0.59	0.59	0.61	0.62	0.66

Mitigation Measure[1]	Unpaved Roads	Soil import areas[3]
Apply water three times daily to all unpaved road surfaces[4]	45%	85%
Traffic speeds on all unpaved roads to be reduced to 15 mph or less	40%	70%
Combined Mitigation Efficiency	**67%**	**96%**

Notes:

1. Mitigation efficiencies from CEQA Table 11-4 (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM_{10} Emissions - Constrution.")
2. Equipment weight from SCAQMD Table A9-9-D-3 and various websites.
3. Because the areas where soil is being imported are known to be subject to large amounts of fugitive emissions, extra care will be taken to keep the area watered and speeds extremely low. Thus, the upper value of the efficiency range has been assumed.
4. Water trucks operate at least 4 times per day.

Hydrogen Energy California, Kern County Power Project
Calculation of Mean Vehicle Weight by Month
8/17/2012

VEHICLE INVENTORY BY MONTH	Vehicle Weight (tons)	MONTHLY VEHICLE COUNT (#)																											
Vehicle Type		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
Avg Daily Worker Vehicles	1.6	26	45	60	78	114	145	173	232	258	310	385	430	510	598	720	813	887	942	992	1051	1102	1233	1325	1425	1516	1533	1686	1805
Light delivery trucks	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Heavy delivery trucks	17.5	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Import fill trucks	25	160	160	160	160	160	160	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 cy fill mat'l haul truck	30			10	10	20	20	20	20	10	10	10	10	5	5	5	5	5	5										
Bus	15	2	2	2	2	3	3	3	3	3	3	5	5	5	5	5	5	7	7	7	10	10	10	10	14	14	14	14	14
Concrete Pumper Truck	30						2	2	2	2	2	2	2	2	3	3	3	2	2	2	2	2							1
Dump Truck	15	3	4	4	3	3	3	3	3	3	3	2	2	2	2	2													2
Diesel Tractor (Yard Dog)	11						2	2	2	2	2	2	4	4	4	4	4	8	8	8	8	8	8	8	10	10	10	10	10
Service Truck - 1 ton	15	2	2	2	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Pile Driver Truck	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck - Fuel/Lube	15	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Tractor Truck 5th Wheel	0																												
Trucks - Pickup 3/4 ton	3	5	5	5	5	5	6	7	8	15	15	15	15	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Trucks - 3 ton	11	1	1	1	1	1	2	2	2	4	4	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Truck - Water	25	5	5	5	5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	2
Air Compressor 185 CFM	0.5	2	2	2	2	3	3	3	3	3	3	3	3	3	6	6	6	8	8	8	10	10	10	10	12	12	12	12	12
Air Compressor 750 CFM	0.5					1	1	1	1	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4
Articulating Boom Platform	0																												
Bob cat loader	0			1	1	1	1	1	4	4	4	4	4	3	3	3	3	3	3	2	2	2	2	2	2				
Bulldozer D10R	0	3	3	3	2	2	2	2	2	2	1	1																	
Bulldozer D6C	0	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1													1
Concrete Trowel Machine	15						2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Concrete Vibrators	0	4	4	4	4	4	4	4	4	4	8	8	8	8	8	8	8	8	4	4	4	2	2	2	2	2	2	2	2
Cranes - Mobile 35 ton	25							1	1	1	4	4	4	4	7	7	7	7	7	7	7	7	7	7	7	7	7	5	5
Cranes - Mobile 45 ton	35											2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4
Crane - Mobile 65 ton	45												1	1	2	4	5	5	5	6	6	6	6	6	6	6	6	6	6
Cranes 100 / 150 ton cap	50											1	1	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4
Diesel Powered Welder	0				10	10	10	10	10	10	10	10	10	10	10	10	15	15	15	20	20	20	20	20	25	25	25	25	25
Excavator - Backhoe/loader	0	2	2	3	4	4	4	4	4	4	4	4	2	2	2	2	2	1	1	1	1	1	1	1	1				
Excavator - Earth Scraper 637	0	7	7	7	7	4	4	2																					
Excavator - loader	0	2	2	2	2	2	2	2	2	2	2	2	2	1	1														1
Excavator - Motor Grader (CAT140H)	0		1	1	1	3	3																						1
Excavator - Trencher (CAT320)	0						2	2	2	2	2	2	2	2	2	2	2												
Fired Heaters (2,000 BTU)	0					4	4	4	4	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Forklift	10	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	6
Fusion Welder	0					2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Heavy Haul / 600 tn Crane	75																		1	1	1	1	1	1	1	1	1		
Heavy Haul / 1,000 tn Crane	75																				1	1	1	1	1	1			
Light Plants	0	1	1	2	4	8	8	8	8	4	4	6	6	8	8	10	10	14	14	14	14	14	14	14	14	14	14	14	14
Man lifts - telescoping	7									5	5	5	10	10	10	10	10	10	10	10	15	15	15	15	20	20	20	20	20
Man lift - scissor	2.5								5	5	5	5	10	10	10	10	10	10	10	10	15	15	15	15	20	20	20	20	20
Portable Compaction Roller	0			5	5	5	5	5	5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				
Portable Compaction - Vibratory Plate	0								6	6	6	6	6	6	6	6	6	6	6	6	6	6	6						3
Portable Compaction - Ram	0																												
Pumps	0	3	3	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	3	3	3	3	3	3	3	3	3	3	3
Portable Power Generators	0	4	4	4	4	6	6	6	6	6	10	10	10	10	10	10	15	15	15	15	15	15	15	20	20	20	20	20	20
Truck Crane - Greater than 200 ton	50												1	1	1	1	1	2	2	3	3	4	4	4	4	4	4	4	4
Truck Crane - Greater than 300 ton	60															1	1	1	1	1	2	2	2	3	3	3	3	3	3
Vibratory Roller Ingersol-Rand 20 ton	20	3	3	3	3	3	3	3	3	3	2	2	2	2	2	1	1	1	1										2
TOTAL VEHICLES		**306**	**327**	**360**	**394**	**453**	**494**	**517**	**428**	**451**	**512**	**594**	**650**	**738**	**834**	**960**	**1063**	**1149**	**1198**	**1250**	**1326**	**1376**	**1505**	**1597**	**1719**	**1806**	**1821**	**1971**	**2099**

Hydrogen Energy California, Kern County Power Project
Calculation of Mean Vehicle Weight by Month
8/17/2012

VEHICLE INVENTORY BY MONTH	Vehicle Weight (tons)																					
Vehicle Type		**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
Avg Daily Worker Vehicles	1.6	1864	1874	1893	1865	1848	1765	1671	1618	1471	1423	1208	982	778	529	422	422	422	390	331	303	228
Light delivery trucks	9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Heavy delivery trucks	17.5	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Import fill trucks	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 cy fill mat'l haul truck	30								3	3	3	3	1	1	1							
Bus	15	14	14	14	14	14	14	14	12	12	12	10	10	5	5	3	3	2	2	2	1	1
Concrete Pumper Truck	30	1	1	1																		
Dump Truck	15	2	2	2	2	2	2	2	2	3	3	3	2	1	1	1	1	1				
Diesel Tractor (Yard Dog)	11	10	10	10	10	10	10	10	4	4	4	4	4	4	4							
Service Truck - 1 ton	15	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
Pile Driver Truck	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck - Fuel/Lube	15	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1			
Tractor Truck 5th Wheel	0																					
Trucks - Pickup 3/4 ton	3	25	25	25	25	25	25	25	25	25	25	25	25	25	25	15	15	10	10	10	10	5
Trucks - 3 ton	11	6	6	6	6	6	6	4	3	3	3	3	2	2	2	1	1	1	1			
Truck - Water	25	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
Air Compressor 185 CFM	0.5	12	12	12	12	12	12	12	8	8	8	6	6	6	6	4	4	4	2	2	1	1
Air Compressor 750 CFM	0.5	4	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Articulating Boom Platform	0																					
Bob cat loader	0								1	1	1	1	1	1	1							
Bulldozer D10R	0																					
Bulldozer D6C	0	1	1	1																		
Concrete Trowel Machine	15									2	2	2	2	2	2							
Concrete Vibrators	0	2	2	2	2	2	2															
Cranes - Mobile 35 ton	25	5	5	5	5	5	5	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1
Cranes - Mobile 45 ton	35	4	2	2	2	2	2	2	2	2	2	2	2	1	1							
Crane - Mobile 65 ton	45	6	6	5	5	4	2	2	2	2	2	1	1	1	1	1	1	1				
Cranes 100 / 150 ton cap	50	2	2	1	1	1	1	1	1													
Diesel Powered Welder	0	25	25	25	25	15	15	15	15	15	10	10	10	10	10	5	5	5	5	3	3	2
Excavator - Backhoe/loader	0								2	2	2	2	1	1	1							
Excavator - Earth Scraper 637	0																					
Excavator - loader	0	1	1	1							1	1	1									
Excavator - Motor Grader (CAT140H)	0	1	1	1					2	2	2	2	1	1	1							
Excavator - Trencher (CAT320)	0																					
Fired Heaters (2,000 BTU)	0	5	5	5	5	3	3	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Forklift	10	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2	2	2	2	1	1	1
Fusion Welder	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
Heavy Haul / 600 tn Crane	75																					
Heavy Haul / 1,000 tn Crane	75																					
Light Plants	0	14	14	14	10	10	10	10	10	10	10	10	10	5	5	5	5	5	4	4	2	2
Man lifts - telescoping	7	20	20	20	20	20	20	20	15	15	15	10	10	10	10	5	5	5	5	2	2	2
Man lift - scissor	2.5	20	20	20	20	20	20	20	15	15	15	10	10	10	10	10	10	10	10	5	5	5
Portable Compaction Roller	0	2	2	2	2	2	2				2	2	2	1	1							
Portable Compaction - Vibratory Plate	0	3	3	3					4	4	4	4	4	2	2							
Portable Compaction - Ram	0																					
Pumps	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2
Portable Power Generators	0	20	20	20	20	20	20	20	15	15	15	15	10	10	10	10	10	10	5	5	5	2
Truck Crane - Greater than 200 ton	50	4	3	3	2	2	2	1	1	1	1	1										
Truck Crane - Greater than 300 ton	60	3	2																			
Vibratory Roller Ingersol-Rand 20 ton	20	2	2	2							1	1	1	1								
TOTAL VEHICLES		**2154**	**2158**	**2173**	**2131**	**2101**	**2015**	**1911**	**1841**	**1696**	**1647**	**1417**	**1178**	**958**	**708**	**554**	**554**	**548**	**505**	**432**	**400**	**316**

CALCULATION OF WEIGHTED MEAN VEHICLE WEIGHT	MONTHLY VEHICLE GROSS WEIGHT (tons)																											
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
Avg Daily Worker Vehicles	42	72	97	125	183	231	276	371	412	496	616	688	815	956	1151	1301	1420	1507	1587	1681	1763	1972	2120	2280	2425	2454	2698	2888
Light delivery trucks	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Heavy delivery trucks	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875
Import fill trucks	4000	4000	4000	4000	4000	4000	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 cy fill mat'l haul truck	0	0	300	300	600	600	600	600	300	300	300	300	150	150	150	150	150	150	0	0	0	0	0	0	0	0	0	0
Bus	30	30	30	30	45	45	45	45	45	45	75	75	75	75	75	75	105	105	105	150	150	150	150	210	210	210	210	210
Concrete Pumper Truck	0	0	0	0	0	60	60	60	60	60	60	60	60	90	90	90	60	60	60	60	60	0	0	0	0	0	0	30
Dump Truck	45	60	60	45	45	45	45	45	45	45	30	30	30	30	30	0	0	0	0	0	0	0	0	0	0	0	0	30
Diesel Tractor (Yard Dog)	0	0	0	0	0	22	22	22	22	22	22	44	44	44	44	44	88	88	88	88	88	88	88	110	110	110	110	110
Service Truck - 1 ton	30	30	30	60	60	60	60	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Pile Driver Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck - Fuel/Lube	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Tractor Truck 5th Wheel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks - Pickup 3/4 ton	15	15	15	15	15	18	21	24	45	45	45	45	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Trucks - 3 ton	11	11	11	11	11	22	22	22	44	44	44	44	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
Truck - Water	125	125	125	125	125	125	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	50	75	50	50	50
Air Compressor 185 CFM	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	3	3	3	4	4	4	5	5	5	5	6	6	6	6	6
Air Compressor 750 CFM	0	0	0	0	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Articulating Boom Platform	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bob cat loader	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulldozer D10R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulldozer D6C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Trowel Machine	0	0	0	0	0	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Concrete Vibrators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cranes - Mobile 35 ton	0	0	0	0	0	0	25	25	25	100	100	100	100	175	175	175	175	175	175	175	175	175	175	175	175	175	125	125
Cranes - Mobile 45 ton	0	0	0	0	0	0	0	0	0	0	70	70	70	70	70	70	70	70	140	140	140	140	140	140	140	140	140	140
Crane - Mobile 65 ton	0	0	0	0	0	0	0	0	0	0	0	45	45	90	180	225	225	225	270	270	270	270	270	270	270	270	270	270
Cranes 100 / 150 ton cap	0	0	0	0	0	0	0	0	0	0	50	50	100	100	150	150	200	200	200	200	200	200	200	200	200	200	200	200
Diesel Powered Welder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Backhoe/loader	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Earth Scraper 637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - loader	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Motor Grader (CAT140H)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Trencher (CAT320)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fired Heaters (2,000 BTU)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Forklift	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	80	80	80	80	80	80	80	80	80	80	80	60
Fusion Welder	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Haul / 600 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	75	75	75	75	75	75	75	75	0	0
Heavy Haul / 1,000 tn Crane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	75	75	75	75	75	0	0	0
Light Plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Man lifts - telescoping	0	0	0	0	0	0	0	0	35	35	35	70	70	70	70	70	70	70	70	105	105	105	105	140	140	140	140	140
Man lift - scissor	0	0	0	0	0	0	0	12.5	12.5	12.5	12.5	25	25	25	25	25	25	25	25	37.5	37.5	37.5	37.5	50	50	50	50	50
Portable Compaction Roller	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portable Compaction - Vibratory Plate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portable Compaction - Ram	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portable Power Generators	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck Crane - Greater than 200 ton	0	0	0	0	0	0	0	0	0	0	0	50	50	50	50	50	100	100	150	150	200	200	200	200	200	200	200	200
Truck Crane - Greater than 300 ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	60	60	60	60	120	120	120	180	180	180	180	180	180
Vibratory Roller Ingersol-Rand 20 ton	60	60	60	60	60	60	60	60	60	40	40	40	40	40	20	20	20	20	0	0	0	0	0	0	0	0	0	40
Weighted Mean Vehicle Weight (tons)	**17.7**	**16.7**	**16.0**	**14.8**	**13.7**	**12.9**	**12.4**	**5.8**	**5.1**	**4.8**	**4.5**	**4.5**	**4.1**	**4.0**	**3.8**	**3.6**	**3.6**	**3.6**	**3.5**	**3.5**	**3.5**	**3.3**	**3.2**	**3.2**	**3.1**	**3.0**	**2.9**	**2.8**

CALCULATION OF WEIGHTED MEAN VEHICLE WEIGHT																					
Vehicle Type		**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
Avg Daily Worker Vehicles		2982	2999	3028	2985	2957	2824	2673	2589	2353	2277	1932	1570	1244	847	676	674	674	624	529	485	366
Light delivery trucks		90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Heavy delivery trucks		875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875	875
Import fill trucks		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 cy fill mat'l haul truck		0	0	0	0	0	0	0	90	90	90	90	30	30	30	0	0	0	0	0	0	0
Bus		210	210	210	210	210	210	210	180	180	180	150	150	75	75	45	45	30	30	30	15	15
Concrete Pumper Truck		30	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dump Truck		30	30	30	30	30	30	30	30	45	45	45	30	15	15	15	15	15	0	0	0	0
Diesel Tractor (Yard Dog)		110	110	110	110	110	110	110	44	44	44	44	44	44	44	0	0	0	0	0	0	0
Service Truck - 1 ton		30	30	30	30	30	30	30	30	30	30	30	30	30	30	15	15	15	15	15	15	15
Pile Driver Truck		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck - Fuel/Lube		30	30	30	30	30	30	30	30	30	30	30	15	15	15	15	15	15	15	0	0	0
Tractor Truck 5th Wheel		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trucks - Pickup 3/4 ton		75	75	75	75	75	75	75	75	75	75	75	75	75	75	45	45	30	30	30	30	15
Trucks - 3 ton		66	66	66	66	66	66	44	33	33	33	33	22	22	22	11	11	11	11	0	0	0
Truck - Water		50	50	50	50	50	50	50	50	50	50	50	50	50	50	25	25	25	25	25	25	25
Air Compressor 185 CFM		6	6	6	6	6	6	6	4	4	4	3	3	3	3	2	2	2	1	1	0.5	0.5
Air Compressor 750 CFM		2	1	1	1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Articulating Boom Platform		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bob cat loader		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulldozer D10R		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulldozer D6C		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Trowel Machine		0	0	0	0	0	0	0	0	30	30	30	30	30	30	0	0	0	0	0	0	0
Concrete Vibrators		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cranes - Mobile 35 ton		125	125	125	125	125	125	50	50	50	50	50	50	50	50	50	50	50	25	25	25	25
Cranes - Mobile 45 ton		140	70	70	70	70	70	70	70	70	70	70	70	35	35	0	0	0	0	0	0	0
Crane - Mobile 65 ton		270	270	225	225	180	90	90	90	90	90	45	45	45	45	45	45	45	0	0	0	0
Cranes 100 / 150 ton cap		100	100	50	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0
Diesel Powered Welder		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Backhoe/loader		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Earth Scraper 637		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - loader		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Motor Grader (CAT140H)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator - Trencher (CAT320)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fired Heaters (2,000 BTU)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Forklift		60	60	60	60	60	60	60	60	60	60	60	60	60	60	20	20	20	20	10	10	10
Fusion Welder		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Haul / 600 tn Crane		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Haul / 1,000 tn Crane		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Light Plants		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Man lifts - telescoping		140	140	140	140	140	140	140	105	105	105	70	70	70	70	35	35	35	35	14	14	14
Man lift - scissor		50	50	50	50	50	50	50	37.5	37.5	37.5	25	25	25	25	25	25	25	25	12.5	12.5	12.5
Portable Compaction Roller		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portable Compaction - Vibratory Plate		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portable Compaction - Ram		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pumps		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portable Power Generators		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck Crane - Greater than 200 ton		200	150	150	100	100	100	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0
Truck Crane - Greater than 300 ton		180	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vibratory Roller Ingersol-Rand 20 ton		40	40	40	0	0	0	0	0	0	20	20	20	20	0	0	0	0	0	0	0	0
Weighted Mean Vehicle Weight (tons)		**2.7**	**2.7**	**2.6**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.6**	**2.6**	**2.7**	**2.8**	**3.0**	**3.5**	**3.6**	**3.6**	**3.6**	**3.6**	**3.8**	**4.0**	**4.6**

Hydrogen Energy California, Kern County Power Project
Construction Vehicle VMT
8/17/2012

SCRAPERS		
Construction days per month	22	days
Site size	453	acres
Site size	1,833,225.77	m2
Assume scraper width is =	3	m
Total distance to cover site =	611,075.26	m
	380	miles
Number of passes over site =	2	
Total pieces of equipment over construction period	38	units

Month	1	2	3	4	5	6	7
# units: Excavator - Earth Scraper 637	7	7	7	7	4	4	2
monthly mileage	140.00	140.00	140.00	140.00	80.00	80.00	40.00
miles per unit per day (VMT)	0.909	0.909	0.909	0.909	0.909	0.909	0.909

1 acre = 4046.856 m2
1 meter = 0.00062137 mile

GRADERS		
Construction days per month	22	days
Site size	453	acres
Site size	1,833,225.77	m2
Assume grader width is =	3	m
Total distance to cover site =	611,075.26	m
	380	miles
Number of passes over site =	2	
Total pieces of equipment over construction period	24	units

Month	2	3	4	5	6	28	29	30	31	36	37	38	39	40	41	42
# units: Excavator - Motor Grader (CAT140H)	1	1	1	3	3	1	1	1	1	2	2	2	2	1	1	1
monthly mileage	31.67	31.67	31.67	95.00	95.00	31.67	31.67	31.67	31.67	63.33	63.33	63.33	63.33	31.67	31.67	31.67
miles per unit per day (VMT)	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439	1.439

1 acre = 4046.856 m2
1 meter = 0.00062137 mile

Hydrogen Energy California, Kern County Power Project
Off-Site Linears Fugitive Dust Emissions
8/17/2012

ASSUMPTIONS:

12 months of soil disturbance
10 total construction hours per work day
22 construction days per month

Dirt Piling or Material Handling

$E = k * (0.0032) * (U/5)^{1.3} / (M/2)^{1.4}$ PM Emissions from Dirt Piling or Material Handling (lb/ton) from USEPA AP42, Chapter 13.2.4 (Aggregate Handling and Storage Piles)

0.053 k for PM2.5
0.35 k for PM10
6.25 U = Mean Wind speed (mph) average for Bakersfield Airport 2000-2004
15 M = Moisture content of surface material (%) (from SCAQMD Table A9-9-G-1 for moist dirt)
0.00001 lb of $PM_{2.5}$/ ton of material
0.00009 lb of PM_{10}/ ton of material

MATERIAL HANDLED (tons/day)	Mitigation Efficiency[1]	MONTH:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		# pieces of equip:	0	0	0	0	0	0	0	0	0	0	6	7	14	14	14	13	14	11
Backhoe	67%	tons/day material handled:	0	0	0	0	0	0	0	0	0	0	5454	4675	3896	3896	3896	4195	3896	4958
Excavator	67%		0	0	0	0	0	0	0	0	0	0	0	779	390	390	390	420	390	496
CAT 325 BACKHOE	67%		0	0	0	0	0	0	0	0	0	0	0	0	390	390	0	0	0	0
CAT 330 BACKHOE	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	390	0	0	0
CAT DOZER D-6	67%		0	0	0	0	0	0	0	0	0	0	0	0	779	779	0	0	390	0
CAT RUBBER TIRE LOADER 966	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	779	839	779	0
		TOTAL material handled	0	0	0	0	0	0	0	0	0	0	5454	5454	5454	5454	5454	5454	5454	5454

MATERIAL HANDLED (tons/day)	Mitigation Efficiency[1]	MONTH:	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
		# pieces of equip:	11	11	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Backhoe	67%	tons/day material handled:	4958	4958	4675	4675	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator	67%		496	496	779	779	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 325 BACKHOE	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 330 BACKHOE	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT DOZER D-6	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT RUBBER TIRE LOADER 966	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		TOTAL material handled	5454	5454	5454	5454	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MATERIAL HANDLED (tons/day)	Mitigation Efficiency[1]	MONTH:	37	38	39	40	41	42	43	44	45	46	47	48	49
		# pieces of equip:	0	0	0	0	0	0	0	0	0	0	0	0	0
Backhoe	67%	tons/day material handled:	0	0	0	0	0	0	0	0	0	0	0	0	0
Excavator	67%		0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 325 BACKHOE	67%		0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 330 BACKHOE	67%		0	0	0	0	0	0	0	0	0	0	0	0	0
CAT DOZER D-6	67%		0	0	0	0	0	0	0	0	0	0	0	0	0
CAT RUBBER TIRE LOADER 966	67%		0	0	0	0	0	0	0	0	0	0	0	0	0
		TOTAL material handled	0	0	0	0	0	0	0	0	0	0	0	0	0

Assume tons/day of material is evenly split among the number of pieces of equipment operating in a given month.

Do not include capacity factor because emissions are based on material handled, not hours of operation.

4622 yd^3/day 5454 ton/day
1,220,222 yd^3 1,439,862 tons 2360 density of soil (lb/yd^3)

(USDA NRCS Physical Soil Properties from Kern County Lockern-Buttonwillow clay soil)

252.11 acres = 1,220,222 cubic yds, assume depth of soils moved is 1 yd

Disturbed Acreage	Length (miles)	ROW width (ft)	Area (ft2)	Area (acres)
Electrical transmission line	2.1	100	1108800	25.45
Natural gas linear	13	50	3432000	78.78
Process water pipeline	14.4	50	3801600	87.27
CO_2 pipeline	3.4	50	897600	20.61
Potable water pipeline	1.2	10	63360	1.45
Railway	5.3	60	1679040	38.54
Sources:			TOTAL:	**252.11**

Lengths: email from William Becktel, 3/26/12
ROW Width: Table 2-01 March 20 from Fluor.doc

Off-Site Linears Fugitive Dust Emissions
8/17/2012

Grading Emissions Factor To be used for all scraping and grading activities

$E = 0.051(S)^{2.0}$ for particles ≤ 15 um USEPA AP42 Chapter 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 - refers to

$E = 0.040(S)^{2.5}$ for TSP ≤ 30 um USEPA AP42 Chapter 11.9 (Western Surface Coal Mining), Table 11.9-1

multiply by 0.60 for PM_{10}

multiply TSP equation by 0.031 for $PM_{2.5}$

S = mean vehicle speed (mph)

S =	7.1	mph	
	5.37	lb ≤ 30 µm/VMT	
	2.57	lb ≤ 15 µm/VMT	
PM_{10} =	1.54	lb PM_{10}/VMT	0
$PM_{2.5}$ =	0.17	lb $PM_{2.5}$/VMT	

Equipment	Daily VMT	Mitigation Efficiency[1]	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/day)	
CAT MODEL 12 MOTOR GRADER	0.9	67%	0.437	0.047	* mileage based on assumed maximum for scrapers in CalEEMod calculations
CAT SCRAPER 615	0.9	67%	0.437	0.047	* mileage based on assumed maximum for scrapers in CalEEMod calculations
		Total	**0.87**	**0.09**	

Formula based on lbs per VMT, not hours, so no capacity factor included.

Storage Piles

SCAQMD Table A9-9-E

E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J

PM10 Emission factor from wind erosion of storage piles per day per acre

50	G = Silt content (%) (from Geotechnical Investigaion, AFC Appendix P)
37	H = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Bakersfield Airport Station)
0.3	I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height (based on 2000-04 (5 yrs) of wind speed data as recorded at Bakersfield Airport station)
0.5	J = Fraction of TSP that is PM_{10} = 0.5
0.791	lb/acre/day

Source	Quantity	Size of Pile (acre)	Mitigation Efficiency[1]	PM_{10} Emissions (lbs/day)	$PM_{2.5}$ Emissions (lbs/day)
Storage Piles	8	0.25	67%	0.52	0.109

Pile size and number are assumed
Days per year accounts for weekend days also, not just work days
Assume PM2.5 is 20.8% of PM10

Off-Site Linears Fugitive Dust Emissions
8/17/2012

Travel on unpaved roads

E = k * (s/12)^a * (W/3)^b USEPA AP42 Chapter 13.2.2 (Unpaved Roads)

Size specific emission factor for vehicle travel on unpaved roads at industrial sites (eqn 1a; lb/VMT)

Constants:	PM2.5	PM10	TSP
k (lb/VMT)	0.15	1.5	4.9
a	0.9	0.9	0.7
b	0.45	0.45	0.45

4 s = Surface material silt content (%) (value for gravel road)
value listed in table W = Mean vehicle weight (ton)

Vehicle Type	Round Trips /Day/ Unit	Round Trip Distance on Dirt Surface (mile)	Mean Vehicle Weight (tons)[2]	PM2.5 EF[5] (lbs/VMT)	PM_{10} EF (lbs/VMT)	Mitigation Efficiency[1]	If weight = 0, where is source included
ON ROAD							
Dump Truck	4	0.25	17	0.12	1.22	67%	
Service Truck (MHD-DSL)	1	0.125	4	0.06	0.64	67%	
Pipe Haul Truck and Trailer (HHDT-DSL)			15	0.12	1.15	67%	
Truck (Pickup 3/4 Ton) - MHD-DSL	2	0.25	1	0.03	0.34	67%	
Truck - water	4	0.25	25	0.14	1.45	67%	
OFF ROAD							
Air Compressor	0			0.00	0.00	67%	
Bore Machine (Hydraulic)	0			0.00	0.00	67%	
Crane	1	0.25	12	0.10	1.04	67%	
Backhoe	0		0	0.00	0.00	67%	Dirt piling
Excavator	1	0.25	0	0.00	0.00	67%	Dirt piling
Forklift	4	0.25	10	0.10	0.96	67%	
Welding Generator	0			0.00	0.00	67%	
Roller	4	0.25	20	0.13	1.31	67%	
Pipe Bending Machine	0			0.00	0.00	67%	
RAIL							
AIR COMPRESSOR 185	0	0	1	0.03	0.34	67%	
BOOM TRUCK 12 TON	4	0.25	12	0.10	1.04	67%	
CAT 325 BACKHOE	4	0.25	0	0.00	0.00	67%	Dirt piling
CAT 330 BACKHOE	4	0.25	0	0.00	0.00	67%	Dirt piling
CAT DOZER D-6	4	0.25	0	0.00	0.00	67%	Dirt piling
CAT MODEL 12 MOTOR GRADER	4	0.25	0	0.00	0.00	67%	Grading
CAT ROLLER-COMPACTOR 563	4	0.25	3	0.06	0.56	67%	
CAT RUBBER TIRE LOADER 966	4	0.25	0	0.00	0.00	67%	Dirt piling
CAT SCRAPER 615	4	0.25	0	0.00	0.00	67%	Grading
CRANE-ROUGH TERRAIN 45T	4	0.25	45	0.19	1.89	67%	
GENSET 5KW	0	0	0.5	0.02	0.25	67%	
JOHN DEERE TRACTOR 9400	4	0.25	20	0.13	1.31	67%	
PICK-UP CRAFT	4	0.25	10	0.10	0.96	67%	
PICK-UP OVERHEAD	4	0.25	10	0.10	0.96	67%	
RAIL BALLAST REGULATOR	4	0.25	1	0.03	0.34	67%	
RAIL CLIP MACHINE	4	0.25	0.3	0.02	0.20	67%	
RAIL MOVER-SHUTTLE WAGON	4	0.25	27.5	0.15	1.51	67%	
RAIL TAMPER	4	0.25	27	0.15	1.50	67%	
RAIL WELDER	0	0	0.5	0.02	0.25	67%	
RAMEX WALK BEHIND COMPACTOR	4	0.25	0.1	0.01	0.12	67%	
TRI-AXLE DUMP TRUCK	4	0.25	17	0.12	1.22	67%	
TRUCK FLATBED 14 FOOT	4	0.25	10	0.10	0.96	67%	
TRUCK TRACTOR	4	0.25	10	0.10	0.96	67%	
WATER TRUCK, 4M ON-ROAD	4	0.25	25	0.14	1.45	67%	
WELDING MACHINE 350 AMP	0	0	0.5	0.02	0.25	67%	

Mitigation Measure[1]	Unpaved Roads
Apply water three times daily to all unpaved road surfaces[3]	45%
Traffic speeds on all unpaved roads to be reduced to 15 mph or less[4]	40%
Combined Mitigation Efficiency	**67%**

Notes:

1. Mitigation efficiencies from CEQA Table 11-4 (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM_{10} Emissions - Constrution.")
2. Equipment weight from SCAQMD Table A9-9-D-3 and various websites.
3. Water trucks operate at least 4 times per day.
4. Assumed maximum travel speed is 5 mph.
5. An emission factor based on mean vehicle weight could not be calculated for the linear equipment since the equipment will be scattered over various linears at different locations. Therefore, emissions remain calculated based on the weight of each piece of equipment; this is a more conservative estimate.

Hydrogen Energy California, Kern County Power Project
Fugitive Dust on Paved Roads
8/17/2012

AP 42 13.2.1 Paved Roads, updated January 2011

For a daily basis,
E = [k (sL)^0.91 x (W)^1.02](1-P/4N) equation (2)

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period
W = average weight (tons) of vehicles treaveling the road
k = particle size multiplier for particle size range and units of interest
sL = road surface silt loading (g/m^2)
N = number of days in the averaging period

	k
	lb/VMT
PM2.5	0.00054
PM10	0.00

Table 13.2.1-1
PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION

Heavy Duty Trucks

				Empty	Full	
W=	17.5	tons, average		5	30	tons
sL=	0.031	g/m2	Default value from URBEMIS 9.2 for Kern County			
P=	36	days/year	Buttonwillow Station 1940-2011, WRCC			

E=
0.00041 lb/VMT PM2.5 large delivery trucks
0.00169 lb/VMT PM10 large delivery trucks

Light Duty (Delivery) Trucks

W=	9	tons, average	
sL=	0.031	g/m2	Default value from URBEMIS 9.2 for Kern County
P=	36	days/year	Buttonwillow Station 1940-2011, WRCC

E=
0.00021 lb/VMT PM2.5 large delivery trucks
0.00086 lb/VMT PM10 large delivery trucks

Worker Vehicles

W=	1.6	tons	
sL=	0.031	g/m2	Default value from URBEMIS 9.2 for Kern County
P=	36	days/year	Buttonwillow Station 1940-2011, WRCC

E=
0.00004 lb/VMT PM2.5 O&M vehicles
0.00015 lb/VMT PM10 O&M vehicles

Hydrogen Energy California, Kern County Power Project
Emission Factors for Onsite Equipment
8/17/2012

					Emission Factors (lbs/hr)									
Equipment Description	**EMFAC designation**	**Horsepower**	**Source**	**Capacity Factor[1]**	**CO**	**CO_2**	**CH_4**	**N_2O**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_x**	**ROG[2]**	**CO_2e**
On-Road Vehicles														
18 cy fill mat'l haul truck	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Bus	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Concrete Pumper Truck	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Dump Truck	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Diesel Tractor (Yard Dog)	HHD-DSL		EMFAC	46.5%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Service Truck - 1 ton	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Pile Driver Truck	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Truck - Fuel/Lube	MHD-DSL		EMFAC	41.0%	0.155	33.180	0.0002	0.001	0.279	0.017	0.015	3.09E-04	0.014	33.39
Tractor Truck 5th Wheel	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Trucks - Pickup 3/4 ton	MHD-DSL		EMFAC	41.0%	0.155	33.180	0.0002	0.001	0.279	0.017	0.015	3.09E-04	0.014	33.39
Trucks - 3 ton	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Truck - Water	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0013	0.001	0.694	0.043	0.039	0.001	0.151	70.16
Off Road Vehicles	**Fuel Type**													
Air Compressor 185 CFM	D	50	OFFROAD - Air Compressors	48.0%	0.269	22.251	0.009	0.001	0.227	0.024	0.022	0.000	0.102	22.619
Air Compressor 750 CFM	D	120	OFFROAD - Air Compressors	48.0%	0.331	46.908	0.008	0.001	0.529	0.050	0.046	0.001	0.090	47.498
Articulating Boom Platform	D	50	OFFROAD - Aerial Lifts	50.5%	0.246	38.038	0.006	0.001	0.396	0.032	0.030	0.000	0.061	38.328
Bobcat Loader	D	50	OFFROAD - Rubber Tired Loaders	54.0%	0.363	31.122	0.011	0.001	0.311	0.029	0.027	0.000	0.120	31.523
Bulldozer D10R	D	500	OFFROAD - Crawler Tractors	59.0%	0.951	258.997	0.023	0.006	2.236	0.087	0.080	0.003	0.254	261.224
Bulldozer D6.C	D	120	OFFROAD - Crawler Tractors	59.0%	0.485	65.751	0.012	0.001	0.767	0.067	0.062	0.001	0.129	66.415
Concrete Trowel Machine	D	50	OFFROAD - Surfacing Equipment	49.0%	0.140	14.095	0.004	0.001	0.136	0.012	0.011	0.000	0.048	14.360
Concrete Vibrators	Electric	50	N/A	43.0%										
Cranes - Mobile 35 ton	D	120	OFFROAD - Cranes	43.0%	0.361	50.103	0.008	0.001	0.550	0.049	0.045	0.001	0.092	50.696
Cranes - Mobile 45 ton	D	175	OFFROAD - Cranes	43.0%	0.482	80.272	0.009	0.002	0.775	0.044	0.041	0.001	0.103	81.078
Crane - Mobile 65 ton	D	175	OFFROAD - Cranes	43.0%	0.482	80.272	0.009	0.002	0.775	0.044	0.041	0.001	0.103	81.078
Cranes 100 / 150 ton cap	D	250	OFFROAD - Cranes	43.0%	0.295	112.058	0.009	0.003	0.993	0.035	0.032	0.001	0.104	113.128
Diesel Powered Welder	D	25	OFFROAD - Welders	45.0%	0.060	11.276	0.002	0.000	0.104	0.007	0.006	0.000	0.022	11.404
Backhoe/loader	D	120	OFFROAD - Tractors/Loaders/Backhoes	46.5%	0.352	51.682	0.006	0.001	0.455	0.038	0.035	0.001	0.069	52.232
Earth Scraper	D	500	OFFROAD - Scrapers	66.0%	1.212	321.140	0.029	0.006	2.826	0.110	0.101	0.003	0.319	323.489
Loader	D	120	OFFROAD - Rubber Tired Loaders	54.0%	0.415	58.861	0.009	0.001	0.600	0.052	0.048	0.001	0.097	59.463
Motor Grader	D	120	OFFROAD - Graders	57.5%	0.530	74.898	0.011	0.001	0.771	0.067	0.062	0.001	0.125	75.553
Excavator - Trencher	D	120	OFFROAD - Trenchers	69.5%	0.468	64.837	0.012	0.001	0.785	0.067	0.061	0.001	0.128	65.498
Fired Heaters	D	25	OFFROAD - Other Construction Equipment	62.0%	0.054	13.205	0.001	0.000	0.101	0.004	0.004	0.000	0.016	13.323
Forklift	D	50	OFFROAD - Forklifts	30.0%	0.167	14.659	0.004	0.001	0.145	0.013	0.012	0.000	0.048	14.925
Fusion Welder	Electric	50	N/A	45.0%										
Heavy Haul / Cranes	D	750	OFFROAD - Cranes	43.0%	0.891	302.773	0.024	0.008	2.451	0.088	0.081	0.003	0.262	305.888
Heavy Haul / Cranes	D	750	OFFROAD - Cranes	43.0%	0.891	302.773	0.024	0.008	2.451	0.088	0.081	0.003	0.262	305.888
Light Plants	D	25	OFFROAD - Other Construction Equipment	62.0%	0.054	13.205	0.001	0.000	0.101	0.004	0.004	0.000	0.016	13.323
Man lifts - telescoping	D	50	OFFROAD - Aerial Lifts	50.5%	0.184	19.595	0.006	0.001	0.188	0.017	0.015	0.000	0.065	19.893
Man lift - scissor	Electric		N/A	50.5%										
Portable Compaction Roller	D	120	OFFROAD - Rollers	57.5%	0.406	58.936	0.009	0.001	0.624	0.053	0.049	0.001	0.098	59.541
Portable Compaction - Vibratory Plate	D	15	OFFROAD - Plate Compactors	43.0%	0.026	4.310	0.000	0.000	0.031	0.001	0.001	0.000	0.005	4.372
Portable Compaction - Vibratory Ram	D	50	OFFROAD - Surfacing Equipment	49.0%	0.140	14.095	0.004	0.001	0.136	0.012	0.011	0.000	0.048	14.360
Pumps	D	25	OFFROAD - Other Construction Equipment	62.0%	0.054	13.205	0.001	0.000	0.101	0.004	0.004	0.000	0.016	13.323
Portable Power Generators	D	50	OFFROAD - Generator Sets	74.0%	0.276	30.595	0.009	0.001	0.291	0.025	0.023	0.000	0.097	30.953
Truck Crane - Greater than 300 ton	D	500	OFFROAD - Cranes	43.0%	0.529	179.940	0.014	0.006	1.421	0.052	0.048	0.002	0.155	181.979
Truck Crane - Greater than 200 ton	D	250	OFFROAD - Cranes	43.0%	0.295	112.058	0.009	0.003	0.993	0.035	0.032	0.001	0.104	113.128
Vibratory Roller 20 ton	D	175	OFFROAD - Rollers	43.0%	0.619	108.049	0.011	0.002	1.009	0.055	0.050	0.001	0.124	108.896

Hydrogen Energy California, Kern County Power Project
Emission Factors for Onsite Equipment
8/17/2012

Notes:

[1] Capacity factors from SCAQMD Table A9-8-D

[2] Assuming ROGs are equivalent to VOCs

- Emission factors for on-road vehicles are based on results from Emfac Emissions Model 2007 Version 2.3 (HHDT-DSL=heavy heavy-duty trucks-diesel; MHD-DSL=medium heavy duty-diesel). EMFAC scenario year was 2010 and the selected area was Kern County. PM_{10} values include break wear and tire wear.

- Emission factors for off-road vehicles are based on output from Offroad 2007, calendar year 2013 for Kern County.

  On-Road Vehicles:

  - $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920

  Off-Road Vehicles:

  - PM2.5 Fraction of PM10, Diesel: 0.920

- CH_4 and N_2O factors are derived from California Climate Action Registry General Reporting Protocol Version 3.0 (April 2008), Table C.5 for LDT, MHD, and HHD diesel fueled trucks in the San Joaquin Valley Air Basin (MHD =HHD). These emissions are in g/mile. On-road vehicles are limited to 10 mph, which is used to convert to lb/hr. (See GHG Reference Info tab)

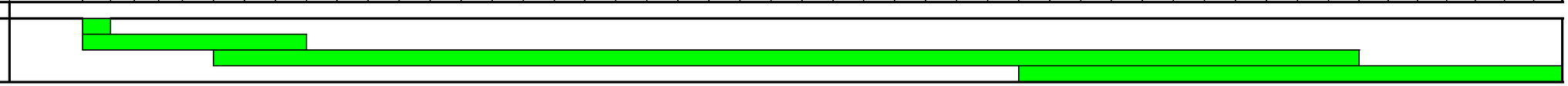
- N_2O factors for off-road vehicles are derived from California Climate Action Registry General Reporting Protocol Version 3.0 (April 2008), Table C.5 (distillate fuel factors for the industrial sector) using the following to convert from kg/gallon to lb/hp-hour, and then multiplying by the rated horsepower rating: 1 gallon/137,000 Btu, 7,000 Btu/hp-hour, and 2.2046 lb/kg. CH_4 factors are from the SCAQMD data.

CO_2 GWP (SAR, 1996)	=	1
CH_4 GWP (SAR, 1996)	=	21
N_2O GWP (SAR, 1996)	=	310

Hydrogen Energy California, Kern County Power Project
Construction Equipment Usage Schedule (on site)
8/17/2012

		Month																																																			
EQUIPMENT	***# of units***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***	***16***	***17***	***18***	***19***	***20***	***21***	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***30***	***31***	***32***	***33***	***34***	***35***	***36***	***37***	***38***	***39***	***40***	***41***	***42***	***43***	***44***	***45***	***46***	***47***	***48***	***49***
On Road Vehicles																																																					
18 cy fill mat'l haul truck	185			10	10	20	20	20	20	10	10	10	10	5	5	5	5	5	5																		3	3	3	3	1	1	1							
Bus	365	2	2	2	2	3	3	3	3	3	3	5	5	5	5	5	5	7	7	7	10	10	10	10	14	14	14	14	14	14	14	14	14	14	14	14	12	12	12	10	10	5	5	3	3	2	2	2	1	1
Concrete Pumper Truck	39						2	2	2	2	2	2	2	2	3	3	3	2	2	2	2	2							1	1	1	1																		
Dump Truck	76	3	4	4	3	3	3	3	3	3	3	2	2	2	2	2													2	2	2	2	2	2	2	2	2	3	3	3	2	1	1	1	1	1				
Diesel Tractor (Yard Dog)	236						2	2	2	2	2	2	4	4	4	4	4	8	8	8	8	8	8	8	10	10	10	10	10	10	10	10	10	10	10	10	4	4	4	4	4	4	4							
Service Truck - 1 ton	99	2	2	2	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
Pile Driver Truck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truck - Fuel/Lube	85	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1			
Tractor Truck 5th Wheel	0																																																		
Trucks - Pickup 3/4 ton	931	5	5	5	5	5	6	7	8	15	15	15	15	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	15	15	10	10	10	10	5
Trucks - 3 ton	185	1	1	1	1	1	2	2	2	4	4	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	3	3	3	3	2	2	2	1	1	1	1			
Truck - Water	127	5	5	5	5	5	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
Off Road Vehicles																																																					
Air Compressor 185 CFM	327	2	2	2	2	3	3	3	3	3	3	3	3	3	6	6	6	8	8	8	10	10	10	10	12	12	12	12	12	12	12	12	12	12	12	12	8	8	8	6	6	6	6	4	4	4	2	2	1	1
Air Compressor 750 CFM	98					1	1	1	1	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Articulating Boom Platform	0																																																			
Bob cat loader	62			1	1	1	1	1	4	4	4	4	4	3	3	3	3	3	3	2	2	2	2	2	2												1	1	1	1	1	1	1							
Bulldozer D10R	23	3	3	3	2	2	2	2	2	2	1	1																																								
Bulldozer D6C	33	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1													1	1	1	1																		
Concrete Trowel Machine	58						2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									2	2	2	2	2	2							
Concrete Vibrators	140	4	4	4	4	4	4	4	4	4	8	8	8	8	8	8	8	8	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2																	
Cranes - Mobile 35 ton	176							1	1	1	4	4	4	4	7	7	7	7	7	7	7	7	7	7	7	7	7	5	5	5	5	5	5	5	5	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1
Cranes - Mobile 45 ton	84											2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	1	1							
Crane - Mobile 65 ton	126												1	1	2	4	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	4	2	2	2	2	2	1	1	1	1	1	1	1				
Cranes 100 / 150 ton cap	70											1	1	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	2	2	1	1	1	1	1	1														
Diesel Powered Welder	643				10	10	10	10	10	10	10	10	10	10	10	10	15	15	15	20	20	20	20	20	25	25	25	25	25	25	25	25	25	15	15	15	15	15	10	10	10	10	10	5	5	5	5	3	3	2
Excavator - Backhoe/loader	68	2	2	3	4	4	4	4	4	4	4	4	2	2	2	2	2	1	1	1	1	1	1	1	1												2	2	2	2	1	1	1							
Excavator - Earth Scraper 637	38	7	7	7	7	4	4	2																																											
Excavator - loader	33	2	2	2	2	2	2	2	2	2	2	2	2	1	1														1	1	1	1							1	1	1								
Excavator - Motor Grader (CAT140H)	24		1	1	1	3	3																						1	1	1	1					2	2	2	2	1	1	1							
Excavator - Trencher (CAT320)	22						2	2	2	2	2	2	2	2	2	2	2																																	
Fired Heaters (2,000 BTU)	166					4	4	4	4	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Forklift	285	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2	2	2	2	1	1	1
Fusion Welder	83					2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
Heavy Haul / 600 tn Crane	9																		1	1	1	1	1	1	1	1	1																							
Heavy Haul / 1,000 tn Crane	6																				1	1	1	1	1	1																								
Light Plants	433	1	1	2	4	8	8	8	8	4	4	6	6	8	8	10	10	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	10	10	10	10	10	10	10	10	10	5	5	5	5	5	4	4	2	2
Man lifts - telescoping	506									5	5	5	10	10	10	10	10	10	10	10	15	15	15	15	20	20	20	20	20	20	20	20	20	20	20	20	15	15	15	10	10	10	10	5	5	5	5	2	2	2
Man lift - scissor	540								5	5	5	5	10	10	10	10	10	10	10	10	15	15	15	15	20	20	20	20	20	20	20	20	20	20	20	20	15	15	15	10	10	10	10	10	10	10	10	5	5	5
Portable Compaction Roller	82			5	5	5	5	5	5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					2	2	2	2	2	2				2	2	2	1	1							
Portable Compaction - Vibratory Plate	126								6	6	6	6	6	6	6	6	6	6	6	6	6	6	6						3	3	3	3					4	4	4	4	4	2	2							
Portable Compaction - Ram	0																																																		
Pumps	182	3	3	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2
Portable Power Generators	608	4	4	4	4	6	6	6	6	6	10	10	10	10	10	10	15	15	15	15	15	15	15	20	20	20	20	20	20	20	20	20	20	20	20	20	15	15	15	15	10	10	10	10	10	10	5	5	5	2
Truck Crane - Greater than 200 ton	68												1	1	1	1	1	2	2	3	3	4	4	4	4	4	4	4	4	4	3	3	2	2	2	1	1	1	1	1										
Truck Crane - Greater than 300 ton	34															1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	2																			
Vibratory Roller Ingersol-Rand 20 ton	53	3	3	3	3	3	3	3	3	3	2	2	2	2	2	1	1	1	1										2	2	2	2							1	1	1	1								
Onsite Total	**7534**	**60**	**62**	**80**	**96**	**119**	**129**	**124**	**136**	**133**	**142**	**149**	**160**	**168**	**176**	**180**	**190**	**202**	**196**	**198**	**215**	**214**	**212**	**212**	**234**	**230**	**228**	**225**	**234**	**230**	**224**	**220**	**206**	**193**	**190**	**180**	**163**	**165**	**164**	**149**	**136**	**120**	**119**	**72**	**72**	**66**	**55**	**41**	**37**	**28**

Schedule



Notes: Preliminary and Confidential
1 These are approximate values

Hydrogen Energy California, Kern County Power Project
Emission Factors for Offsite Linears Equipment
8/17/2012

					Emission Factors (lbs/hr)									
Equipment Description	**EMFAC designation**	**Horsepower**	**Source**	**Capacity Factor[1]**	**CO**	**CO_2**	**CH_4**	**N_2O**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_x**	**ROG[2]**	**CO_2e**
On-Road Vehicles					EMFAC									
Dump Truck	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0018	0.001	0.694	0.043	0.039	0.001	0.151	70.165
Service Truck	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0018	0.001	0.694	0.043	0.039	0.001	0.151	70.165
Pipe Haul Truck and Trailer (HHDT-DSL)	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0018	0.001	0.694	0.043	0.039	0.001	0.151	70.165
Trucks - Pickup 3/4 ton	MHD-DSL		EMFAC	41.0%	0.155	33.180	0.0018	0.001	0.279	0.017	0.015	0.000	0.014	33.558
Truck - Water	HHD-DSL		EMFAC	41.0%	0.320	69.786	0.0018	0.001	0.694	0.043	0.039	0.001	0.151	70.165
Off Road Vehicles	**Fuel Type**													
Air Compressor	D	50	OFFROAD - Air Compressors	48.0%	0.269	22.251	0.009	0.001	0.227	0.024	0.022	0.000	0.102	22.619
Bore Machine (Hydraulic)	D	50	OFFROAD - Bore/Drill Rigs	75.0%	0.228	31.009	0.003	0.001	0.257	0.012	0.011	0.000	0.029	31.238
Crane	D	250	OFFROAD - Cranes	43.0%	0.295	112.058	0.009	0.003	0.993	0.035	0.032	0.001	0.104	113.128
Backhoe	D	120	OFFROAD - Tractors/Loaders/Backhoes	46.5%	0.352	51.682	0.006	0.001	0.455	0.038	0.035	0.001	0.069	52.232
Excavator	D	120	OFFROAD - Excavators	58.0%	0.517	73.557	0.010	0.001	0.678	0.058	0.054	0.001	0.108	74.181
Forklift	D	50	OFFROAD - Forklifts	30.0%	0.167	14.659	0.004	0.001	0.145	0.013	0.012	0.000	0.048	14.925
Generator (Welding)	D	50	OFFROAD - Generator Sets	74.0%	0.276	30.595	0.009	0.001	0.291	0.025	0.023	0.000	0.097	30.953
Roller	D	50	OFFROAD - Rollers	57.5%	0.291	25.960	0.009	0.001	0.258	0.024	0.022	0.000	0.102	26.328
Pipe Bending Machine	D	50	OFFROAD - Other Construction Equipment	62.0%	0.265	27.964	0.007	0.001	0.258	0.020	0.019	0.000	0.075	28.281
RAIL														
AIR COMPRESSOR 185	D	49	OFFROAD - Air Compressors	48.0%	0.269	22.251	0.009	0.001	0.227	0.024	0.022	0.000	0.102	22.616
BOOM TRUCK 12 TON	D	300	EMFAC	41.0%	0.320	69.786	0.002	0.001	0.694	0.043	0.039	0.001	0.151	70.165
CAT 325 BACKHOE	D	168	OFFROAD - Tractors/Loaders/Backhoes	46.5%	0.585	101.296	0.009	0.000	0.768	0.043	0.039	0.001	0.098	101.482
CAT 330 BACKHOE	D	222	OFFROAD - Tractors/Loaders/Backhoes	46.5%	0.366	171.583	0.011	0.000	1.163	0.037	0.034	0.002	0.120	171.811
CAT DOZER D-6	D	185	OFFROAD - Crawler Tractors	59.0%	0.744	121.079	0.015	0.000	1.250	0.071	0.065	0.001	0.167	121.395
CAT MODEL 12 MOTOR GRADER	D	140	OFFROAD - Graders	57.5%	0.530	74.898	0.011	0.000	0.771	0.067	0.062	0.001	0.125	75.134
CAT ROLLER-COMPACTOR 563	D	145	OFFROAD - Rollers	57.5%	0.406	58.936	0.009	0.000	0.624	0.053	0.049	0.001	0.098	59.122
CAT RUBBER TIRE LOADER 966	D	253	OFFROAD - Rubber Tired Loaders	54.0%	0.368	148.843	0.011	0.000	1.210	0.042	0.038	0.002	0.126	149.081
CAT SCRAPER 615	D	265	OFFROAD - Scrapers	66.0%	0.641	209.282	0.020	0.000	2.044	0.079	0.073	0.002	0.225	209.709
CRANE-ROUGH TERRAIN 45T	D	173	OFFROAD - Cranes	43.0%	0.482	80.272	0.009	0.000	0.775	0.044	0.041	0.001	0.103	80.467
GENSET 5KW	D	5	OFFROAD - Generator Sets	74.0%	0.069	10.198	0.001	0.000	0.105	0.006	0.006	0.000	0.015	10.228
JOHN DEERE TRACTOR 9400	D	410	OFFROAD - Tractors/Loaders/Backhoes	46.5%	0.744	344.544	0.021	0.000	2.062	0.070	0.064	0.004	0.229	344.977
PICK-UP CRAFT	D	385	OFFROAD - Other Construction Equipment	62.0%	0.523	254.010	0.013	0.000	1.516	0.049	0.045	0.002	0.145	254.285
PICK-UP OVERHEAD	D	260	OFFROAD - Other Construction Equipment	62.0%	0.587	106.420	0.008	0.000	0.799	0.042	0.038	0.001	0.093	106.597
RAIL BALLAST REGULATOR	D	240	OFFROAD - Other Construction Equipment	62.0%	0.587	106.420	0.008	0.000	0.799	0.042	0.038	0.001	0.093	106.597
RAIL CLIP MACHINE	D	80	OFFROAD - Other Construction Equipment	62.0%	0.265	27.964	0.007	0.000	0.258	0.020	0.019	0.000	0.075	28.107
RAIL MOVER-SHUTTLE WAGON	D	250	OFFROAD - Other Construction Equipment	62.0%	0.587	106.420	0.008	0.000	0.799	0.042	0.038	0.001	0.093	106.597
RAIL TAMPER	D	260	OFFROAD - Other Construction Equipment	62.0%	0.587	106.420	0.008	0.000	0.799	0.042	0.038	0.001	0.093	106.597
RAIL WELDER	D	58	OFFROAD - Welders	45.0%	0.060	11.276	0.002	0.000	0.104	0.007	0.006	0.000	0.022	11.317
RAMEX WALK BEHIND COMPACTOR	D	10	OFFROAD - Plate Compactors	43.0%	0.026	4.310	0.000	0.000	0.031	0.001	0.001	0.000	0.005	4.319
TRI-AXLE DUMP TRUCK	D	450	EMFAC	41.0%	0.320	69.786	0.002	0.001	0.694	0.043	0.039	0.001	0.151	70.165
TRUCK FLATBED 14 FOOT	D	362	EMFAC	41.0%	0.320	69.786	0.002	0.001	0.694	0.043	0.039	0.001	0.151	70.165
TRUCK TRACTOR	D	450	OFFROAD - Off-Highway Trucks	41.0%	0.636	272.089	0.020	0.000	1.783	0.063	0.058	0.003	0.217	272.500
WATER TRUCK, 4M ON-ROAD	D	300	EMFAC	41.0%	0.320	69.786	0.002	0.001	0.694	0.043	0.039	0.001	0.151	70.165
WELDING MACHINE 350 AMP	D	25	OFFROAD - Welders	45.0%	0.060	11.276	0.002	0.000	0.104	0.007	0.006	0.000	0.022	11.317

Notes:

[1] Capacity factors from SCAQMD Table A9-8-D

[2] Assuming ROGs are equivalent to VOCs

- Emission factors for on-road vehicles are based on results from Emfac Emissions Model 2010 Version 2.3 (LDT-DSL=light duty class II trucks-diesel; HHDT-DSL=heavy heavy-duty trucks-diesel; MHD-DSL=medium heavy duty-diesel). EMFAC scenario year was 2010.

- Emission factors for off-road vehicles are based on output from Offroad 2007, calendar year 2013 for Kern County.
  On-Road Vehicles:
  - $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
  Off-Road Vehicles:
  - PM2.5 Fraction of PM10, Diesel: 0.920

- CH_4 and N_2O factors are derived from California Climate Action Registry General Reporting Protocol Version 3.0 (April 2008), Table C.5 for LDT, MHD, and HHD diesel fueled trucks in the San Joaquin Valley Air Basin (MHD =HHD). These emissions are in g/mile. On-road vehicles are limited to 10 mph, which is used to convert to lb/hr. (See GHG Reference Info tab)

- N_2O factors for off-road vehicles are derived from California Climate Action Registry General Reporting Protocol Version 3.0 (April 2008), Table C.5 (distillate fuel factors for the industrial sector) using the following to convert from kg/gallon to lb/hp-hour, and then multiplying by the rated horsepower rating: 1 gallon/137,000 Btu, 7,000 Btu/hp-hour, and 2.2046 lb/kg. CH_4 factors are from the SCAQMD data.

CO_2 GWP (SAR, 1996) =	1
CH_4 GWP (SAR, 1996) =	21
N_2O GWP (SAR, 1996) =	310

Hydrogen Energy California, Kern County Power Project
Construction Equipment Usage Schedule (off site linears)
8/17/2012

EQUIPMENT	Month / # of units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
ON ROAD																																																		
Dump Truck	64											4	4	6	6	6	6	6	6	6	6	4	4																											
Service Truck (MHD-DSL)												2	2	2	2	2	2	3	3	3	3	3	3																											
Pipe Haul Truck and Trailer (HHDT-DSL	30											3	3	3	3	3	3	2	2	2	2	2	2																											
Truck (Pickup 3/4 Ton) - MHD-DSL	150											10	10	10	10	10	10	15	15	15	15	15	15																											
Truck - water	40											2	2	4	4	4	4	4	4	4	4	2	2																											
OFF ROAD																																																		
Air Compressor	48											2	2	4	4	6	6	6	6	4	4	2	2																											
Bore Machine (Hydraulic)	5															1	1	1	1	1																														
Crane	60											2	4	4	6	6	6	6	6	6	6	4	4																											
Backhoe	104											6	6	10	10	10	10	10	10	10	10	6	6																											
Excavator	11												1	1	1	1	1	1	1	1	1	1	1																											
Forklift	42											2	2	4	4	4	4	4	4	4	4	4	2																											
Welding Generator	96											8	8	8	8	8	8	8	8	8	8	8	8																											
Roller	22												2	2	2	2	2	2	2	2	2	2	2																											
Pipe Bending Machine	36											2	2	4	4	4	4	4	4	4	2	2																											
RAIL																																																		
AIR COMPRESSOR 185	8													0	2	2	2	2																																
BOOM TRUCK 12 TON	3													0	0	1	1	1																																
CAT 325 BACKHOE	2													1	1	0	0	0																																
CAT 330 BACKHOE	1													0	0	1	0	0																																
CAT DOZER D-6	5													2	2	0	0	1																																
CAT MODEL 12 MOTOR GRADER	7													2	2	1	1	1																																
CAT ROLLER-COMPACTOR 563	5													2	2	1	0	0																																
CAT RUBBER TIRE LOADER 966	6													0	0	2	2	2																																
CAT SCRAPER 615	3													2	1	0	0	0																																
CRANE-ROUGH TERRAIN 45T	2													0	1	1	0	0																																
GENSET 5KW	6													0	4	2	0	0																																
JOHN DEERE TRACTOR 9400	1													1	0	0	0	0																																
PICK-UP CRAFT	15													3	3	3	3	3																																
PICK-UP OVERHEAD	24													2	6	6	5	5																																
RAIL BALLAST REGULATOR	2													0	0	0	1	1																																
RAIL CLIP MACHINE	2													0	0	0	1	1																																
RAIL MOVER-SHUTTLE WAGON	3													0	0	1	1	1																																
RAIL TAMPER	2													0	0	0	1	1																																
RAIL WELDER	3													0	0	0	2	1																																
RAMEX WALK BEHIND COMPACTOR	1													0	1	0	0	0																																
TRI-AXLE DUMP TRUCK	12													4	6	2	0	0																																
TRUCK FLATBED 14 FOOT	11													1	1	3	3	3																																
TRUCK TRACTOR	2													0	0	1	1	0																																
WATER TRUCK, 4M ON-ROAD	5													1	1	1	1	1																																
WELDING MACHINE 350 AMP	5													1	1	1	1	1																																
TOTAL	**874**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**43**	**48**	**84**	**98**	**96**	**93**	**97**	**72**	**70**	**67**	**55**	**51**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Notes: Preliminary and Confidential
1 These are approximate values
2 Construction Equipment Assumptions - Natural Gas line work begins in month 11 and ends in month 20. Process water line work begins in month 11 and ends in month 17 Potable Water line work begins in month 17 and ends in month 20. CO2 line work begins in month 17 and ends in month 22. Transmission line work begins in month 17 and ends in month 22. Rail spur line work begins in month 13 and ends in month 17

COMBUSTION - Short-term (Month 6)

equipment / vehicles	TOTAL EMISSION RATE (lb/day)				
	$PM_{2.5}$	PM_{10}	CO	NO_2	SO_2
Worker vehicles	0.0	0.0	0.5	0.0	0.0
Delivery trucks	0.3	0.3	2.2	5.1	0.0
Soil import	1.4	1.5	10.4	24.2	0.0
Construction equip	19.3	21.1	187.3	347.0	0.4

equipment / vehicles	number of sources in the model	operating hours per day in the model	MODEL EMISSION RATE per source (lb/hr/source)				
			$PM_{2.5}$ 24hr	PM_{10} 24hr	CO 1 & 8 hr	NO_2 1-hr	SO_2 1,3 & 24 hr
Worker vehicles	36	10	1.30E-05	1.67E-05	1.36E-03	1.09E-04	2.14E-06
Delivery trucks	26	10	1.10E-03	1.22E-03	8.48E-03	1.98E-02	1.59E-05
Soil import	67	10	2.04E-03	2.25E-03	1.55E-02	3.62E-02	2.92E-05
Construction equip	58	10	3.32E-02	3.64E-02	3.23E-01	5.98E-01	6.57E-04

SOURCE PARAMETERS

Source ID	Source Description	Easting (m)	Northing (m)	Base elevation (m)	Stack Height (m)	Temperature K	Exit Velocity (m/s)	Stack diameter (m)	Emissions per source: $PM_{2.5}$ 24hr lb/hr	PM_{10} 24hr lb/hr	CO 1hr & 8hr lb/hr	NO_2 1hr lb/hr	SO_2 1, 3 and 24hr lb/hr
Worker vehicles[1]	Worker vehicles for commuting to/from site			87.9348	0.3	622	0.001	0.051	1.30E-05	1.67E-05	1.36E-03	1.09E-04	2.14E-06
Delivery trucks[2]	Light and heavy duty delivery trucks			87.9348	3	622	57.5	0.127	1.10E-03	1.22E-03	8.48E-03	1.98E-02	1.59E-05
Soil import[2]	Importing soil for fill			87.9348	3	622	57.5	0.127	2.04E-03	2.25E-03	1.55E-02	3.62E-02	2.92E-05
Construction equipment[2]	All construction equipment			87.9348	3	622	59.9	0.102	3.32E-02	3.64E-02	3.23E-01	5.98E-01	6.57E-04

Notes:

1. Stack parameters for worker vehicles modified to reflect realistic stack height and stack diameter for a typical passenger vehicle. Exit velocity was set at 0.001 m/s, per guidance from SJVAPCD for horizontal stacks.
2. Reference for truck stack parameters and worker vehicle temperature: Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines, California EPA-Air Resources Board, October 2000.

	Average horsepower:	HP used for stack params
Worker vehicles	195.5	200
Delivery trucks	275	300
Construction equipment	170	200

COMBUSTION - Long-term (Months 1-12)

equipment / vehicles	TOTAL EMISSION RATE (tons/year)				
	$PM_{2.5}$	PM_{10}	CO	NO_2	SO_2
Worker vehicles	0.00	0.00	0.08	0.01	0.00
Delivery trucks	0.14	0.16	1.09	2.54	0.00
Soil import	0.11	0.12	0.80	1.87	0.00
Construction equip	2.07	2.26	20.60	37.22	0.04

equipment / vehicles	number of sources in the model	Annual Hours of Operation	MODEL EMISSION RATE per source (lb/hr/source)				
			$PM_{2.5}$ annual	PM_{10} annual	CO annual	NO_2 annual	SO_2 annual
Worker vehicles	36	2640	1.68E-05	2.17E-05	1.76E-03	1.41E-04	2.79E-06
Delivery trucks	26	2640	4.17E-03	4.60E-03	3.18E-02	7.41E-02	5.98E-05
Soil import	67	2640	1.19E-03	1.31E-03	9.06E-03	2.11E-02	1.70E-05
Construction equip	142	2640	1.10E-02	1.21E-02	1.10E-01	1.99E-01	2.21E-04

SOURCE PARAMETERS

Source ID	Source Description	Easting (m)	Northing (m)	Base elevation (m)	Stack Height (m)	Temperature K	Exit Velocity (m/s)	Stack diameter (m)	Emissions per source: $PM_{2.5}$ annual lb/hr	PM_{10} annual lb/hr	CO annual lb/hr	NO_2 annual lb/hr	SO_2 annual lb/hr
Worker vehicles[1]	Worker vehicles for commuting to/from site			87.9348	0.3	622	0.001	0.051	1.68E-05	2.17E-05	1.76E-03	1.41E-04	2.79E-06
Delivery trucks[2]	Light and heavy duty delivery trucks			87.9348	3	622	57.5	0.127	4.17E-03	4.60E-03	3.18E-02	7.41E-02	5.98E-05
Soil import[2]	Importing soil for fill			87.9348	3	622	57.5	0.127	1.19E-03	1.31E-03	9.06E-03	2.11E-02	1.70E-05
Construction equipment[2]	All construction equipment			87.9348	3	622	59.9	0.102	1.10E-02	1.21E-02	1.10E-01	1.99E-01	2.21E-04

Notes:

1. Stack parameters for worker vehicles modified to reflect realistic stack height and diameter for a typical passenger vehicle. Exit velocity was set at 0.001 m/s, per guidance from SJVAPCD for horizontal stacks.
2. Reference for truck stack parameters: Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines, California EPA-Air Resources Board, October 2000.

	Average horsepower:	HP used for stack params
Construction equipment	170	200
Worker vehicles	195.5	200
Delivery trucks	275	300

COMBUSTION - Short-term (Month 24)

equipment / vehicles	TOTAL EMISSION RATE (lb/day)				
	$PM_{2.5}$	PM_{10}	CO	NO_2	SO_2
Worker vehicles	0.0	0.1	4.8	0.4	0.0
Delivery trucks	0.3	0.3	2.2	5.1	0.0
Soil import	-	-	-	-	-
Construction equip	22.6	24.8	231.6	384.9	0.5

equipment / vehicles	number of sources in the model	operating hours per day in the model	MODEL EMISSION RATE per source (lb/hr/source)				
			$PM_{2.5}$ 24hr	PM_{10} 24hr	CO 1 & 8 hr	NO_2 1-hr	SO_2 1,3 & 24 hr
Worker vehicles	36	10	1.28E-04	1.64E-04	1.34E-02	1.07E-03	2.11E-05
Delivery trucks	26	10	1.10E-03	1.22E-03	8.48E-03	1.98E-02	1.59E-05
Soil import	-	-	-	-	-	-	-
Construction equip	58	10	3.90E-02	4.27E-02	3.99E-01	6.64E-01	7.81E-04

SOURCE PARAMETERS

Source ID	Source Description	Easting (m)	Northing (m)	Base elevation (m)	Stack Height (m)	Temperature K	Exit Velocity (m/s)	Stack diameter (m)	Emissions per source: $PM_{2.5}$ 24hr lb/hr	PM_{10} 24hr lb/hr	CO 1hr & 8hr lb/hr	NO_2 1hr lb/hr	SO_2 1, 3 and 24hr lb/hr
Worker vehicles[1]	Worker vehicles for commuting to/from site			87.9348	0.3	622	0.001	0.051	1.28E-04	1.64E-04	1.34E-02	1.07E-03	2.11E-05
Delivery trucks[2]	Light and heavy duty delivery trucks			87.9348	3	622	57.5	0.127	1.10E-03	1.22E-03	8.48E-03	1.98E-02	1.59E-05
Soil import[2]	Importing soil for fill			-	-	-	-	-	-	-	-	-	-
Construction equipment[2]	All construction equipment			87.9348	3	622	59.9	0.102	3.90E-02	4.27E-02	3.99E-01	6.64E-01	7.81E-04

Notes:
1. Stack parameters for worker vehicles modified to reflect realistic stack height and diameter for a typical passenger vehicle. Exit velocity was set at 0.001 m/s, per guidance from SJVAPCD for horizontal stacks.
2. Reference for truck stack parameters: Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines, California EPA-Air Resources Board, October 2000.

	Average horsepower:	HP used for stack params
Worker vehicles	195.5	200
Delivery trucks	275	300
Construction equipment	170	200

COMBUSTION - Long-term (Months 20-31)

equipment / vehicles	TOTAL EMISSION RATE (tons/year)				
	$PM_{2.5}$	PM_{10}	CO	NO_2	SO_2
Worker vehicles	0.01	0.01	0.68	0.05	0.00
Delivery trucks	0.04	0.04	0.29	0.68	0.00
Soil import	-	-	-	-	-
Construction equip	2.81	3.07	28.62	47.37	0.06

equipment / vehicles	number of sources in the model	Annual Hours of Operation	MODEL EMISSION RATE per source (lb/hr/source)				
			$PM_{2.5}$ annual	PM_{10} annual	CO annual	NO_2 annual	SO_2 annual
Worker vehicles	36	2640	1.37E-04	1.76E-04	1.43E-02	1.15E-03	2.26E-05
Delivery trucks	26	2640	1.10E-03	1.22E-03	8.48E-03	1.98E-02	1.59E-05
Soil import	-	2640	-	-	-	-	-
Construction equip	142	2640	1.50E-02	1.64E-02	1.53E-01	2.53E-01	2.96E-04

SOURCE PARAMETERS

Source ID	Source Description	Easting (m)	Northing (m)	Base elevation (m)	Stack Height (m)	Temperature K	Exit Velocity (m/s)	Stack diameter (m)	Emissions per source: $PM_{2.5}$ annual lb/hr	PM_{10} annual lb/hr	CO annual lb/hr	NO_2 annual lb/hr	SO_2 annual lb/hr
Worker vehicles[1]	Worker vehicles for commuting to/from site			87.9348	0.3	622	0.001	0.051	1.37E-04	1.76E-04	1.43E-02	1.15E-03	2.26E-05
Delivery trucks[2]	Light and heavy duty delivery trucks			87.9348	3	622	57.5	0.127	1.10E-03	1.22E-03	8.48E-03	1.98E-02	1.59E-05
Soil import[2]	Importing soil for fill			-	-	-	-	-	-	-	-	-	-
Construction equipment[2]	All construction equipment			87.9348	3	622	59.9	0.102	1.50E-02	1.64E-02	1.53E-01	2.53E-01	2.96E-04

Notes:
1. Stack parameters for worker vehicles modified to reflect realistic stack height and diameter for a typical passenger vehicle. Exit velocity was set at 0.001 m/s, per guidance from SJVAPCD for horizontal stacks.
2. Reference for truck stack parameters: Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines, California EPA-Air Resources Board, October 2000.

	Average horsepower:	HP used for stack params
Construction equipment	170	200
Worker vehicles	195.5	200
Delivery trucks	275	300

FUGITIVES - Short-term (Month 6)

Location	X (m)	Y (m)	AREA (m2)
Parking1	215	100	21500
Parking2	215	100	21500
Parking3	215	100	21500
Parking4	215	100	21500
Parking5	215	100	21500
Parking6	215	100	21500
Delivery / Construction Laydown	1075	290	311750
Soil import	600	600	360000
Construction area	677	677	458,306

Project Site	453 acres	(from Project Description section 2.1.8)
% disturbed in one month	25%	
Acreage disturbed in one month	113.25 acres	

Fugitive Source	Operating Hours per day	TOTAL EMISSION RATE (lb/day)		MODEL EMISSION RATE (g/s-m2)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
Parking1	10	0.2	1.9	1.10E-07	1.10E-06
Parking2	10	0.2	1.9	1.10E-07	1.10E-06
Parking3	10	0.2	1.9	1.10E-07	1.10E-06
Parking4	10	0.2	1.9	1.10E-07	1.10E-06
Parking5	10	0.2	1.9	1.10E-07	1.10E-06
Parking6	10	0.2	1.9	1.10E-07	1.10E-06
Delivery Trucks	10	2.0	19.5	7.90E-08	7.90E-07
Soil import	10	9.0	90.3	3.16E-07	3.16E-06
Construction Equipment	10	17.8	97.0	4.89E-07	2.67E-06

Construction Activity — Fugitives from these activities are included above with "Construction equipment"
- Dirt Piling / Material Handling
- Grading
- Bulldozing / Earth clearing
- Covered Storage Piles

FUGITIVES - Long-term (Months 1-12)

Location	X (m)	Y (m)	AREA (m2)
Parking1	215	100	21500
Parking2	215	100	21500
Parking3	215	100	21500
Parking4	215	100	21500
Parking5	215	100	21500
Parking6	215	100	21500
Delivery / Construction Laydown	1075	290	311750
Soil import	600	600	360000
Construction area	1250	1100	1,374,919

Project Site	453 acres	(from Project Description section 2.1.8)
% disturbed in one year	75%	
Acreage disturbed in one year	339.75 acres	

Fugitive Source	Annual hours of operation	TOTAL EMISSION RATE (tons/yr)		MODEL EMISSION RATE (g/s-m2)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
Parking1	2640	0.0	0.2	1.08E-07	1.08E-06
Parking2	2640	0.0	0.2	1.08E-07	1.08E-06
Parking3	2640	0.0	0.2	1.08E-07	1.08E-06
Parking4	2640	0.0	0.2	1.08E-07	1.08E-06
Parking5	2640	0.0	0.2	1.08E-07	1.08E-06
Parking6	2640	0.0	0.2	1.08E-07	1.08E-06
Delivery Trucks	2640	0.2	2.3	7.03E-08	7.03E-07
Soil import	2640	0.7	7.4	1.96E-07	1.96E-06
Construction Equipment	2640	2.2	11.0	1.51E-07	7.65E-07

Construction Activity — Fugitives from these activities are included above with "Construction equipment"
- Dirt Piling / Material Handling
- Grading
- Bulldozing / Earth clearing
- Covered Storage Piles

FUGITIVES - Short-term (Month 24)

Location	X (m)	Y (m)	AREA (m2)
Parking1	215	100	21500
Parking2	215	100	21500
Parking3	215	100	21500
Parking4	215	100	21500
Parking5	215	100	21500
Parking6	215	100	21500
Delivery / Construction Laydown	1075	290	311750
Soil import	-	-	-
Construction area	677	677	458,306

Project Site	453 acres	(from Project Description section 2.1.8)
% disturbed in one month	25%	
Acreage disturbed in one month	113.25 acres	

Fugitive Source	Operating Hours per day	TOTAL EMISSION RATE (lb/day)		MODEL EMISSION RATE (g/s-m2)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
Parking1	10	1.0	9.9	5.78E-07	5.78E-06
Parking2	10	1.0	9.9	5.78E-07	5.78E-06
Parking3	10	1.0	9.9	5.78E-07	5.78E-06
Parking4	10	1.0	9.9	5.78E-07	5.78E-06
Parking5	10	1.0	9.9	5.78E-07	5.78E-06
Parking6	10	1.0	9.9	5.78E-07	5.78E-06
Delivery Trucks	10	1.0	10.4	4.19E-08	4.19E-07
Soil import	-	-	-	-	-
Construction Equipment	10	3.8	38.1	1.05E-07	1.05E-06

Construction Activity — Fugitives from these activities are included above with "Construction equipment"
- Dirt Piling / Material Handling
- Grading
- Bulldozing / Earth clearing
- Covered Storage Piles

FUGITIVES - Long-term (Months 20-31)

Location	X (m)	Y (m)	AREA (m2)
Parking1	215	100	21500
Parking2	215	100	21500
Parking3	215	100	21500
Parking4	215	100	21500
Parking5	215	100	21500
Parking6	215	100	21500
Delivery / Construction Laydown	1075	290	311750
Soil import	-	-	-
Construction area	1250	1100	1,374,919

Project Site	453 acres	(from Project Description section 2.1.8)
% disturbed in one year	75%	
Acreage disturbed in one year	339.75 acres	

Fugitive Source	Annual hours of operation	TOTAL EMISSION RATE (tons/yr)		MODEL EMISSION RATE (g/s-m2)	
		$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}
Parking1	2640	0.1	1.4	6.02E-07	6.02E-06
Parking2	2640	0.1	1.4	6.02E-07	6.02E-06
Parking3	2640	0.1	1.4	6.02E-07	6.02E-06
Parking4	2640	0.1	1.4	6.02E-07	6.02E-06
Parking5	2640	0.1	1.4	6.02E-07	6.02E-06
Parking6	2640	0.1	1.4	6.02E-07	6.02E-06
Delivery Trucks	2640	0.1	1.3	4.11E-08	4.11E-07
Soil import	-	-	-	-	-
Construction Equipment	2640	0.6	5.4	4.37E-08	3.76E-07

Construction Activity — Fugitives from these activities are included above with "Construction equipment"
- Dirt Piling / Material Handling
- Grading
- Bulldozing / Earth clearing
- Covered Storage Piles

APPENDIX B

DETAILED OPERATIONAL EMISSION CALCULATIONS FOR ALTERNATIVE 1

Summary of Applicable Operational Emissions for General Conformity (Alternative 1) - 2017 Overlapping with Construction

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
San Joaquin Valley, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM2.5 Nonattainment CO Maintenance - Moderate - Fresno, CA (Part of Fresno County), Modesto, CA (Part of Stanislaus County), Stockton, CA (Part of San Joaquin County) PM10 Maintenance	SJVAPCD	**Construction** - Entire SJVAPCD jurisdiction area (one way trip: trucks = worker vehicles = 20 miles)	Onsite Construction Equipment	2.65	3.84	1.23	0.35	0.00	0.83
				Onsite Trucks	0.15	0.34	0.77	0.09	0.00	0.09
				Onsite Vehicles	0.08	0.01	1.04	0.10	0.00	0.01
				Onsite Total	2.88	4.18	3.04	0.55	0.01	0.93
				Offsite Linears Equipment	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Trucks	1.02	5.16	0.42	0.21	0.00	0.22
				Offsite Vehicles	5.98	0.72	0.20	0.07	0.01	0.18
				Offsite Total	6.99	5.87	0.61	0.28	0.01	0.41
				Total Construction Emission (ton/yr)	**9.87**	**10.06**	**3.66**	**0.82**	**0.02**	**1.34**
			Operation - Entire SJVAPCD jurisdiction area (one way trip: trains = 63 to 287 miles, trucks = 40 to 80 miles, worker vehicles = 20 miles)	Offsite Train	2.06	7.95	0.13	0.12	0.15	0.22
				Offsite Truck	1.76	2.90	0.80	0.24	0.02	0.25
				Offsite Workers Commuting	1.39	0.16	0.35	0.09	0.00	0.04
				Onsite Train	0.28	0.79	0.01	0.01	0.02	0.04
				Onsite Truck	0.21	0.33	0.05	0.02	0.00	0.05
				Total Operation Emissions	**5.70**	**12.13**	**1.34**	**0.49**	**0.19**	**0.60**
				Total Construction and Operation Overlapping Emissions	**15.57**	**22.19**	**4.99**	**1.31**	**0.21**	**1.94**
				Applicable General Conformity *de minimis* Thresholds	**100**	**10**	**100**	**100**	**100**	**10**
				Less Than Thresholds?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Los Angeles-South Coast Air Basin, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM10 Nonattainment - Serious PM2.5 Nonattainment NO2 Maintenance CO Maintenance - Serious	SCAQMD	Entire SCAQMD jurisdiction area (one way trip: trucks = 88 to 90 miles)	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Truck	1.38	2.27	0.62	0.19	0.02	0.19
				Total Emissions	**1.38**	**2.27**	**0.62**	**0.19**	**0.02**	**0.19**
				Applicable General Conformity *de minimis* Thresholds	**100**	**10**	**70**	**100**	**100**	**10**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Kern County (East Kern), CA	8-Hour Ozone (2008) Nonattainment - Marginal PM10 Nonattainment - Serious	EKAPCD	Entire EKAPCD jurisdiction area (one way trip: trains = 62 to 83 miles)	Offsite Train		4.66	0.08			0.13
				Offsite Truck		0.00	0.00			0.00
				Total Emissions		**4.66**	**0.08**			**0.13**
				Applicable General Conformity *de minimis* Thresholds		**100**	**70**			**100**
				Less Than Thresholds?		**Yes**	**Yes**			**Yes**
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	8-Hour Ozone (2008) Nonattainment - Severe 15 (Part of San Bernardino and Los Angeles Counties)	MDAQMD	Los Angeles-San Bernardino Counties (West Mojave Desert) - 8-hr Ozone (2008) NAA (one way trip: trains = 120	Offsite Train		7.70				0.21
				Offsite Truck		0.00				0.00
				Total Emissions		**7.70**				**0.21**
				Applicable General Conformity *de minimis* Thresholds		**25**				**25**
				Less Than Thresholds?		**Yes**				**Yes**
San Bernardino County, CA (Mojave Desert)	PM10 Nonattainment - Moderate	MDAQMD	Entire MDAQMD jurisdiction area (one way trip: trains = 204 miles)	Offsite Train			0.22			
				Offsite Truck			0.00			
				Total Emissions			**0.22**			
				Applicable General Conformity *de minimis* Thresholds			**100**			
				Less Than Thresholds?			**Yes**			
Sacramento Metro, CA	8-Hour Ozone (2008) Nonattainment - Severe 15 PM10 Nonattainment - Moderate (Sacramento County) PM2.5 Nonattainment CO Maintenance - Moderate - Sacramento, CA (Part of Placer, Sacramento and Yolo Counties)	SMAQMD	Entire SMAQMD jurisdiction area (one way trip: trains = 80 miles)	Offsite Train	0.11	0.42	0.01	0.01	0.01	0.01
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**0.11**	**0.42**	**0.01**	**0.01**	**0.01**	**0.01**
				Applicable General Conformity *de minimis* Thresholds	**100**	**25**	**100**	**100**	**100**	**25**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Yuba City-Marysville, CA	PM2.5 Nonattainment (Sutter and Part of Yuba Counties) 1-Hour Ozone Nonattainment (Yuba City)	FRAQMD	Yuba City-Marysville, CA - PM2.5 NAA (one way trip: trains = 50 miles)	Offsite Train		0.27		0.00	0.00	0.01
				Offsite Truck		0.00		0.00	0.00	0.00
				Total Emissions		**0.27**		**0.00**	**0.00**	**0.01**
				Applicable General Conformity *de minimis* Thresholds		**100**		**100**	**100**	**100**
				Less Than Thresholds?		**Yes**		**Yes**	**Yes**	**Yes**
Chico, CA	8-Hour Ozone (2008) Nonattainment - Marginal (Butte County) PM2.5 Nonattainment (Part of Butte County) CO Maintenance - Moderate (Part of Butte County)	BCAQMD	Chico, CA - 8-Hour Ozone (2008) NAA - Entire Butte County (one way trip: trains = 50 miles)	Offsite Train	0.07	0.27		0.00	0.00	0.01
				Offsite Truck	0.00	0.00		0.00	0.00	0.00
				Total Emissions	**0.07**	**0.27**		**0.00**	**0.00**	**0.01**
				Applicable General Conformity *de minimis* Thresholds	**100**	**100**		**100**	**100**	**100**
				Less Than Thresholds?	**Yes**	**Yes**		**Yes**	**Yes**	**Yes**

Summary of Applicable Operational Emissions for General Conformity (Alternative 1) - 2017 Overlapping with Construction

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
NAAs in State of Arizona	8-Hour Ozone (2008) Nonattainment - Marginal - Phoenix-Mesa, AZ (Part of Maricopa and Pinal County) PM10 Nonattainment (Moderate, Serious, or Maintenance) (12 Counties) PM2.5 Nonattainment - Nogales, AZ (Part of Santa Cruz County), West Central Pinal, AZ (West Pinal County) SO2 Nonattainment - Hayden (Pinal County), AZ (Part of Pinal County), Maintenance - San Manual (Pinal County), AZ, Ajo (Pima County), AZ, Douglas (Cochise County), AZ, Miami (Gila County), AZ CO Maintenance - Serious - Phoenix, AZ. (Part of Maricopa)	ADEQ	Entire ADEQ jurisdiction area (one way trip: trains = 364 miles)	Offsite Train	6.04	23.37	0.38	0.37	0.43	0.65
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**6.04**	**23.37**	**0.38**	**0.37**	**0.43**	**0.65**
				Applicable General Conformity *de minimis* Thresholds	**100**	**100**	**70**	**100**	**100**	**100**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
NAAs in State of New Mexico	PM10 Nonattainment - Moderate - Anthony, NM (Dona Ana County) CO Maintenance (Bernalillo County) SO2 Maintenance - Grant Co, NM	NMED-AQB	Entire NMED-AQB jurisdiction area (one way trip: trains = 102 miles to coal mine site)	Offsite Train	1.68		0.11		0.12	
				Offsite Truck	0.00		0.00		0.00	
				Total Emissions	**1.68**		**0.11**		**0.12**	
				Applicable General Conformity *de minimis* Thresholds	**100**		**100**		**100**	
				Less Than Thresholds?	**Yes**		**Yes**		**Yes**	

Notes:

1. The associated emissions from the onsite worker travel are negligible
2. To simplify the analysis, the biggest area among all detailed NAA areas was conservativly used to estimate the emissions in each main NAA category area.
   For State of Arizona and New Mexico the total distances accross each state along the train routes were conservativly used to estimate the emissions in NAA.
3. The distance for trains and trucks are varied depending on the type to materials transporting and their destinations.
4. In MDAQMD, it is important to note that the size of the ozone NAA and PM10 NAA area are different and the ozone NAA is smaller than PM10 NAA. Therefore, the train route (distance) within MDAQMD in ozone nonattainment area is smaller than the distance in PM10 nonattainment area.
5. ACRONYMS AND ABBREVIATIONS
   MDAQMD = Mojave Desert Air Quality Management District
   SCAQMD = South Coast Air Quality Management District
   EKAPCD = East Kern County Air Pollution Control District
   SMAQMD = Sacramento Metro Air Quality Management District
   BCAQMD = Butte County Air Quality Management District
   FRAQMD = Feather River Air Quality Management District
   ADEQ = Arizona Department of Environmental Quality
   NMED-AQB = New Mexico Environment Department - Air Quality Bureau
6. Construction of the project is expected to complete in June 2017 and the operation will start from September. Therefore, the operational emissions were scaled from the entire year of project operation.

Summary of Applicable Operational Emissions for General Conformity (Alternative 1) - 2018 and Beyond

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
San Joaquin Valley, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM2.5 Nonattainment CO Maintenance - Moderate - Fresno, CA (Part of Fresno County), Modesto, CA (Part of Stanislaus County), Stockton, CA (Part of San Joaquin County) PM10 Maintenance	SJVAPCD	Entire SJVAPCD jurisdiction area (one way trip: trains = 63 to 287 miles, trucks = 40 to 80 miles, workers= 20 miles)	Offsite Train	6.17	23.85	0.39	0.37	0.44	0.66
				Offsite Truck	5.29	8.71	2.39	0.72	0.06	0.74
				Offsite Workers Commuting	4.17	0.48	1.05	0.28	0.01	0.13
				Onsite Train	0.85	2.38	0.04	0.04	0.06	0.12
				Onsite Truck	0.63	0.99	0.15	0.05	0.01	0.16
				Total Emissions	**17.11**	**36.40**	**4.01**	**1.46**	**0.57**	**1.80**
				Applicable General Conformity *de minimis* Thresholds	**100**	**10**	**100**	**100**	**100**	**10**
				Less Than Thresholds?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Los Angeles-South Coast Air Basin, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM10 Nonattainment - Serious PM2.5 Nonattainment NO2 Maintenance CO Maintenance - Serious	SCAQMD	Entire SCAQMD jurisdiction area (one way trip: trucks = 88 to 90 miles)	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Truck	4.14	6.82	1.87	0.56	0.05	0.58
				Total Emissions	**4.14**	**6.82**	**1.87**	**0.56**	**0.05**	**0.58**
				Applicable General Conformity *de minimis* Thresholds	**100**	**10**	**70**	**100**	**100**	**10**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Kern County (East Kern), CA	8-Hour Ozone (2008) Nonattainment - Marginal PM10 Nonattainment - Serious	EKAPCD	Entire EKAPCD jurisdiction area (one way trip: trains = 62 to 83 miles)	Offsite Train		13.98	0.23			0.39
				Offsite Truck		0.00	0.00			0.00
				Total Emissions		**13.98**	**0.23**			**0.39**
				Applicable General Conformity *de minimis* Thresholds		**100**	**70**			**100**
				Less Than Thresholds?		**Yes**	**Yes**			**Yes**
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	8-Hour Ozone (2008) Nonattainment - Severe 15 (Part of San Bernardino and Los Angeles Counties)	MDAQMD	Los Angeles-San Bernardino Counties (West Mojave Desert) - 8-hr Ozone (2008) NAA (one way trip: trains = 120 miles)	Offsite Train		23.11				0.64
				Offsite Truck		0.00				0.00
				Total Emissions		**23.11**				**0.64**
				Applicable General Conformity *de minimis* Thresholds		**25**				**25**
				Less Than Thresholds?		**Yes**				**Yes**
San Bernardino County, CA (Mojave Desert)	PM10 Nonattainment - Moderate	MDAQMD	Entire MDAQMD jurisdiction area (one way trip: trains = 204 miles)	Offsite Train			0.65			
				Offsite Truck			0.00			
				Total Emissions			**0.65**			
				Applicable General Conformity *de minimis* Thresholds			**100**			
				Less Than Thresholds?			**Yes**			
Sacramento Metro, CA	8-Hour Ozone (2008) Nonattainment - Severe 15 PM10 Nonattainment - Moderate (Sacramento County) PM2.5 Nonattainment CO Maintenance - Moderate - Sacramento, CA (Part of Placer, Sacramento and Yolo Counties)	SMAQMD	Entire SMAQMD jurisdiction area (one way trip: trains = 80 miles)	Offsite Train	0.33	1.27	0.02	0.02	0.02	0.04
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**0.33**	**1.27**	**0.02**	**0.02**	**0.02**	**0.04**
				Applicable General Conformity *de minimis* Thresholds	**100**	**25**	**100**	**100**	**100**	**25**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Yuba City-Marysville, CA	PM2.5 Nonattainment (Sutter and Part of Yuba Counties) 1-Hour Ozone Nonattainment (Yuba City)	FRAQMD	Yuba City-Marysville, CA - PM2.5 NAA (one way trip: trains = 50 miles)	Offsite Train		0.80		0.01	0.01	0.02
				Offsite Truck		0.00		0.00	0.00	0.00
				Total Emissions		**0.80**		**0.01**	**0.01**	**0.02**
				Applicable General Conformity *de minimis* Thresholds		**100**		**100**	**100**	**100**
				Less Than Thresholds?		**Yes**		**Yes**	**Yes**	**Yes**
Chico, CA	8-Hour Ozone (2008) Nonattainment - Marginal (Butte County) PM2.5 Nonattainment (Part of Butte County) CO Maintenance - Moderate (Part of Butte County)	BCAQMD	Chico, CA - 8-Hour Ozone (2008) NAA - Entire Butte County (one way trip: trains = 50 miles)	Offsite Train	0.21	0.80		0.01	0.01	0.02
				Offsite Truck	0.00	0.00		0.00	0.00	0.00
				Total Emissions	**0.21**	**0.80**		**0.01**	**0.01**	**0.02**
				Applicable General Conformity *de minimis* Thresholds	**100**	**100**		**100**	**100**	**100**
				Less Than Thresholds?	**Yes**	**Yes**		**Yes**	**Yes**	**Yes**

Summary of Applicable Operational Emissions for General Conformity (Alternative 1) - 2018 and Beyond

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

NAAs in State of Arizona	8-Hour Ozone (2008) Nonattainment - Marginal - Phoenix-Mesa, AZ (Part of Maricopa and Pinal County) PM10 Nonattainment (Moderate, Serious, or Maintenance) (12 Counties) PM2.5 Nonattainment - Nogales, AZ (Part of Santa Cruz County), West Central Pinal, AZ (West Pinal County) SO2 Nonattainment - Hayden (Pinal County), AZ (Part of Pinal County), Maintenance - San Manual (Pinal County), AZ, Ajo (Pima County), AZ, Douglas (Cochise County), AZ, Miami (Gila County), AZ CO Maintenance - Serious - Phoenix, AZ. (Part of Maricopa)	ADEQ	Entire ADEQ jurisdiction area (one way trip: trains = 364 miles)	Offsite Train	18.13	70.10	1.13	1.10	1.28	1.94
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**18.13**	**70.10**	**1.13**	**1.10**	**1.28**	**1.94**
				Applicable General Conformity *de minimis* Thresholds	**100**	**100**	**70**	**100**	**100**	**100**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
NAAs in State of New Mexico	PM10 Nonattainment - Moderate - Anthony, NM (Dona Ana County) CO Maintenance (Bernalillo County) SO2 Maintenance - Grant Co, NM	NMED-AQB	Entire NMED-AQB jurisdiction area (one way trip: trains = 102 miles to coal mine site)	Offsite Train	5.05		0.32		0.36	
				Offsite Truck	0.00		0.00		0.00	
				Total Emissions	**5.05**		**0.32**		**0.36**	
				Applicable General Conformity *de minimis* Thresholds	**100**		**100**		**100**	
				Less Than Thresholds?	**Yes**		**Yes**		**Yes**	

Notes:

1. The associated emissions from the onsite worker travel are negligible
2. To simplify the analysis, the biggest area among all detailed NAA areas was conservativly used to estimate the emissions in each main NAA category area.
   For State of Arizona and New Mexico the total distances accross each state along the train routes were conservativly used to estimate the emissions in NAA.
3. The distance for trains and trucks are varied depending on the type to materials transporting and their destinations.
4. In MDAQMD, it is important to note that the size of the ozone NAA and PM10 NAA area are different and the ozone NAA is smaller than PM10 NAA. Therefore, the train route (distance) within MDAQMD in ozone nonattainment area is smaller than the distance in PM10 nonattainment area.
5. ACRONYMS AND ABBREVIATIONS
   MDAQMD = Mojave Desert Air Quality Management District
   SCAQMD = South Coast Air Quality Management District
   EKAPCD = East Kern County Air Pollution Control District
   SMAQMD = Sacramento Metro Air Quality Management District
   BCAQMD = Butte County Air Quality Management District
   FRAQMD = Feather River Air Quality Management District
   ADEQ = Arizona Department of Environmental Quality
   NMED-AQB = New Mexico Environment Department - Air Quality Bureau

8/05/2012 revision

Annual Number of Train Cars (incoming/outgoing)

	Coal Cars (incoming)	Liquid Sulfur Cars (outgoing)	Gasification Cars (outgoing)	Ammonia Cars (outgoing)	Urea Cars (outgoing)	UAN Cars (outgoing)	Maximum Total Trains per period
Annual average number of train cars	13034	83	2800	357	1795	1983	20051

	Line-Haul Engine for Coal Train	Line-Haul Engine for Product Trains				
		Liquid Sulfur	Gasification	Ammonia	Urea	UAN
ton-mile/gallon	480	480	480	480	480	480
Train car capacity (ton)	117	100	100	117	117	117
Unloaded train car weight (ton)	25	25	25	25	25	25

480 ton-mile/gallon is based on 2009 *class I rail freight fuel consumption and travel* data (Association of American Railroads, *Railroad Facts*)

	Coal Trains			Liquid Sulfur Product Train			Gasification Solid Product Train		
Area	Miles traveled per Train (mile/engine) - One Way *	Coal Train (ton-miles/year) - Round Trip	Fuel Use for Coal Train (gal/year) - Round Trip	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip
San Joaquin Valley, CA	63	137,132,692	285,683	150	1,856,250	3,867	63	26,460,000	55,123
Kern County (East Kern), CA	62	134,955,983	281,148		0	0	83	34,852,294	72,606
San Bernardino County, CA (Mojave Desert) (PM10 nonattainment)	204	442,960,363	922,802		0	0	52	21,847,706	45,514
Los Angeles-San Bernardino Counties (West Mojave Desert), CA - (Ozone nonattainment)	120	261,205,128	544,158		0	0		0	0
State of Arizona (PM10 nonattainment, the maximum distance)	364	792,322,222	1,650,613		0	0		0	0
State of New Mexico	102	220,936,004	460,267		0	0		0	0

* Since exact route of coal train was not determined yet, It was assumed that the coal train would travel across the maximum distance of the nonattainment area for all pollutants in Arizona.

	Ammonia Product Train			Urea Product Train			UAN Product Train		
Area	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip
San Joaquin Valley, CA	264	15,732,256	32,774	287	86,026,410	179,215	264	87,422,359	182,123
Sacramento Metro, CA		0	0	80	23,979,487	49,956		0	0
Yuba City-Marysville, CA		0	0	50	14,987,179	31,222		0	0
Chico, CA		0	0	50	14,987,179	31,222		0	0
Other Area in State of California		0	0	161	48,258,718	100,535		0	0

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offsite locomotive travelling speed in average 40 mph
ratio of required horsepower (empty train/full train) 0.76
locomotive load factor 28%

Train Type	Coal	Liquid Sulfur	Gasification Solids	Ammonia	Urea	UAN
Railcar Capacity (ton)	117	100	100	117	117	117
Locomotive Engine Power (hp, each)	4,400	3,000	3,000	3,000	3,000	3,000
Railcars per train	120	46	46	46	46	46
Numbers of locomotive engine per train	6	2	2	2	2	2
Total ton of material per locomotive engine	2,340	2,300	2,300	2,691	2,691	2,691
Total # locomotive engines needed to transport material per year	652	4	122	16	79	87
Total # locomotive engines needed for returning trains per year	495	3	93	12	60	66
Total locomotive hours per year in San Joaquin Valley, CA	1,807	26	338	186	997	1,010
Total locomotive hours per year in Kern County (East Kern), CA	1,778		445			
Total locomotive hours per year in San Bernardino County, CA (Mojave Desert) (PM10 nonattainment)	5,836		279			
Total locomotive hours per year in Los Angeles-San Bernardino Counties (West Mojave Desert), CA - (Ozone nonattainment)	3,441					
Total locomotive hours per year in Arizona (PM10 nonattainment, the maximum distance)	10,438					
Total locomotive hours per year in Arizona (PM2.5 nonattainment)	574					
Total locomotive hours per year in Arizona (Ozone nonattainment)	2,868					
Total locomotive hours per year in State of Arizona	5,735					
Total locomotive hours per year in State of New Mexico	2,911					
Total locomotive hours per year in Sacramento Metro, CA					278	
Total locomotive hours per year in Yuba City-Marysville, CA					174	
Total locomotive hours per year in Chico, CA					174	
Total locomotive hours per year in Other Area in the rest State of California and State of Oregon/State of Washington					559	

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	Line-Haul Emission Factors	CO	NOx	PM10	PM2.5	SO2	VOC
	Tier 3 Emission Factor (g/bhp-hr)	1.28	4.95	0.08	0.08	0.09	0.14
	Tier 3 Emission Factor (g/gal)	26.62	102.96	1.66	1.61	1.88	2.85

Annual Emission Rates by Area

Area	Train Types	CO	NOx	PM10	PM2.5	SO2	VOC
		Annual Emission Rates (tons/year) all trains					
San Joaquin Valley, CA	Line-haul coal engines	3.14	12.13	0.20	0.19	0.22	0.34
	Line-haul liquid sulfur product engines	0.03	0.12	0.00	0.00	0.00	0.00
	Line-haul gasification product engines	0.40	1.55	0.03	0.02	0.03	0.04
	Line-haul ammonia product engines	0.22	0.85	0.01	0.01	0.02	0.02
	Line-haul urea product engines	1.18	4.57	0.07	0.07	0.08	0.13
	Line-haul UAN product engines	1.20	4.63	0.07	0.07	0.08	0.13
	Total Trains (ton/yr)	**6.17**	**23.85**	**0.39**	**0.37**	**0.44**	**0.66**
Kern County (East Kern), CA	Line-haul coal engines	3.09	11.94	0.19	0.19	0.22	0.33
	Line-haul gasification product engines	0.53	2.04	0.03	0.03	0.04	0.06
	Total Trains (ton/yr)	**3.62**	**13.98**	**0.23**	**0.22**	**0.26**	**0.39**
San Bernardino County, CA (Mojave Desert) (PM10 nonattainment)	Line-haul coal engines	10.13	39.19	0.63	0.61	0.72	1.08
	Line-haul gasification product engines	0.33	1.28	0.02	0.02	0.02	0.04
	Total Trains (ton/yr)	**10.47**	**40.47**	**0.65**	**0.63**	**0.74**	**1.12**
Los Angeles-San Bernardino Counties (West	Line-haul coal engines	5.98	23.11	0.37	0.36	0.42	0.64
	Line-haul gasification product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**5.98**	**23.11**	**0.37**	**0.36**	**0.42**	**0.64**
State of Arizona	Line-haul coal engines	18.13	70.10	1.13	1.10	1.28	1.94
	Total Trains (ton/yr)	**18.13**	**70.10**	**1.13**	**1.10**	**1.28**	**1.94**
Sacramento Metro, CA	Line-haul urea product engines	0.33	1.27	0.02	0.02	0.02	0.04
	Total Trains (ton/yr)	**0.33**	**1.27**	**0.02**	**0.02**	**0.02**	**0.04**
Yuba City-Marysville, CA	Line-haul urea product engines	0.21	0.80	0.01	0.01	0.01	0.02
	Total Trains (ton/yr)	**0.21**	**0.80**	**0.01**	**0.01**	**0.01**	**0.02**
Chico, CA	Line-haul urea product engines	0.21	0.80	0.01	0.01	0.01	0.02
	Total Trains (ton/yr)	**0.21**	**0.80**	**0.01**	**0.01**	**0.01**	**0.02**
Other Area in California and State of Oregon/State of Washington	Line-haul urea product engines	0.66	2.56	0.04	0.04	0.05	0.07
	Total Trains (ton/yr)	**0.66**	**2.56**	**0.04**	**0.04**	**0.05**	**0.07**
State of New Mexico	Line-haul coal engines	5.05	19.55	0.32	0.31	0.36	0.54
	Total Trains (ton/yr)	**5.05**	**19.55**	**0.32**	**0.31**	**0.36**	**0.54**

EPA Estimated Locomotive (line-haul) Average Emission Rates by Tiers

Tier	Emission Factor (g/bhp-hr)			
	CO	NO_X	PM	HC
Uncontrolled	1.28	13.00	0.32	0.48
Tier 0	1.28	8.60	0.32	0.48
Tier 0+	1.28	7.20	0.20	0.30
Tier 1	1.28	6.70	0.32	0.47
Tier 1+	1.28	6.70	0.20	0.29
Tier 2	1.28	4.95	0.18	0.26
Tier 2+ and Tier 3	1.28	4.95	0.08	0.13
Tier 4	1.28	1.00	0.015	0.04

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Emission Factors For all Locomotives
SOx (3)
g/gal
1.88

Locomotive Application	Conversion Factor (bhp-hr/gal)
Large Line-haul & Passenger	20.8
Small Line-haul	18.2
Switching	15.2

Note:

(1) EPA's Technical Highlights: Emission Factors for Locomotives, 2009 (http://www.epa.gov/nonroad/locomotv/420f09025.pdf).

(2) Line-haul engine emissions of CO, NOx, PM, and HC are based on EPA Tier 2+ and Tier 3 emission factors.

(3) Based on 300 ppm sulfur diesel fuel.

(4) VOC emissions can be assumed to be equal to 1.053 times the HC emissions

(5) $PM_{2.5}$ Fraction of PM_{10}, = 0.97

(6) No off-site switching or idling was assumed for train transportation.

(7) Average line haul locomotive load factor was obtained from Table 5.12 of The Port Of Long Beach - 2007 Air Emissions Inventory (http://www.polb.com/civica/filebank/blobdload.asp?BlobID=6021)

Summary of Truck Emissions - HECA

8/05/2012 revision

Calculations for Trucks Operations

Data Supplied By Client							
Parameter	**Coke and Coal Trucks (Max @ 50 or 60 mph)**	**Liquid Sulfur Product Trucks (Max @ 50 or 60 mph)**	**Gasification Product Trucks (Max @ 50 or 60 mph)**	**Ammonia Product Trucks (Max @ 50 or 60 mph)**	**Urea Product Trucks (Max @ 50 or 60 mph)**	**UAN Sulfur Product Trucks (Max @ 50 or 60 mph)**	**Equipment and Miscellaneous Trucks (Max @ 50 or 60 mph)**
	Running Emissions	**Running Emissions**					**Running Emissions**
Distance traveled per truck in San Joaquin Valley, CA (mi)	104	104	160	80	80	80	80
Distance traveled per truck in Los Angeles-South Coast Air Basin, CA (mi)	176	180	0	0	0	0	0
Maximum number of trucks or loads:							
Annual average trucks or loads	15,200	990	2,800	5,010	2,800	9,280	1,818

No off-site idling was assumed for truck transportation.
Distance traveled per truck is based on round-trip.

EMFAC2007 Emission Factors + Fugitive Dust (g/mi) For Truck Model year 2010, Scenario year 2015

Pollutant	**Coke and Coal Trucks (Max @ 50 or 60 mph)**	**Liquid Sulfur Product Trucks (Max @ 50 or 60 mph)**	**Gasification Product Trucks (Max @ 50 or 60 mph)**	**Ammonia Product Trucks (Max @ 50 or 60 mph)**	**Urea Product Trucks (Max @ 50 or 60 mph)**	**UAN Sulfur Product Trucks (Max @ 50 or 60 mph)**	**Equipment and Miscelleneous Trucks (Max @ 50 or 60 mph)**
	Running Emissions (g/mile/trk)	**Running Emissions (g/mile/trk)**	**Running Emissions (g/mile/trk)**	**Running Emissions (g/mile/trk)**	**Running Emissions (g/mile/trk)**	**Running Emissions (g/mile/trk)**	**Running Emissions (g/mile/trk)**
CO	1.32	1.32	1.32	1.32	1.32	1.32	1.32
NOx	2.17	2.17	2.17	2.17	2.17	2.17	2.17
ROG	0.18	0.18	0.18	0.18	0.18	0.18	0.18
SOx	0.02	0.02	0.02	0.02	0.02	0.02	0.02
PM10 *	0.60	0.60	0.60	0.60	0.60	0.60	0.60
PM2.5 *	0.18	0.18	0.18	0.18	0.18	0.18	0.18

EMFAC2007 is the approved federal model for vehicle combustion emissions
* PM10 and PM2.5 includes fugitive dust factor for paved roads obtained from AP-42 Ch. 13 plus PM factors from EMFAC 2007
PM factors from EMFAC = combustion exhaust + tire wear + break wear
The maximum emission factor from either truck speed at 50 mph or 60 mph was used.
Most California highways have speed limits of 60 or 70 mph and large trucks travel more slowly than the speed limit.

Annual Emission Rates in ton/yr all trucks

Pollutant	**Coke and Coal Trucks (Max @ 50 or 60 mph)**	**Liquid Sulfur Product Trucks (Max @ 50 or 60**	**Gasification Product Trucks (Max @ 50 or 60**	**Ammonia Product Trucks (Max @ 50 or 60 mph)**	**Urea Product Trucks (Max @ 50 or 60 mph)**	**UAN Sulfur Product Trucks (Max @ 50 or 60 mph)**	**Equipment and Miscelleneous Trucks (Max**	**Total Truck Emission Rates (tons/yr)**
	Running Emissions	**Running Emissions**	**Running Emissions**	**Running Emissions**	**Running Emissions**	**Running Emissions**	**Running Emissions**	
San Joaquin Valley, CA								
CO	2.29	0.15	0.65	0.58	0.32	1.08	0.21	**5.29**
NOx	3.78	0.25	1.07	0.96	0.54	1.77	0.35	**8.71**
ROG	0.32	0.02	0.09	0.08	0.05	0.15	0.03	**0.74**
SOx	0.03	0.00	0.01	0.01	0.00	0.01	0.00	**0.06**
PM10	1.04	0.07	0.29	0.26	0.15	0.49	0.10	**2.39**
PM2.5	0.31	0.02	0.09	0.08	0.04	0.15	0.03	**0.72**
Los Angeles-South Coast Air Basin, CA								
CO	3.88	0.26	0.00	0.00	0.00	0.00	0.00	**4.14**
NOx	6.39	0.43	0.00	0.00	0.00	0.00	0.00	**6.82**
ROG	0.54	0.04	0.00	0.00	0.00	0.00	0.00	**0.58**
SOx	0.05	0.00	0.00	0.00	0.00	0.00	0.00	**0.05**
PM10	1.76	0.12	0.00	0.00	0.00	0.00	0.00	**1.87**
PM2.5	0.53	0.04	0.00	0.00	0.00	0.00	0.00	**0.56**

Summary of Worker Commute Vehicle Emissions - HECA

8/05/2012 revision

Calculations for Worker Commute Vehicle Operation

OFFSITE - 50 MPH								EF (g/mile)					
Onroad Vehicle	**Fuel Type**	**Vehicle Type**	**Total Number of Workers per day**	**Daily Vehicle Count**	**Round Trip Distance (miles/vehicle/day)**	**Trips per day**	**VMT (Annual)**	**CO**	**NOx**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**TOC**
Personal Commuting Vehicles	G/D	LDA/ LDT	200	154	40.0	1	2,246,154	1.6825	0.1930	0.4234	0.1134	3.50E-03	0.0540

Assumptions:

Assumed average distance traveled off site for all employees commuting will be 20 miles

times 2 for return trip = 40 miles

365 days per year

Number of workers per commuter vehicle = 1.3

EMFAC2007 emissions are for fleet mix years 1971-2015 travelling at 50 mph.

Area	Description	CO	NOx	PM10	PM2.5	SO2	VOC
		Annual Emission Rates (tons/year) all worker commute vehicles					
San Joaquin Valley, CA	Personal Commuting Vehicles	4.17	0.48	1.05	0.28	0.01	0.13

Fugitive Dust on Paved Road

AP 42 13.2.1 Paved Roads, updated January 2011

For a daily basis,
E = [k (sL)^0.91 x (W)^1.02](1-P/4N) (2)

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period
W = average weight (tons) of vehicles traveling the road
k = particle size multiplier for particle size range and units of interest
sL = road surface silt loading (g/m^2)

	k
	g/VMT
PM2.5	0.25
PM10	1.00

Table 13.2.1-1
PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION

Fleet mix on highway

W= 9.1 tons, average
sL= 0.031 g/m2 Default value from URBEMIS 9.2 for Kern County
P= 36 days/year Buttonwillow Station 1940-2011, WRCC

E=
0.09836 g/VMT PM2.5
0.39344 g/VMT PM10

Vehicle weight (tons)		fraction of each vehicle type
1.6	passenger vehicles	0.75
40	large trucks	0.18
9	2-4 axle trucks	0.07
9.1	weighted average for all vehicles (ton)	

On I-5 near the Project, 75% of all vehicles are passenger vehicles,
of the remaining vehicle, 73% are 5-axle trucks and the remainder are 2-4 axle trucks.
From information provided by California Department of Transportation for the traffic analysis.

Summary of Transportation Vehicles and Routes

Commodity Handled	Petcoke	Coal	Liquid Sulfur	Gasification	Ammonia	Urea	UAN	Equipment	Miscellaneous
Expected plant operation									
Expected plant operation is 8000 hours / year									
The plant will operate 24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day
The plant will operate 333 days / year	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr
Shipment by trucks	100 %	0 %	75 %	25 %	75 %	25 %	50 %	100 %	100 %
Shipment by train	0 %	100 %	25 %	75 %	25 %	75 %	50 %	0 %	0 %
Production rate									
Required Normal Flow / day	1,140 tons / day	4,580 tons / day	100 tons / day	839 tons / day	500 tons / day	833 tons / day	1,392 tons / day		
Required Normal Flow / year	380,000 tons / yr	1,525,000 tons / yr	33,000 tons / yr	280,000 tons / yr	167,000 tons / yr	280,000 tons / yr	464,000 tons / yr		
Required Maximum Flow day	1,368 tons / day (3)	6,107 tons / day (4)	200 tons / day (5)	1,678 tons / day (6)	1,000 tons / day (6)	1,666 tons / day (6)	2,784 tons / day (6)		
Truck Shipments									
Truck Capacity	25 tons / truck		25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck
Required trucks loads for normal operation / day	46 trucks / day		4 trucks / day	8 trucks / day	15 trucks / day	8 trucks / day	28 trucks / day	2 trucks / day	3 trucks / day
Required trucks loads for normal operation / yr	15,200 truck / yr		990 truck / yr	2,800 truck / yr	5,010 truck / yr	2,800 truck / yr	9,280 truck / yr		
Required trucks loads for maximum operation /day	55 trucks / day		8 trucks / day	17 trucks / day	30 trucks / day	17 trucks / day	56 trucks / day		
Train Shipments									
Railcar Capacity		117 tons / car	100 tons / car	100 tons / car	117 tons / car	117 tons / car	117 tons / car		
Assume a train has 13,000 ton capacity									
Required railcars for normal operation / day		39 cars / day	0.25 cars / day	6 cars / day	1 cars / day	5 cars / day	6 cars / day		
Required railcar loads for normal operation / yr		13,034 cars / yr	83 cars / yr	2,800 cars / yr	357 cars / yr	1,795 cars / yr	1,983 cars / yr		
Required railcars for maximum operation / day		200 cars / day	1 cars / day	16 cars / day	2 cars / day	11 cars / day	12 cars / day		
Basis	- 91% availability - 25% petcoke (heat input) - 25 ton/truck - 7 days/week receiving - 25% excess truck	- 91% availability - 75% coal (heat input) per - 117 tons/car - 100% coal for maximum - Rack sized to handle two	- 91% availability - High sulfur case - 100 - 25 ton/truck - Weekdays only - Can only move up to 25% of	- 91% availability - 75% coal max annual - 100% capable by rail - 25% capable by truck - Maximun is double the daily	- 91% availability - 500 t/d NH3 sales - 75% by truck - Ability to ship 7500 tons ove	- 91% availability - 75% by rail -empty 45 day storage in 10	- 91% availability - 75% by rail -empty 45 day storage in 10	'	
Traffic route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route
Destination/Origin	Carson Refinery	None	California Sulfur	Various	Various	Various	Various	Various	Various
Address	1801 E Sepulveda, Carson		2509 E Grant Street, Wilmington						
Distance	140 Miles		142 Miles	80 Mile radius	40 mile radius	40 mile radius	40 mile ratius	40 mile ratius	40 mile ratius
Route	Alameda 405 Fwy 5 Fwy Stockdale hwy Morris Road Station Road Station Road		Grant Henry Ford Alameda 405 Fwy 5 Fwy Stockdale hwy Morris Road Station Road	40 mile radius Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	5 fwy Stockdale Hwy Dairy Road	5 fwy Stockdale Hwy Dairy Road
	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route
Destination/Origin	None	Elk Ranch New Mexico	In SJVAPCD	CEMEX, Victorville	Calamco	Oregon/Washington	Calamco	None	None
Address					Port Rd G15, Stockton, CA		Port Rd G15, Stockton, CA		
Distance		794 miles		198 miles	264 miles	628 Miles	264 miles		
Route		Kern County: 132.2 miles (County Line near Boron, CA to north pro Mine to Boron, CA: 662 miles Total Distance: 794.2 miles		SJVR/BNSF	SJVR/UPRR	SJVR/UPRR			

Notes

1) Equipment Maintenance Trucks are considered to be 2% of the total trucks per day for the feed and product operation.
2) Miscellaneous trucks are considered to be 3% of the total trucks per day for the feed and product operation.
3) The maximum flow rate of coke is ratioed up from the normal flow rate at 25% to 30% of feed
4) The maximum flow rate of coal is ratioed up from the normal flow rate at 75% to 100% of feed
5) The maximum flow rate of sulfur is 2 times the normal production
6) The maximum flow rate of these commodities is 2 times the normal production
7) The sources of flow data used in the Production Rate calculation were based on the flow rates provided in "Conference Note: Rail and Truck Traffic - Planning Session" and the "FertilizerProductMovement Update", 01-25-12.

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Calculations for Trucks Operation onsite

Assumed Number of Unit Trains (incoming/outgoing)

Averaging Period	Coal Unit Trains (incoming)	Unit Trains of Product (outgoing)	Maximum Total Trains per period
Annual average unit trains	109	153	262
# Cars Per train	120	46	
maximum # Cars Per day	200-240	42-46	

	Switching Enigne/ Rail car movers	Line-Haul Engine for Coal Train	Line-Haul Engine for Product Trains
Engine Power Rating (hp)		4400	3000
Notch Operation		1	1
Notch percentage of hp		5.0%	5.0%
Avg Notch horsepower	260	220	150
# of engines per train	1	2	2
hours to unload/load each train		2	1
max operating hours (hrs/day)	8		
max operating hours (hrs/year)	1248		

The majority of the time the line-haul engine will operate in Notch 1 or idling, therefore emissions were conservatively estimated for Notch 1 horsepower.

Notch percentage presented in PORT OF LONG BEACH AIR EMISSIONS INVENTORY for 2007 (POLB, Jan 2009) derived from EPA data.

For each coal train it takes 2 hours to complete the onsite loop to unload

For each product train it takes 1 hour to load

	CO	NOx	PM10	PM2.5	SO2	VOC
Switching Engine Emission Factors						
Tier 3 Emission Factor (g/bhp-hr)	1.83	4.50	0.08	0.08	0.12	0.27
Emissions (lbs/hr /engine)	1.05	2.58	0.05	0.04	0.07	0.16
Line-Haul Emission Factors						
Tier 3 Emission Factor (g/bhp-hr)	1.28	4.95	0.08	0.08	0.09	0.14
Coal Train Emissions (lbs/hr /engine)	0.62	2.40	0.04	0.04	0.04	0.07
Product Train Emissions (lbs/hr /engine)	0.42	1.64	0.03	0.03	0.03	0.05

Annual Emission Rates in tons/year

	CO	NOx	PM10	PM2.5	SO2	VOC
Switching engines	0.65	1.61	0.03	0.03	0.04	0.10
Line-haul coal engines	0.14	0.52	0.01	0.01	0.01	0.01
Line-haul product engines	0.06	0.25	0.00	0.00	0.00	0.01

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Emission Factors For all Locomotives

SOx
g/gal
1.88

Locomotive Application	Conversion Factor (bhp-hr/gal)
Large Line-haul & Passenger	20.8
Small Line-haul	18.2
Switching	15.2

Notes:

New line-haul engines will be AC locomotives such as the GE Evolution Series, that meet Tier 3 emissions

New switching engines will meet Tier 3 emissions, they may be the Titan Trackmobile railcar movers or similar

Emission factors from EPA's Technical Highlights: Emission Factors for Locomotives, 2009 (http://www.epa.gov/nonroad/locomotv/420f09025.pdf).

SO2 emissions Based on 300 ppm sulfur diesel fuel.

VOC emissions can be assumed to be equal to 1.053 times the HC emissions

$PM_{2.5}$ Fraction of PM_{10}, = 0.97

Line-haul engine emissions of CO, NOx, PM, and HC are based on EPA Tier 2+ and Tier 3 emission factors.

8/05/2012 revision

Calculations for Trucks Operation onsite

Transportation Information			Notes
- Onsite Vehicle =	20	trucks	- Information Provided By Applicant
- Vehicle year=	2010		- Information Provided By Applicant
- Maximum annual mileage =	10,000	miles/truck-year	- All routine vehicular traffic is anticipated to travel exclusively on paved roads
			- Assumed 15 mph average speed within HECA facility

EMFAC2007 Emission Factors (g/mi) For Truck Model year 2010

	Emission Factors in g/mi	
Pollutant	Gas LHDT1	Diesel LHDT2
CO	0.229	0.920
NOx	0.064	0.672
ROG	0.014	0.085
SOx	0.011	0.005
PM10 *	0.167	0.176
PM2.5 *	0.054	0.062

EMFAC2007 is the approved federal model for vehicle combustion emissions
* PM10 and PM2.5 includes fugitive dust factor for paved roads obtained from AP-42 Ch. 13 plus PM factors from EMFAC 2007
PM factors from EMFAC = combustion exhaust + tire wear + break wear
EMFAC emissions are for fleet year 2010 travelling at 15 mph.

Annual Emission Rates in g/s From All Trucks

	Emissions in g/s	
Pollutant	Gas LHDT1	Diesel LHDT2
CO	1.45E-03	5.83E-03
NOx	4.06E-04	4.26E-03
ROG	8.88E-05	5.39E-04
SOx	6.98E-05	3.17E-05
PM10	1.06E-03	1.11E-03
PM2.5	3.40E-04	3.91E-04

8/05/2012 revision

Calculations for Trucks Operation onsite

Data Supplied By Client					
Parameter	**Petcoke Trucks**		**Product Trucks**		**Miscellaneous Trucks**
	Running Emissions	**Idling Emissions**	**Running Emissions**	**Idling Emissions**	**Running Emissions**
Distance Traveled (mi)*	0.96		2.49		2.20
Per Truck Idle Time (hr)		0.083		0.083	
Maximum number of trucks or loads:					
Annual average trucks or loads	15,200	15,200	20,880	20,880	1,818

EMFAC2007 Emission Factors + Fugitive Dust (g/mi or g/idle-hour) For Truck Model year 2010

	Petcoke Trucks		**Product Trucks**		**Miscellaneous Trucks**
Pollutant	**Running Emissions (g/mile/trk)**	**Idling Emissions (g/idle-hour/trk)**	**Running Emissions (g/mile/trk)**	**Idling Emissions (g/idle-hour/trk)**	**Running Emissions (g/mile/trk)**
CO	3.03	43.69	3.03	43.69	3.03
NOx	5.43	122.65	5.43	122.65	5.43
ROG	1.39	7.74	1.39	7.74	1.39
SOx	0.03	0.06	0.03	0.06	0.03
PM10 *	0.92	0.11	0.92	0.11	0.92
PM2.5 *	0.29	0.10	0.29	0.10	0.29

EMFAC2007 is the approved federal model for vehicle combustion emissions
* PM10 and PM2.5 includes fugitive dust factor for paved roads obtained from AP-42 Ch. 13 plus PM factors from EMFAC 2007
PM factors from EMFAC = combustion exhaust + tire wear + break wear
EMFAC emissions are for fleet year 2010 travelling at 10 mph.

Annual Emission Rates in g/s For All Trucks

	Petcoke Trucks		**Product Trucks**		**Miscellaneous Trucks**
Pollutant	**Running Emissions**	**Idling Emissions (at each Idle Point)**	**Running Emissions**	**Idling Emissions (at each Idle Point)**	**Running Emissions**
CO	1.40E-03	1.755E-03	4.983E-03	2.411E-03	3.839E-04
NOx	2.501E-03	4.926E-03	8.931E-03	6.767E-03	6.880E-04
ROG	6.398E-04	3.110E-04	2.284E-03	4.273E-04	1.760E-04
SOx	1.383E-05	2.490E-06	4.937E-05	3.421E-06	3.803E-06
PM10	4.226E-04	4.579E-06	1.509E-03	6.290E-06	1.162E-04
PM2.5	1.348E-04	4.177E-06	4.813E-04	5.738E-06	3.708E-05

Fugitive Dust on Paved Road

8/05/2012 revision

AP 42 13.2.1 Paved Roads, updated January 2011

Calculations for Trucks Operation onsite

For a daily basis,

E = [k (sL)^0.91 x (W)^1.02](1-P/4N) (2)

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period
W = average weight (tons) of vehicles traveling the road
k = particle size multiplier for particle size range and units of interest
sL = road surface silt loading (g/m^2)

	k
	g/VMT
PM2.5	0.25
PM10	1.00

Table 13.2.1-1
PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION

Large Trucks

				Empty truck	full truck	Load Capacity	
W=	17.5	tons, average		5	30	25	tons
sL=	0.031	g/m2	Default value from URBEMIS 9.2 for Kern County				
P=	36	days/year	Buttonwillow Station 1940-2011, WRCC				

E=

0.19149 g/VMT PM2.5 large delivery trucks
0.76594 g/VMT PM10 large delivery trucks

Operation and Maintenance Vehicles

W=	3	tons	
sL=	0.031	g/m2	Default value from URBEMIS 9.2 for Kern County
P=	36	days/year	Buttonwillow Station 1940-2011, WRCC

E=

0.03169 g/VMT PM2.5 O&M trucks
0.12675 g/VMT PM10 O&M trucks

APPENDIX C

DETAILED OPERATIONAL EMISSION CALCULATIONS FOR ALTERNATIVE 2

Summary of Applicable Operational Emissions for General Conformity (Alternative 2) - 2017 Overlapping with Construction

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
San Joaquin Valley, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM2.5 Nonattainment CO Maintenance - Moderate - Fresno, CA (Part of Fresno County), Modesto, CA (Part of Stanislaus County), Stockton, CA (Part of San Joaquin County) PM10 Maintenance	SJVAPCD	**Construction** - Entire SJVAPCD jurisdiction area (one way trip: trucks = worker vehicles = 20 miles)	Onsite Construction Equipmen	2.65	3.84	1.23	0.35	0.00	0.83
				Onsite Trucks	0.15	0.34	0.77	0.09	0.00	0.09
				Onsite Vehicles	0.08	0.01	1.04	0.10	0.00	0.01
				Onsite Total	2.88	4.18	3.04	0.55	0.01	0.93
				Offsite Linears Equipment	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Trucks	1.02	5.16	0.42	0.21	0.00	0.22
				Offsite Vehicles	5.98	0.72	0.20	0.07	0.01	0.18
				Offsite Total	6.99	5.87	0.61	0.28	0.01	0.41
				Total Construction Emission	**9.87**	**10.06**	**3.66**	**0.82**	**0.02**	**1.34**
			Operation - Entire SJVAPCD jurisdiction area (one way trip: trains = 70 miles, trucks = 26.5 to 80 miles, workers= 20 miles)	Offsite Train	1.16	4.49	0.07	0.07	0.08	0.12
				Offsite Truck	4.74	7.81	2.14	0.65	0.06	0.66
				Offsite Workers Commuting	1.39	0.16	0.35	0.09	0.00	0.04
				Onsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Onsite Truck	0.47	0.92	0.09	0.03	0.00	0.14
				Total Operation Emissions	**7.76**	**13.38**	**2.66**	**0.84**	**0.15**	**0.97**
				Total Construction and Operation Overlapping Emissions	**17.63**	**23.44**	**6.32**	**1.66**	**0.16**	**2.30**
				Applicable General Conformity *de minimis* Thresholds	**100**	**10**	**100**	**100**	**100**	**10**
				Less Than Thresholds?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Los Angeles-South Coast Air Basin, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM10 Nonattainment - Serious PM2.5 Nonattainment NO2 Maintenance CO Maintenance - Serious	SCAQMD	Entire SCAQMD jurisdiction area (one way trip: trucks = 88 to 90 miles)	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Truck	1.41	2.32	0.64	0.19	0.02	0.20
				Total Emission	**1.41**	**2.32**	**0.64**	**0.19**	**0.02**	**0.20**
				Conformity De minimis (ton/yr)	**100**	**10**	**70**	**100**	**100**	**10**
				Less than De minimis?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Kern County (East Kern), CA	8-Hour Ozone (2008) Nonattainment - Marginal PM10 Nonattainment - Serious	EKAPCD	Entire EKAPCD jurisdiction area (one way trip: trains = 62 miles)	Offsite Train		3.98	0.06			0.11
				Offsite Truck		0.00	0.00			0.00
				Total Emission		**3.98**	**0.06**			**0.11**
				Conformity De minimis (ton/yr)		**100**	**70**			**100**
				Less than De minimis?		**Yes**	**Yes**			**Yes**
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	8-Hour Ozone (2008) Nonattainment - Severe 15 (Part of San Bernardino and Los Angeles Counties)	MDAQMD	Los Angeles-San Bernardino Counties (West Mojave Desert) - 8-hr Ozone (2008) NAA (one way trip: trains = 120 miles)	Offsite Train		7.70				0.21
				Offsite Truck		0.00				0.00
				Total Emission		**7.70**				**0.21**
				Conformity De minimis (ton/yr)		**25**				**25**
				Less than De minimis?		**Yes**				**Yes**
San Bernardino County, CA (Mojave Desert)	PM10 Nonattainment - Moderate	MDAQMD	Entire MDAQMD jurisdiction area (one way trip: trains = 204 miles)	Offsite Train			0.21			
				Offsite Truck			0.00			
				Total Emission			**0.21**			
				Conformity De minimis (ton/yr)			**100**			
				Less than De minimis?			**Yes**			
Sacramento Metro, CA	8-Hour Ozone (2008) Nonattainment - Severe 15 PM10 Nonattainment - Moderate (Sacramento County) PM2.5 Nonattainment CO Maintenance - Moderate - Sacramento, CA (Part of Placer, Sacramento and Yolo Counties)	SMAQMD	Entire SMAQMD jurisdiction area (one way trip: trains = 0 miles)	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emission	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
				Conformity De minimis (ton/yr)	**NA**	**25**	**100**	**100**	**100**	**25**
				Less than De minimis?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Yuba City-Marysville, CA	PM2.5 Nonattainment (Sutter and Part of Yuba Counties) 1-Hour Ozone (Yuba City)	FRAQMD	Yuba City-Marysville, CA - PM2.5 NAA (one way trip: trains = 0 miles)	Offsite Train		0.00		0.00	0.00	0.00
				Offsite Truck		0.00		0.00	0.00	0.00
				Total Emission		**0.00**		**0.00**	**0.00**	**0.00**
				Conformity De minimis (ton/yr)		**100**		**100**	**100**	**100**
				Less than De minimis?		**Yes**		**Yes**	**Yes**	**Yes**
Chico, CA	8-Hour Ozone (2008) Nonattainment - Marginal (Butte County) PM2.5 Nonattainment (Part of Butte County) CO Maintenance - Moderate (Part of Butte County)	BCAQMD	Chico, CA - 8-Hour Ozone (2008) NAA - Entire Butte County (one way trip: trains = 0 miles)	Offsite Train	0.00	0.00		0.00	0.00	0.00
				Offsite Truck	0.00	0.00		0.00	0.00	0.00
				Total Emission	**0.00**	**0.00**		**0.00**	**0.00**	**0.00**
				Conformity De minimis (ton/yr)	**NA**	**100**		**100**	**100**	**100**
				Less than De minimis?	**Yes**	**Yes**		**Yes**	**Yes**	**Yes**

Summary of Applicable Operational Emissions for General Conformity (Alternative 2) - 2017 Overlapping with Construction

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
NAAs in State of Arizona	8-Hour Ozone (2008) Nonattainment - Marginal - Phoenix-Mesa, AZ (Part of Maricopa and Pinal County) PM10 Nonattainment (Moderate, Serious, or Maintenance) (12 Counties) PM2.5 Nonattainment - Nogales, AZ (Part of Santa Cruz County), West Central Pinal, AZ (West Pinal County) SO2 Nonattainment - Hayden (Pinal County), AZ (Part of Pinal County), Maintenance - San Manual (Pinal County), AZ, Ajo (Pima County), AZ, Douglas (Cochise County), AZ, Miami (Gila County), AZ CO Maintenance - Serious - Phoenix, AZ. (Part of Maricopa)	ADEQ	Entire ADEQ jurisdiction area (one way trip: trains = 364 miles)	Offsite Train	6.04	23.37	0.38	0.37	0.43	0.65
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emission	**6.04**	**23.37**	**0.38**	**0.37**	**0.43**	**0.65**
				Conformity De minimis (ton/yr)	**100**	**100**	**70**	**100**	**100**	**100**
				Less than De minimis?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
NAAs in State of New Mexico	PM10 Nonattainment - Moderate - Anthony, NM (Dona Ana County) CO Maintenance (Bernalillo County) SO2 Maintenance - Grant Co, NM	NMED-AQB	Entire NMED-AQB jurisdiction area (one way trip: trains = 102 miles to coal mine site)	Offsite Train	1.68		0.11		0.12	
				Offsite Truck	0.00		0.00		0.00	
				Total Emission	**1.68**		**0.11**		**0.12**	
				Conformity De minimis (ton/yr)	**100**		**100**		**100**	
				Less than De minimis?	**Yes**		**Yes**		**Yes**	

Notes:

1. The associated emissions from the onsite worker travel are negligible
2. To simplify the analysis, the biggest area among all detailed NAA areas was conservativly used to estimate the emissions in each main NAA category area.
   For State of Arizona and New Mexico the total distances accross each state along the train routes were conservativly used to estimate the emissions in NAA.
3. The distance for trains and trucks are varied depending on the type to materials transporting and their destinations.
ozone nonattainment area is smaller than the distance in PM10 nonattainment area.
5. ACRONYMS AND ABBREVIATIONS
   MDAQMD = Mojave Desert Air Quality Management District
   SCAQMD = South Coast Air Quality Management District
   EKAPCD = East Kern County Air Pollution Control District
   SMAQMD = Sacramento Metro Air Quality Management District
   BCAQMD = Butte County Air Quality Management District
   FRAQMD = Feather River Air Quality Management District
   ADEQ = Arizona Department of Environmental Quality
   NMED-AQB = New Mexico Environment Department - Air Quality Bureau
6. Construction of the project is expected to complete in June 2017 and the operation will start from September. Therefore, the operational emissions were scaled from the entire year of project operation.

Summary of Applicable Operational Emissions for General Conformity (Alternative 2) - 2018 and Beyond

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
San Joaquin Valley, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM2.5 Nonattainment CO Maintenance - Moderate - Fresno, CA (Part of Fresno County), Modesto, CA (Part of PM10 Maintenance	SJVAPCD	Entire SJVAPCD jurisdiction area (one way trip: trains = 70 miles, trucks = 26.5 to 80 miles, workers= 20 miles)	Offsite Train	3.49	13.48	0.22	0.21	0.25	0.37
				Offsite Truck	14.22	23.42	6.43	1.94	0.17	1.98
				Offsite Workers Commuting	4.17	0.48	1.05	0.28	0.01	0.13
				Onsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Onsite Truck	1.42	2.76	0.28	0.09	0.01	0.41
				Total Emission	**23.29**	**40.14**	**7.98**	**2.52**	**0.44**	**2.90**
				Conformity De minimis (ton/yr)	**100**	**10**	**100**	**100**	**100**	**10**
				Less than De minimis?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Los Angeles-South Coast Air Basin, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM10 Nonattainment - Serious PM2.5 Nonattainment NO2 Maintenance CO Maintenance - Serious	SCAQMD	Entire SCAQMD jurisdiction area (one way trip: trucks = 88 to 90 miles)	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Truck	4.23	6.96	1.91	0.58	0.05	0.59
				Total Emission	**4.23**	**6.96**	**1.91**	**0.58**	**0.05**	**0.59**
				Conformity De minimis (ton/yr)	**100**	**10**	**70**	**100**	**100**	**10**
				Less than De minimis?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Kern County (East Kern), CA	8-Hour Ozone (2008) Nonattainment - Marginal PM10 Nonattainment - Serious	EKAPCD	Entire EKAPCD jurisdiction area (one way trip: trains = 62 miles)	Offsite Train		11.94	0.19			0.33
				Offsite Truck		0.00	0.00			0.00
				Total Emission		**11.94**	**0.19**			**0.33**
				Conformity De minimis (ton/yr)		**100**	**70**			**100**
				Less than De minimis?		**Yes**	**Yes**			**Yes**
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	8-Hour Ozone (2008) Nonattainment - Severe 15 (Part of San Bernardino and Los Angeles Counties)	MDAQMD	Los Angeles-San Bernardino Counties (West Mojave Desert) - 8-hr Ozone (2008) NAA (one way trip: trains = 120 miles)	Offsite Train		23.11				0.64
				Offsite Truck		0.00				0.00
				Total Emission		**23.11**				**0.64**
				Conformity De minimis (ton/yr)		**25**				**25**
				Less than De minimis?		**Yes**				**Yes**
San Bernardino County, CA (Mojave Desert)	PM10 Nonattainment - Moderate	MDAQMD	Entire MDAQMD jurisdiction area (one way trip: trains = 204 miles)	Offsite Train			0.63			
				Offsite Truck			0.00			
				Total Emission			**0.63**			
				Conformity De minimis (ton/yr)			**100**			
				Less than De minimis?			**Yes**			
Sacramento Metro, CA	8-Hour Ozone (2008) Nonattainment - Severe 15 PM10 Nonattainment - Moderate (Sacramento County) PM2.5 Nonattainment CO Maintenance - Moderate - Sacramento, CA (Part of Placer, Sacramento and Yolo Counties)	SMAQMD	Entire SMAQMD jurisdiction area (one way trip: trains = 0 miles)	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emission	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
				Conformity De minimis (ton/yr)	**NA**	**25**	**100**	**100**	**100**	**25**
				Less than De minimis?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Yuba City-Marysville, CA	PM2.5 Nonattainment (Sutter and Part of Yuba Counties) 1-Hour Ozone (Yuba City)	FRAQMD	Yuba City-Marysville, CA - PM2.5 NAA (one way trip: trains = 0 miles)	Offsite Train		0.00		0.00	0.00	0.00
				Offsite Truck		0.00		0.00	0.00	0.00
				Total Emission		**0.00**		**0.00**	**0.00**	**0.00**
				Conformity De minimis (ton/yr)		**100**		**100**	**100**	**100**
				Less than De minimis?		**Yes**		**Yes**	**Yes**	**Yes**
Chico, CA	8-Hour Ozone (2008) Nonattainment - Marginal (Butte County) PM2.5 Nonattainment (Part of Butte County) CO Maintenance - Moderate (Part of Butte County)	BCAQMD	Chico, CA - 8-Hour Ozone (2008) NAA - Entire Butte County (one way trip: trains = 0 miles)	Offsite Train	0.00	0.00		0.00	0.00	0.00
				Offsite Truck	0.00	0.00		0.00	0.00	0.00
				Total Emission	**0.00**	**0.00**		**0.00**	**0.00**	**0.00**
				Conformity De minimis (ton/yr)	**NA**	**100**		**100**	**100**	**100**
				Less than De minimis?	**Yes**	**Yes**		**Yes**	**Yes**	**Yes**

Summary of Applicable Operational Emissions for General Conformity (Alternative 2) - 2018 and Beyond

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
NAAs in State of Arizona	8-Hour Ozone (2008) Nonattainment - Marginal - Phoenix-Mesa, AZ (Part of Maricopa and Pinal County) PM10 Nonattainment (Moderate, Serious, or Maintenance) (12 Counties) PM2.5 Nonattainment - Nogales, AZ (Part of Santa Cruz County), West Central Pinal, AZ (West Pinal County) SO2 Nonattainment - Hayden (Pinal County), AZ (Part of Pinal County), Maintenance - San Manual (Pinal County), AZ, Ajo (Pima County), AZ, Douglas (Cochise County), AZ, Miami (Gila County), AZ CO Maintenance - Serious - Phoenix, AZ. (Part of Maricopa)	ADEQ	Entire ADEQ jurisdiction area (one way trip: trains = 364 miles)	Offsite Train	18.13	70.10	1.13	1.10	1.28	1.94
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emission	**18.13**	**70.10**	**1.13**	**1.10**	**1.28**	**1.94**
				Conformity De minimis (ton/yr)	**100**	**100**	**70**	**100**	**100**	**100**
				Less than De minimis?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
NAAs in State of New Mexico	PM10 Nonattainment - Moderate - Anthony, NM (Dona Ana County) CO Maintenance (Bernalillo County) SO2 Maintenance - Grant Co, NM	NMED-AQB	Entire NMED-AQB jurisdiction area (one way trip: trains = 102 miles to coal mine site)	Offsite Train	5.05		0.32		0.36	
				Offsite Truck	0.00		0.00		0.00	
				Total Emission	**5.05**		**0.32**		**0.36**	
				Conformity De minimis (ton/yr)	**100**		**100**		**100**	
				Less than De minimis?	**Yes**		**Yes**		**Yes**	

Notes:

1. The associated emissions from the onsite worker travel are negligible
2. To simplify the analysis, the biggest area among all detailed NAA areas was conservativly used to estimate the emissions in each main NAA category area. For State of Arizona and New Mexico the total distances accross each state along the train routes were conservativly used to estimate the emissions in NAA.
3. The distance for trains and trucks are varied depending on the type to materials transporting and their destinations.

nonattainment area is smaller than the distance in PM10 nonattainment area.

5. ACRONYMS AND ABBREVIATIONS

MDAQMD = Mojave Desert Air Quality Management District
SCAQMD = South Coast Air Quality Management District
EKAPCD = East Kern County Air Pollution Control District
SMAQMD = Sacramento Metro Air Quality Management District
BCAQMD = Butte County Air Quality Management District
FRAQMD = Feather River Air Quality Management District
ADEQ = Arizona Department of Environmental Quality
NMED-AQB = New Mexico Environment Department - Air Quality Bureau

Annual Number of Train Cars (incoming/outgoing)

	Coal Cars (incoming)	Liquid Sulfur Cars (outgoing)	Gasification Cars (outgoing)	Ammonia Cars (outgoing)	Urea Cars (outgoing)	UAN Cars (outgoing)	Maximum Total Trains per period
Annual average number of train cars	13034	0	0	0	0	0	13034

	Line-Haul Engine for Coal Train	Line-Haul Engine for Product Trains				
		Liquid Sulfur	Gasification	Ammonia	Urea	UAN
ton-mile/gallon	480	480	480	480	480	480
Train car capacity (ton)	117	100	100	117	117	117
Unloaded train car weight (ton)	25	25	25	25	25	25

480 ton-mile/gallon is based on 2009 *class I rail freight fuel consumption and travel* data (Association of American Railroads, *Railroad Facts*)

	Coal Trains			Liquid Sulfur Product Train			Gasification Solid Product Train		
Area	Miles traveled per Train (mile/engine) - One Way *	Coal Train (ton-miles/year) - Round Trip	Fuel Use for Coal Train (gal/year) - Round Trip	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip
SJVAPCD	70	152,369,658	317,426	0	0	0	0	0	0
EKAPCD	62	134,955,983	281,148		0	0	0	0	0
MDAQMD (PM10 nonattainment and the maximum distance)	204	442,960,363	922,802		0	0	0	0	0
MDAQMD (Ozone nonattainment)	120	261,205,128	544,158		0	0		0	0
Arizona (PM10 nonattainment and the maximum distance)	364	792,322,222	1,650,613		0	0		0	0
New Mexico	102	220,936,004	460,267		0	0		0	0

* Since exact route of coal train was not determined yet, It was assumed that the coal train would travel across the maximum distance of the nonattainment area for all pollutants in Arizona.

	Ammonia Product Train			Urea Product Train			UAN Product Train		
Area	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip	Miles traveled per Train (mile/engine) - One Way	Product Train (ton-miles/year) - Round Trip	Fuel Use for Product Train (gal/year) - Round Trip
SJVAPCD	0	0	0	0	0	0	0	0	0
Sacramento Metro		0	0	0	0	0		0	0
Yuba City-Marysville		0	0	0	0	0		0	0
Chico		0	0	0	0	0		0	0
Other Area in California and Oregon/Washington		0	0	0	0	0		0	0

offsite locomotive travelling speed in average	40	mph
ratio of required horsepower (empty train/full train)	0.76	
locomotive load factor	28%	

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Train Type	Coal	Liquid Sulfur	Gasification Solids	Ammonia	Urea	UAN
Railcar Capacity (ton)	117	100	100	117	117	117
Locomotive Engine Power (hp, each)	4,400	3,000	3,000	3,000	3,000	3,000
Railcars per train	120	46	46	46	46	46
Numbers of locomotive engine per train	6	2	2	2	2	2
Total ton of material per locomotive engine	2,340	2,300	2,300	2,691	2,691	2,691
Total # locomotive engines needed to transport material per year	652	-	-	-	-	-
Total # locomotive engines needed for returning trains per year	495	-	-	-	-	-
Total locomotive hours per year in SJVAPCD	2,007					
Total locomotive hours per year in EKAPCD	1,778					
Total locomotive hours per year in MDAQMD (PM10 nonattainment and the maximum distance)	5,836					
Total locomotive hours per year in MDAQMD (Ozone nonattainment)	3,441					
Total locomotive hours per year in Arizona (PM10 nonattainment and the maximum distance)	10,438					
Total locomotive hours per year in Arizona (PM2.5 nonattainment)	574					
Total locomotive hours per year in Arizona (Ozone nonattainment)	2,868					
Total locomotive hours per year in Arizona (SO2 and CO nonattainment)	5,735					
Total locomotive hours per year in New Mexico	2,911					
Total locomotive hours per year in Sacramento Metro						
Total locomotive hours per year in Yuba City-Marysville						
Total locomotive hours per year in Chico						
Total locomotive hours per year in Other Area in California and Oregon/Washington						

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	Line-Haul Emission Factors	CO	NOx	PM10	PM2.5	SO2	VOC
	Tier 3 Emission Factor (g/bhp-hr)	1.28	4.95	0.08	0.08	0.09	0.14
	Tier 3 Emission Factor (g/gal)	26.62	102.96	1.66	1.61	1.88	2.85

Annual Emission Rates by Area

Area		CO	NOx	PM10	PM2.5	SO2	VOC
		Annual Emission Rates (tons/year) all trains					
SJVAPCD (San Joaquin Valley), CA	Line-haul coal engines	3.49	13.48	0.22	0.21	0.25	0.37
	Line-haul liquid sulfur product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Line-haul gasification product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Line-haul ammonia product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Line-haul urea product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Line-haul UAN product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**3.49**	**13.48**	**0.22**	**0.21**	**0.25**	**0.37**
EKAPCD (East Kern County), CA	Line-haul coal engines	3.09	11.94	0.19	0.19	0.22	0.33
	Line-haul gasification product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**3.09**	**11.94**	**0.19**	**0.19**	**0.22**	**0.33**
MDAQMD (PM10 nonattainment and total distance)	Line-haul coal engines	10.13	39.19	0.63	0.61	0.72	1.08
	Line-haul gasification product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**10.13**	**39.19**	**0.63**	**0.61**	**0.72**	**1.08**
MDAQMD (Ozone nonattainment)	Line-haul coal engines	5.98	23.11	0.37	0.36	0.42	0.64
	Line-haul gasification product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**5.98**	**23.11**	**0.37**	**0.36**	**0.42**	**0.64**
Arizona	Line-haul coal engines	18.13	70.10	1.13	1.10	1.28	1.94
	Total Trains (ton/yr)	**18.13**	**70.10**	**1.13**	**1.10**	**1.28**	**1.94**
Sacramento Metro, CA	Line-haul urea product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Yuba City-Marysville, CA	Line-haul urea product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Chico, CA	Line-haul urea product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Other Area in California and Oregon/Washington	Line-haul urea product engines	0.00	0.00	0.00	0.00	0.00	0.00
	Total Trains (ton/yr)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
New Mexico	Line-haul coal engines	5.05	19.55	0.32	0.31	0.36	0.54
	Total Trains (ton/yr)	**5.05**	**19.55**	**0.32**	**0.31**	**0.36**	**0.54**

EPA Estimated Locomotive Average Emission Rates by Tiers

Tier	Emission Factor (g/bhp-hr)			
	CO	NO_X	PM	HC
Uncontrolled	1.28	13.00	0.32	0.48
Tier 0	1.28	8.60	0.32	0.48
Tier 0+	1.28	7.20	0.20	0.30
Tier 1	1.28	6.70	0.32	0.47
Tier 1+	1.28	6.70	0.20	0.29
Tier 2	1.28	4.95	0.18	0.26
Tier 2+ and Tier 3	1.28	4.95	0.08	0.13
Tier 4	1.28	1.00	0.015	0.04

Emission Factors For all Locomotives
SOx (3)
g/gal
1.88

Locomotive Application	Conversion Factor (bhp-hr/gal)
Large Line-haul & Passenger	20.8
Small Line-haul	18.2
Switching	15.2

Note:

(1) EPA's Technical Highlights: Emission Factors for Locomotives, 2009 (http://www.epa.gov/nonroad/locomotv/420f09025.pdf).

(2) Line-haul engine emissions of CO, Nox, PM, and HC are based on EPA Tier 3.

(3) Based on 300 ppm sulfur diesel fuel.

(4) VOC emissions can be assumed to be equal to 1.053 times the HC emissions

(5) $PM_{2.5}$ Fraction of PM_{10}, = 0.97

(6) No off-site switching or idling was assumed for train transportation.

(7) Average line haul locomotive load factor was obtained from Table 5.12 of The Port Of Long Beach - 2007 Air Emissions Inventory (http://www.polb.com/civica/filebank/blobdload.asp?BlobID=6021)

Summary of Truck Emissions - HECA

8/05/2012 revision

Calculations for Trucks Operation

Data Supplied By Client								
Parameter	**Coke Trucks (Max @ 50 or 60 mph)**	**Coal Trucks (Max @ 50 or 60 mph)**	**Liquid Sulfur Product Trucks (Max @ 50 or 60 mph)**	**Gasification Product Trucks (Max @ 50 or 60 mph)**	**Ammonia Product Trucks (Max @ 50 or 60 mph)**	**Urea Product Trucks (Max @ 50 or 60 mph)**	**UAN Sulfur Product Trucks (Max @ 50 or 60 mph)**	**Equipment and Miscellaneous Trucks (Max @ 50 or 60 mph)**
	Running Emissions	**Running Emissions**	**Running Emissions**	**Running Emissions**	**Running Emissions**	**Running Emissions**	**Running Emissions**	**Running Emissions**
Distance traveled per truck in San Joaquin Valley, CA (mi)	104	53	104	160	80	80	80	80
Distance traveled per truck in Los Angeles-South Coast Air Basin, CA (mi)	176	0	180	0	0	0	0	0
Maximum number of trucks or loads:								
Annual average trucks or loads	15,200	61,000	1,320	11,200	6,680	11,200	18,560	1,818

No off-site idling was assumed for truck transportation.
Distance traveled per truck is based on round-trip.

EMFAC2007 Emission Factors + Fugitive Dust (g/mi) For Truck Model year 2010, Scenario year 2015

Pollutant	Coke Trucks (Max @ 50 or 60 mph) Running Emissions (g/mile/trk)	Coal Trucks (Max @ 50 or 60 mph) Running Emissions (g/mile/trk)	Liquid Sulfur Product Trucks (Max @ 50 or 60 mph) Running Emissions (g/mile/trk)	Gasification Product Trucks (Max @ 50 or 60 mph) Running Emissions (g/mile/trk)	Ammonia Product Trucks (Max @ 50 or 60 mph) Running Emissions (g/mile/trk)	Urea Product Trucks (Max @ 50 or 60 mph) Running Emissions (g/mile/trk)	UAN Sulfur Product Trucks (Max @ 50 or 60 mph) Running Emissions (g/mile/trk)	Equipment and Miscelleneous Trucks (Max @ 50 or 60 mph) Running Emissions (g/mile/trk)
CO	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32
NOx	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17
ROG	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
SOx	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
PM10 *	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
PM2.5 *	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18

EMFAC2007 is the approved federal model for vehicle combustion emissions
* PM10 and PM2.5 includes fugitive dust factor for paved roads obtained from AP-42 Ch. 13 plus PM factors from EMFAC 2007
PM factors from EMFAC = combustion exhaust + tire wear + break wear
The maximum emission factor from either truck speed at 50 mph or 60 mph was used.
Most California highways have speed limits of 60 or 70 mph and large trucks travel more slowly than the speed limit.

Annual Emission Rates in ton/yr all trucks

Pollutant	Coke Trucks (Max @ 50 or 60 mph) Running Emissions	Coal Trucks (Max @ 50 or 60 mph) Running Emissions	Liquid Sulfur Product Trucks (Max @ 50 or 60 Running Emissions	Gasification Product Trucks (Max @ 50 or 60 mph) Running Emissions	Ammonia Product Trucks (Max @ 50 or 60 mph) Running Emissions	Urea Product Trucks (Max @ 50 or 60 mph) Running Emissions	UAN Sulfur Product Trucks (Max @ 50 or 60 mph) Running Emissions	Equipment and Miscelleneous Trucks (Max Running Emissions	Total Truck Emission Rates (tons/yr)
San Joaquin Valley, CA									
CO	2.29	4.69	0.20	2.60	0.78	1.30	2.15	0.21	**14.22**
NOx	3.78	7.72	0.33	4.28	1.28	2.14	3.55	0.35	**23.42**
ROG	0.32	0.65	0.03	0.36	0.11	0.18	0.30	0.03	**1.98**
SOx	0.03	0.06	0.00	0.03	0.01	0.02	0.03	0.00	**0.17**
PM10	1.04	2.12	0.09	1.18	0.35	0.59	0.97	0.10	**6.43**
PM2.5	0.31	0.64	0.03	0.35	0.11	0.18	0.29	0.03	**1.94**
Los Angeles-South Coast Air Basin, CA									
CO	3.88	0.00	0.34	0.00	0.00	0.00	0.00	0.00	**4.23**
NOx	6.39	0.00	0.57	0.00	0.00	0.00	0.00	0.00	**6.96**
ROG	0.54	0.00	0.05	0.00	0.00	0.00	0.00	0.00	**0.59**
SOx	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.05**
PM10	1.76	0.00	0.16	0.00	0.00	0.00	0.00	0.00	**1.91**
PM2.5	0.53	0.00	0.05	0.00	0.00	0.00	0.00	0.00	**0.58**

Summary of Worker Commute Vehicle Emissions - HECA

8/05/2012 revision

Calculations for Worker Commute Vehicle Operation

OFFSITE - 50 MPH								EF (g/mile)					
Onroad Vehicle	**Fuel Type**	**Vehicle Type**	**Total Number of Workers per day**	**Daily Vehicle Count**	**Round Trip Distance (miles/vehicle/day)**	**Trips per day**	**VMT (Annual)**	**CO**	**NOx**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**TOC**
Personal Commuting Vehicles	G/D	LDA/ LDT	200	154	40.0	1	2,246,154	1.6825	0.1930	0.4234	0.1134	3.50E-03	0.0540

Assumptions:

Assumed average distance traveled off site for all employees commuting will be 20 miles

times 2 for return trip = 40 miles

365 days per year

Number of workers per commuter vehicle = 1.3

EMFAC2007 emissions are for fleet mix years 1971-2015 travelling at 50 mph.

Area	Description	Annual Emission Rates (tons/year) all worker commute vehicles					
		CO	**NOx**	**PM10**	**PM2.5**	**SO2**	**VOC**
San Joaquin Valley, CA	Personal Commuting Vehicles	4.17	0.48	1.05	0.28	0.01	0.13

Fugitive Dust on Paved Road

AP 42 13.2.1 Paved Roads, updated January 2011

For a daily basis,
E = [k (sL)^0.91 x (W)^1.02](1-P/4N) (2)

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period
W = average weight (tons) of vehicles traveling the road
k = particle size multiplier for particle size range and units of interest
sL = road surface silt loading (g/m^2)

	k
	g/VMT
PM2.5	0.25
PM10	1.00

Table 13.2.1-1
PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION

Fleet mix on highway

W= 9.1 tons, average
sL= 0.031 g/m2 Default value from URBEMIS 9.2 for Kern County
P= 36 days/year Buttonwillow Station 1940-2011, WRCC

E=
0.09836 g/VMT PM2.5
0.39344 g/VMT PM10

Vehicle weight (tons)		fraction of each vehicle type
1.6	passenger vehicles	0.75
40	large trucks	0.18
9	2-4 axle trucks	0.07

9.1 weighted average for all vehicles (ton)

On I-5 near the Project, 75% of all vehicles are passenger vehicles,
of the remaining vehicle, 73% are 5-axle trucks and the remainder are 2-4 axle trucks.
From information provided by California Department of Transportation for the traffic analysis.

Summary of Transportation Vehicles and Routes

Commodity Handled	Petcoke	Coal	Liquid Sulfur	Gasification	Ammonia	Urea	UAN	Equipment	Miscellaneous
Expected plant operation									
Expected plant operation is 8000 hours / year									
The plant will operate 24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day
The plant will operate 333 days / year	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr
Shipment by trucks	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Shipment by train	0 %	100 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
Production rate									
Required Normal Flow / day	1,140 tons / day	4,580 tons / day	100 tons / day	839 tons / day	500 tons / day	833 tons / day	1,392 tons / day		
Required Normal Flow / year	380,000 tons / yr	1,525,000 tons / yr	33,000 tons / yr	280,000 tons / yr	167,000 tons / yr	280,000 tons / yr	464,000 tons / yr		
Required Maximum Flow day	1,368 tons / day (3)	6,107 tons / day (4)	200 tons / day (5)	1,678 tons / day (6)	1,000 tons / day (6)	1,666 tons / day (6)	2,784 tons / day (6)		
Truck Shipments									
Truck Capacity	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck
Required trucks loads for normal operation / day	46 trucks / day	183 trucks / day	4 trucks / day	34 trucks / day	20 trucks / day	33 trucks / day	56 trucks / day	2 trucks / day	3 trucks / day
Required trucks loads for normal operation / yr	15,200 truck / yr	61,000 truck / yr	1,320 truck / yr	11,200 truck / yr	6,680 truck / yr	11,200 truck / yr	18,560 truck / yr		
Required trucks loads for maximum operation /day	55 trucks / day	244 trucks / day	8 trucks / day	67 trucks / day	40 trucks / day	67 trucks / day	111 trucks / day		
Train Shipments									
Railcar Capacity		117 tons / car	100 tons / car	100 tons / car	117 tons / car	117 tons / car	117 tons / car		
Assume a train has 13,000 ton capacity									
Required railcars for normal operation / day		39 cars / day	0 cars / day	0 cars / day	0 cars / day	0 cars / day	0 cars / day		
Required railcar loads for normal operation / yr		13,034 cars / yr	0 cars / yr	0 cars / yr	0 cars / yr	0 cars / yr	0 cars / yr		
Required railcars for maximum operation / day		200 cars / day	0 cars / day	0 cars / day	0 cars / day	0 cars / day	0 cars / day		
Basis	- 91% availability - 25% petcoke (heat input) - 25 ton/truck - 7 days/week receiving - 25% excess truck	- 91% availability - 75% coal (heat input) per year - 117 tons/car - 100% coal for maximum - Rack sized to handle two trains/day	- 91% availability - High sulfur case - 100 - 25 ton/truck - Weekdays only	- 91% availability - 75% coal max annual - Maximum is double the daily average rate	- 91% availability - 500 t/d NH3 sales - Ability to ship 7500 tons over 10 days (75% of tank plus some production)	- 91% availability -empty 45 day storage in 10 days	- 91% availability -empty 45 day storage in 10 days	'	
Traffic route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route
Destination/Origin	Carson Refinery	Wasco rail terminal to site	California Sulfur	Various	Various	Various	Various	Various	Various
Address	1801 E Sepulveda, Carson		2509 E Grant Street, Wilmington						
Distance	140 miles	26.5 miles	142 miles	80 mile radius	40 mile radius	40 mile radius	40 mile radius	40 mile ratius	40 mile ratius
Route	Alameda 405 Fwy 5 Fwy Stockdale hwy Morris Road Station Road		Grant Henry Ford Alameda 405 Fwy 5 Fwy Stockdale hwy Morris Road Station Road	40 mile radius Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	5 fwy Stockdale Hwy Dairy Road	5 fwy Stockdale Hwy Dairy Road
	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route
Destination/Origin	None	Elk Ranch New Mexico	None	None	None	None	None	None	None
Address		801 miles							
Distance									
Route		Kern County: 139.2 miles (County Line near Boron, CA to north property line of plant) Mine to Boron, CA: 662 miles Total Distance: 801.2 miles							

Notes

1) Equipment Maintenance Trucks are considered to be 2% of the total trucks per day for the feed and product operation.
2) Miscellaneous trucks are considered to be 3% of the total trucks per day for the feed and product operation.
3) The maximum flow rate of coke is ratioed up from the normal flow rate at 25% to 30% of feed
4) The maximum flow rate of coal is ratioed up from the normal flow rate at 75% to 100% of feed
5) The maximum flow rate of sulfur is 2 times the normal production
6) The maximum flow rate of these commodities is 2 times the normal production
7) The sources of flow data used in the Production Rate calculation were based on the flow rates provided in "Conference Note: Rail and Truck Traffic - Planning Session" and the "FertilizerProductMovement Update", 01-25-12.

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Calculations for Trucks Operation onsite

Data Supplied By Client					
Parameter	**Petcoke and Coal Trucks**		**Product Trucks**		**Miscellaneous Trucks**
	Running Emissions	**Idling Emissions**	**Running Emissions**	**Idling Emissions**	**Running Emissions**
Distance Traveled (mi)*	0.96		2.49		2.20
Per Truck Idle Time (hr)		0.083		0.083	
Maximum number of trucks or loads:					
Annual average trucks or loads	76,200	76,200	48,960	48,960	1,818

EMFAC2007 Emission Factors + Fugitive Dust (g/mi or g/idle-hour) For Truck Model year 2010

	Coke and Coal Trucks		**Product Trucks**		**Miscellaneous Trucks**
Pollutant	**Running Emissions (g/mile/trk)**	**Idling Emissions (g/idle-hour/trk)**	**Running Emissions (g/mile/trk)**	**Idling Emissions (g/idle-hour/trk)**	**Running Emissions (g/mile/trk)**
CO	3.03	43.69	3.03	43.69	3.03
NOx	5.43	122.65	5.43	122.65	5.43
ROG	1.39	7.74	1.39	7.74	1.39
SOx	0.03	0.06	0.03	0.06	0.03
PM10 *	0.92	0.11	0.92	0.11	0.92
PM2.5 *	0.29	0.10	0.29	0.10	0.29

EMFAC2007 is the approved federal model for vehicle combustion emissions
* PM10 and PM2.5 includes fugitive dust factor for paved roads obtained from AP-42 Ch. 13 plus PM factors from EMFAC 2007
PM factors from EMFAC = combustion exhaust + tire wear + break wear
EMFAC emissions are for fleet year 2010 travelling at 10 mph.

Annual Emission Rates in g/s For All Trucks

	Coke and Coal Trucks		**Product Trucks**		**Miscellaneous Trucks**		
Pollutant	**Running Emissions**	**Idling Emissions (at each Idle Point)**	**Running Emissions**	**Idling Emissions (at each Idle Point)**	**Running Emissions**	**TOTAL (g/s)**	**TOTAL (tpy)**
CO	6.997E-03	8.797E-03	1.168E-02	5.652E-03	3.839E-04	3.35E-02	1.17E+00
NOx	1.254E-02	2.470E-02	2.094E-02	1.587E-02	6.880E-04	7.47E-02	2.60E+00
ROG	3.207E-03	1.559E-03	5.356E-03	1.002E-03	1.760E-04	1.13E-02	3.93E-01
SOx	6.932E-05	1.248E-05	1.158E-04	8.021E-06	3.803E-06	2.09E-04	7.28E-03
PM10	2.119E-03	2.295E-05	3.538E-03	1.475E-05	1.162E-04	5.81E-03	2.02E-01
PM2.5	6.758E-04	2.094E-05	1.129E-03	1.346E-05	3.708E-05	1.88E-03	6.52E-02

8/05/2012 revision

Transportation Information			Notes
- Onsite Vehicle =	20	trucks	- Information Provided By Applicant
- Vehicle year=	2010		- Information Provided By Applicant
- Maximum annual mileage =	10,000	miles/truck-year	- All routine vehicular traffic is anticipated to travel exclusively on paved roads
			- Assumed 15 mph average speed within HECA facility

EMFAC2007 Emission Factors (g/mi) For Truck Model year 2010

	Emission Factors in g/mi	
Pollutant	Gas LHDT1	Diesel LHDT2
CO	0.229	0.920
NOx	0.064	0.672
ROG	0.014	0.085
SOx	0.011	0.005
PM10 *	0.167	0.176
PM2.5 *	0.054	0.062

EMFAC2007 is the approved federal model for vehicle combustion emissions
* PM10 and PM2.5 includes fugitive dust factor for paved roads obtained from AP-42 Ch. 13 plus PM factors from EMFAC 2007
PM factors from EMFAC = combustion exhaust + tire wear + break wear
EMFAC emissions are for fleet year 2010 travelling at 15 mph.

Annual Emission Rates in g/s From All Trucks

	Emissions in g/s			
Pollutant	Gas LHDT1	Diesel LHDT2	TOTAL (g/s)	TOTAL (tpy)
CO	1.45E-03	5.83E-03	7.29E-03	0.253
NOx	4.06E-04	4.26E-03	4.67E-03	0.162
ROG	8.88E-05	5.39E-04	6.28E-04	0.022
SOx	6.98E-05	3.17E-05	1.01E-04	0.004
PM10	1.06E-03	1.11E-03	2.17E-03	0.076
PM2.5	3.40E-04	3.91E-04	7.32E-04	0.025

Fugitive Dust on Paved Road

8/05/2012 revision

AP 42 13.2.1 Paved Roads, updated January 2011

For a daily basis,
E = [k (sL)^0.91 x (W)^1.02](1-P/4N) (2)

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period
W = average weight (tons) of vehicles traveling the road
k = particle size multiplier for particle size range and units of interest
sL = road surface silt loading (g/m^2)

	k
	g/VMT
PM2.5	0.25
PM10	1.00

Table 13.2.1-1
PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION

Large Trucks

				Empty truck	full truck	Load Capacity	
W=	17.5	tons, average		5	30	25	tons
sL=	0.031	g/m2	Default value from URBEMIS 9.2 for Kern County				
P=	36	days/year	Buttonwillow Station 1940-2011, WRCC				

E=
0.19149 g/VMT PM2.5 large delivery trucks
0.76594 g/VMT PM10 large delivery trucks

Operation and Maintenance Vehicles

W=	3	tons	
sL=	0.031	g/m2	Default value from URBEMIS 9.2 for Kern County
P=	36	days/year	Buttonwillow Station 1940-2011, WRCC

E=
0.03169 g/VMT PM2.5 large delivery trucks
0.12675 g/VMT PM10 large delivery trucks

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
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AMENDED APPLICATION FOR CERTIFICATION FOR THE HYDROGEN ENERGY CALIFORNIA PROJECT

Docket No. 08-AFC-08A
(Revised 8/28/12)

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DECLARATION OF SERVICE

I, Dale Shileikis, declare that on September 14, 2012, I served and filed a copy of the attached General Conformity Evaluation, dated September, 2012. This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: http://www.energy.ca.gov/sitingcases/hydrogen_energy/index.html

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:
(*Check all that Apply*)

For service to all other parties:

_X_ Served electronically to all e-mail addresses on the Proof of Service list;

___ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses marked *"hard copy required" or where no e-mail address is provided.

AND

For filing with the Docket Unit at the Energy Commission:

_X_ by sending one electronic copy to the e-mail address below (preferred method); OR

___ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 08-AFC-08A
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.ca.gov

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

___ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
michael.levy@energy.ca.gov

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.