Responses to CEC Data Requests: Nos. A1 through A123

Amended Application for Certification for HYDROGEN ENERGY CALIFORNIA (08-AFC-8A) Kern County, California

Prepared for:
Hydrogen Energy California LLC

hydrogen energy california

Submitted to:

California Energy Commission

U.S Department of Energy

Prepared by:

URS

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RESPONSES TO DATA REQUESTS A1 THROUGH A123
FROM CALIFORNIA ENERGY COMMISSION (CEC)

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LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES

AQRV	Air-Quality–Related Value
ASU	Air Separation Unit
BACT	Best Available Control Technology
Btu	British thermal unit
CalEEMod	California Emissions Estimator Model
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act of 1970
CFR	Code of Federal Regulations
CH_4	methane
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalents
CTG	combustion turbine generator
DOE	Department of Energy
DPM	Diesel Particulate Matter
EDR	Environmental Data Resources, Inc.
EOR	Enhanced Oil Recovery
EPA	Environmental Protection Agency (see USEPA)
GHG	greenhouse gas
GIS	Geographic Information System
GLO	Government Land Office
GPS	global positioning system
HECA	Hydrogen Energy California
HEI	Hydrogen Energy International, LLC
HNO_3	Nitric acid
HRA	Human Health Risk Assessment
HRSG	heat recovery steam generator
I-5	Interstate 5
lb	pound
lb/VMT	pounds per vehicle mile traveled
LDAR	leak detection and repair
mg/L	milligrams per liter
MMBtu	million British thermal units
MRR	Mandatory Reporting Regulation
MW	megawatt
MWh	megawatt per hour
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
OEHI	Occidental of Elk Hills, Inc.
P&ID	piping and instrumentation diagrams
PCC	Portland cement concrete
Petcoke	petroleum coke
PM	particulate matter
PM_{10}	particulate matter 10 microns in diameter or less
$PM_{2.5}$	particulate matter 2.5 microns in diameter or less
ppm	parts per million
PSD	Prevention of Significant Deterioration
QM	Quantification Methodology

SCAQMD	South Coast Air Quality Management District
SJVAPCD	San Joaquin Valley Air Pollution Control District
SOCMI	Synthetic Organic Chemical Manufacturing Industry
Syngas	synthesis gas
TDS	total dissolved solids
tpy	tons per year
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic compound
ZLD	zero liquid discharge

Technical Area: Air Quality/Greenhouse Gases
Authors: William Walters; Nancy Fletcher

BACKGROUND: PREVIOUS DATA RESPONSES

Staff needs to determine if certain previous data responses, including those responding to questions posed during the data request/response workshop and later correspondence, such as those submitted to the Energy Commission on 11/11/09, 11/12/09, 12/11/09, 1/8/10, 2/1/10, 4/2/10, 6/10/2010, 7/27/10, 11/12/10, 12/6/10, and 12/16/10, still apply to the project and are still valid.

DATA REQUEST

A1. Please describe any revisions, or inapplicability to the revised project, for the data responses to the previous air quality and Green House Gas (GHG) data requests in general, and particularly for the previous data requests listed below:

Data Request Set One – 1, 2, 5, 10, 20, 21, 25, 27, 28, 29, 37, 55, 56 http:// www.energy.ca.gov/sitingcases/hydrogen_energy/documents/08-AFC-8/index.html

RESPONSE

The previous Data Requests and their responses are provided in Table A1-1. The table also indicates the revisions to the previous response.

Table A1-1
Revisions or Updates to Previous Data Request Responses

Data Request from Hydrogen Energy California Project (08-AFC-8) Data Request Set 1 (Nos. 1-132) October 12, 2009	Hydrogen Energy California Project (08-AFC-8) Response to Data Request November 11, 2009 and January 8, 2010	Hydrogen Energy California Project (08-AFC-8a) Revisions or Updates to Response
2009 Data Request No. 1. Please describe the types of activities that emit combustion and fugitive dust emissions on the site currently and the quantities of the criteria pollutant emissions that occur from those activities.	To respond to this data request and also to Data Request Nos. 32 and 33, the Applicant completed and submitted a Public Records Request Form to the San Joaquin Valley Air Pollution Control District (SJVAPCD) on October 26, 2009, asking in part for any emissions information regarding the Port Organics facility that recently ceased operations on the Project Site and adjacent Controlled Area. In addition, that same request asked for information about any other sources on the Project Site for which the SJVAPCD had records, including agricultural emissions. The information provided by SJVAPCD did not identify any newly permitted sources or recent permit applications for any sources currently occupying the Project Site or Controlled Area (see the response to Data Request No. 32 in this document for the information received from SJVAPCD). In addition, SJVAPCD staff confirmed via phone contact that the name "Port Organics" does not appear on the list of companies holding air permits in Kern County. Therefore, the Applicant concludes that there are no current SJVAPCD-regulated activities on the Project Site.	There is no substantive change to the previous response. The only differences are the size of the current Project Site and Controlled Area, which are now 453 acres and 653 acres, respectively, rather than 473 and 628 acres. These changes are underlined as follows: Agricultural activities (typically exempt from SJVAPCD regulations) occurring on the ~~628~~653-acre Controlled Area portion of the Hydrogen Energy California (HECA) property could continue. Therefore, there would be no change in emissions related to agricultural activities in the Controlled Area. Agricultural activities within the ~~473~~453-acre Project Site would be discontinued. SJVAPCD was asked for recommendations for emission factors applicable to the fugitive dust emissions and the fuel combustion emissions from mobile sources for the types of agricultural activities present, but offered none. Although there may

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	Agricultural activities (typically exempt from SJVAPCD regulations) occurring on the 628-acre Controlled Area portion of the Hydrogen Energy California (HECA) property could continue. Therefore, there would be no change in emissions related to agricultural activities in the Controlled Area. Agricultural activities within the 473-acre Project Site would be discontinued. SJVAPCD was asked for recommendations for emission factors applicable to the fugitive dust emissions and the fuel combustion emissions from mobile sources for the types of agricultural activities present, but offered none. Although there may be a reduction in localized air emissions as a result of cessation of agricultural activities at the Project Site, the Applicant is not claiming any credit for the reduction of agricultural activity air pollutant emissions from the 473-acre Project Site at this time (URS, 2010).	be a reduction in localized air emissions as a result of cessation of agricultural activities at the Project Site, the Applicant is not claiming any credit for the reduction of agricultural activity air pollutant emissions from the ~~473~~453-acre Project Site at this time.
2009 Data Request No. 2. Please describe whether those activities will be permanently discontinued from the entire project site when the project is completed and estimate the reductions from the current onsite baseline emissions.	See response to Data Request No. 1. At this time, the Applicant is not claiming any credit for reductions to baseline emissions from the Project Site and Controlled Area (URS, 2010).	No change to previous response.
2009 Data Request No. 5. The calculations provided for unpaved road travel assume graveled roads. Please indicate if the applicant is planning to gravel the entrance and exits roads, parking areas, and lay down areas at the site during construction.	The Applicant will gravel the entrance and exit roads, parking areas, and laydown area roads at the Project Site during construction (URS, 2009).	No change to previous response.
2009 Data Request No. 10. Please indicate if all onsite roads will be paved and whether all onsite travel will be restricted to paved roads.	During normal operations of the HECA Project, all routine vehicular traffic is anticipated to travel almost exclusively on paved roads. See Figure 2-42, Preliminary Paving Plan, in the Revised AFC indicating locations of paved roads (URS, 2009).	Similar to the Applicant's previous response, during normal operations of the HECA Project, all routine vehicular traffic is still anticipated to travel almost exclusively on paved roads. See Figure 2-49, Preliminary Paving Plan, in the 2012 Amended Application for Certification for HYDROGEN ENERGY CALIFORNIA (08-AFC-8) Kern County, California ["2012 Amended AFC"] indicating locations of paved roads.

Data Request from Hydrogen Energy California Project (08-AFC-8) Data Request Set 1 (Nos. 1-132) October 12, 2009	**Hydrogen Energy California Project (08-AFC-8) Response to Data Request November 11, 2009 and January 8, 2010**	**Hydrogen Energy California Project (08-AFC-8a) Revisions or Updates to Response**
2009 Data Request No. 20. Please indicate if the applicant is willing to increase the onsite water treatment capabilities to substantially reduce the total dissolved solids (TDS) content of the cooling towers' recirculating water.	The Applicant is unwilling to increase the onsite water treatment capabilities. The Applicant's choice of impaired water as the source of raw water to the plant combined with Zero Liquid Discharge effluent treatment results in a significant environmental benefit. The current onsite water treatment configuration produces a cooling tower circulating water TDS content that balances power consumption, cost-effectiveness, and environmental benefits. Increasing the onsite water treatment capabilities to substantially reduce circulating water TDS would significantly increase capital cost and parasitic energy consumption, thereby reducing the overall efficiency of the HECA Project. Furthermore, this proposed design modification would not result in a substantial corresponding benefit in excess of that already delivered with the existing design. Therefore, the Applicant has determined that a TDS level of 9,000 milligrams per liter in the cooling water circulation is the optimal concentration (URS, 2009).	There is no change to the previous response. This response remains the same for the process and power block cooling towers. The only difference is that the Air Separation Unit (ASU) cooling tower will require water with a cycled-up TDS of up to 2,000 milligrams per liter (mg/L). See the 2012 Amended AFC, Section 5.1.2.
2009 Data Request No. 21. Please indicate if the applicant is willing to revise the design to use an air cooled condenser for project cooling.	The Applicant is unwilling to revise the design to use an air cooled condenser and has conducted a comprehensive air cooling study which provides the basis for this decision (see Revised AFC Appendix X, Water Usage Minimization Study). The Water Usage Minimization Study concluded that air cooling substantially increases capital cost, parasitic energy consumption, and operating cost with a significant reduction in the efficiency of the HECA Project (as much as 25 megawatts [MW] would be lost for summer peak output). Therefore, the Applicant has not selected air cooling as the heat rejection method for the HECA Project (URS, 2009).	Only change is that the current expectation is that there would be approximately 15 MW reduction in output.
2009 Data Request No. 25. Please identify if the applicant would be willing to stipulate to a condition of certification that would require a review of available alternative low-emission vehicle technologies, including electric and hydrogen fueled vehicles. Staff needs to know whether the applicant would consider use of those technologies to replace any proposed onsite dedicated diesel and gasoline fueled vehicles used for operations and maintenance if lower emission alternative technology vehicles are both available and not cost prohibitive.	The Applicant would be willing to stipulate to a condition of certification to review available alternative low-emission vehicle technologies for onsite transportation, including electric and hydrogen-fueled vehicles. The Applicant will consider these technologies to replace any proposed onsite dedicated diesel- and gasoline-fueled vehicles used for operations and maintenance provided the technology is suitable for the task and environment, commercially available, and not cost prohibitive (URS, 2009).	No change to previous response.

Data Request from Hydrogen Energy California Project (08-AFC-8) Data Request Set 1 (Nos. 1-132) October 12, 2009	**Hydrogen Energy California Project (08-AFC-8) Response to Data Request November 11, 2009 and January 8, 2010**	**Hydrogen Energy California Project (08-AFC-8a) Revisions or Updates to Response**
2009 Data Request No. 27. Please identify if the applicant would be willing to stipulate to contracting for only new trucks for fuel delivery at the time of starting operations and maintaining a maximum average fleet age, or some other measures to mitigate this large emissions source.	The Applicant is willing to commit to only employing trucks that meet or exceed the 2010 heavy diesel emission standards. New diesel trucks are becoming progressively cleaner as a result of California and national emission standards. For example, by 2010, diesel particulate matter and NO_X emissions from new heavy-duty diesel truck engines will be about 98 percent lower than uncontrolled levels (URS, 2009).	No change to previous response.
2009 Data Request No. 28. Please identify likely destinations for the gasification solids, sulfur, and zero liquid discharge (ZLD) filter cake haul trips, and revise the offsite emissions calculations appropriately.	**Gasification Solids** Information regarding composition and quantity of gasification solids can be found in Sections 2.1.9.4 and 5.13.2.2 of the Revised AFC. This product can either be disposed or reused/recycled as described below. • Disposal method: offsite disposal or reuse/recycle for the following applications (see the response to Data Request No. 29 for detailed information): – Ready-mix Concrete – Cement Manufacturing – Aggregate application – Portland Cement Concrete/road base/ flowable fill – Sand-blasting application • Potential destinations for reuse/recycling of gasification solids: See the response to Data Request No. 115. • Potential destinations for disposal of gasification solids: See Table 5.13-1 of the Revised AFC. **Molten Sulfur** Information regarding the composition and quantity of molten sulfur can be found in Section 2.1.9.3 of the Revised AFC. This by-product can be sold to chemical manufacturers in Southern California as a raw material for sulfuric acid manufacturing; processed into plant nutrient mix; or converted into soil fertilizer. Potential customers for the material are listed in Table 28-1 which is being submitted under separate confidential cover. **Zero Liquid Discharge Solids Disposal** Information regarding composition and quantity of ZLD solids can be found in Sections 2.1.9.5 and 2.4.5, and Revised Tables 2-20 and 5.13-3 of the Revised AFC. Table 112-2 (Revised Tables 5.13-3 and 2-20) is presented as part of	Updated response is as follows and includes updates to section references. **Gasification Solids** Information regarding composition and quantity of gasification solids can be found in Sections 2.1.12.4 and 5.13.2.2 of the 2012 Amended AFC. This product can either be disposed or reused/recycled as described below. • Disposal method: offsite disposal or reuse/recycle for the following applications (see the response to 2009 Data Request No. 29 for detailed information): – Ready-mix Concrete – Cement Manufacturing – Aggregate application – Portland Cement Concrete (PCC)/~~road base/~~flowable fill – Sand-blasting application – Roofing granules HECA is in the process of acquiring gasification solids samples reflective of the feed stock mix that will be used for the project. Samples of these materials will be provided to potential customers to facilitate further negotiations. • Potential destinations for reuse/ recycling of gasification solids: See the response to 2009 Data Request No. 115, which was submitted under separate confidential cover. • Potential destinations for disposal of gasification solids: See Table 5.13-1 of the 2012 AFC Amendment.

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	the response to Data Request No. 112. The likely destinations for ZLD solids include Class I and Class III landfills (depending on the characterization of the material) near the site, as listed in Revised AFC Table 5.13-1. Disposal methods and corresponding destinations are described below. • Process wastewater ZLD solids – Will be tested to characterize as hazardous or nonhazardous. – If hazardous, solids will be disposed of at an offsite hazardous waste disposal facility (Class I landfill) as listed in Table 5.13-1. – If nonhazardous, the solids will be disposed of at an offsite nonhazardous waste disposal facility (Class III landfill) as listed in Table 5.13-1. • Plant wastewater ZLD solids – Will be nonhazardous – Will be disposed of at an offsite non–hazardous-waste disposal facility (Class III landfill) as listed in Table 5.13-1. **Offsite Emissions** With respect to potential impacts to estimated offsite vehicle emissions, the refined destination information in this response will be evaluated to determine if revisions to the air pollutant emissions inventory in the Revised AFC already including these vehicles are necessary (URS, 2009).	**~~Molten~~ Degassed Liquid Sulfur** Information regarding the composition and quantity of degassed liquid sulfur can be found in Section 2.1.12.3 of the 2012 Amended AFC. This by-product can be sold to chemical manufacturers in Southern California as a raw material for sulfuric acid manufacturing; processed into plant nutrient mix; or converted into soil fertilizer. Potential customers for the material were listed in 2009 Data Request Table 28-1, which was submitted under separate confidential cover. **Zero Liquid Discharge (ZLD) Solids Disposal** Information regarding composition and quantity of ZLD solids can be found in Sections 2.1.11.7 and 2.1.12.6, and Tables 2-17 and 5.13-3, of the 2012 Amended AFC. The likely destinations for ZLD solids include Class I and Class III landfills (depending on the characterization of the material) near the site, as listed in Table 5.13-3 of the 2012 Amended AFC. Disposal methods and corresponding destinations are described below. • ~~Process wastewater~~ ZLD solids – Will be tested to characterize as hazardous or nonhazardous. – If hazardous, solids will be disposed of at an offsite hazardous waste disposal facility (Class I landfill) as listed in Table 5.13-1. – If nonhazardous, the solids will be disposed of at an offsite nonhazardous waste disposal facility (Class III landfill) as listed in Table 5.13-1. ~~• Plant wastewater ZLD solids~~ ~~– Will be nonhazardous~~ ~~– Will be disposed of at an offsite non–hazardous-waste disposal facility (Class III landfill) as listed in Table 5.13-1.~~ **Offsite Emissions** Offsite vehicular emissions and destination information were evaluated in the 2012 Amended AFC.

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2009 Data Request No. 29. Please indicate if the gasification solids may be used, in a manner like fly ash, for concrete production; or be used for some other beneficial purpose.	In terms of chemical properties, both fly-ash and gasification solids are similar and can be used interchangeably for cement/concrete mixing and other uses. In the State of California, fly-ash is used extensively in many different applications. This fly-ash demand is met by importing it from other states such as Arizona, Colorado, and Utah. There are some differences that might require minor alterations in how gasification solids are used as compared with fly-ash. Physically, the gasification solids are granular, vitreous, and glassy, with a dark color, while fly-ash is much finer, and light in color. However, gasification solids produced by the HECA Project will potentially provide a substitute for fly-ash in these various applications and also reduce the need for importing fly-ash from out of state. The bulleted list below presents potential beneficial uses for the HECA Project gasification solids. These uses are also supported by the research conducted by National Energy Technology Laboratory (IEP – Coal Utilization By-Products – Utilization Projects). • Ready – Mixed Concrete. Ready-Mixed Concrete is generally manufactured using Portland cement, sand, gravel, and water. Like fly-ash, gasification solids may be used for cement replacement. The Applicant expects that gasification solids may be used as concrete replacement for up to 15 percent to 20 percent of the Ready-Mixed Concrete (with fly-ash, the replacement is up to 50 percent). The use of gasification solids in concrete can improve workability, lower water requirements, lessen heat hydration, and improve resistance to alkali aggregates and sulfur attack, and reduce permeability. • Cement Manufacture. Gasification solids may be used in the manufacture of cement clinker, which is ground to produce Portland cement. The chemistry of the gasification solids has important elements, such as aluminum, that are needed for cement manufacture and can substitute for raw materials routinely used by cement plants. The specific quantity of gasification solids that can be used in cement manufacture is kiln-specific, but can be up to 3 to 5 percent of the raw feed materials. • Aggregate Applications. Gasification solids can also be used, in a similar manner to crushed stone and gravel, in aggregate and concrete mixing. There are two types of aggregate: fine and coarse. Fine aggregate consists of natural sand or crushed stone with	Updated portion of this response is as follows. • Closed-Loop Recycling in Place. As discussed in Section 2.2.3.2 of the 2012 Amended AFC, the high-carbon fine particles will be recycled internally by a closed-loop recycling process to minimize the generation of material. Gasification products generated from the gasification process will be segregated into a fraction containing mostly high-carbon fine particles, and another fraction containing mostly low-carbon and high-ash coarse particles. High-carbon fine particles after segregation will be recovered and recycled back through the gasification process, while low-carbon high-ash coarse particles will ~~be dried out and~~ exit the gasifier process. It is estimated that ~~a significant fraction~~ virtually all of the gasification products with fuel value can be segregated in the recycling process and returned for reuse in the gasification process, and the remaining high-ash coarse particles without fuel value will become gasification solids as a final product. This reuse process results in significant recycling, and limits the amount of solids produced for offsite use or disposal.

Data Request from Hydrogen Energy California Project (08-AFC-8) Data Request Set 1 (Nos. 1-132) October 12, 2009	Hydrogen Energy California Project (08-AFC-8) Response to Data Request November 11, 2009 and January 8, 2010	Hydrogen Energy California Project (08-AFC-8a) Revisions or Updates to Response
	a particles size less than 3/8 inch; coarse aggregate particles range between 3/8 inch and 1 1/2 inch and are made up by gravels and crushed stone. The gasification solids can be used in the fine aggregate mix. • Portland Cement Concrete (PCC)/road base/flowable fill. In highway engineering, gasification solids can be mixed with other materials to produce PCC, road base, flowable fills, grouts, and asphalt filler. Gasification solids are mostly used as a pozzolan in PCC applications and as mineral filler in hot-mix asphalt application to improve the fluidity of flowable fill and grout. • Sandblasting. Gasification solids can be processed to manufacture a sandblasting grit that is used for metals sandblasting. The coarse fraction of the solids is hard, and offers good properties as a sandblasting material. • Closed-Loop Recycling in Place. As discussed in Section 2.2.3 of the 2009 Revised AFC, the high-carbon fine particles will be recycled internally by a closed-loop recycling process to minimize the generation of material. Gasification products generated from the gasification process will be segregated into a fraction containing mostly high-carbon fine particles, and another fraction containing mostly low-carbon and high-ash coarse particles. High-carbon fine particles after segregation will be recovered and recycled back through the gasification process, while low-carbon high-ash coarse particles will be dried out and exit the gasifier process. It is estimated that a significant fraction of the gasification products with fuel value can be segregated in the recycling process and returned for reuse in the gasification process, and the remaining high-ash coarse particles without fuel value will become gasification solids as a final product. This reuse process results in significant recycling, and limits the amount of solids produced for offsite use or disposal (URS, 2009).	

Data Request from Hydrogen Energy California Project (08-AFC-8) Data Request Set 1 (Nos. 1-132) October 12, 2009	Hydrogen Energy California Project (08-AFC-8) Response to Data Request November 11, 2009 and January 8, 2010	Hydrogen Energy California Project (08-AFC-8a) Revisions or Updates to Response
2009 Data Request No. 37. Please identify all of the residential properties near/adjacent to the site that the applicant has or is trying to acquire, provide the current status of that acquisition, and provide staff with additional acquisition information as that process moves forward.	As indicated on pages 2-4 and 2-5 of the Revised AFC, the Project Site and Controlled Area are comprised of what are currently six separate parcels. In addition, the Applicant has entered into an option to acquire another parcel, which is referred to as the "Ackerman Property." Attachment 37-1 contains a map depicting the location of the Ackerman Property and the Memorandum of Option Agreement entered into by the Applicant and the owners of the Ackerman Property, which was recorded with Kern County on May 29, 2009. At this time, the Applicant has not acquired, and is not trying to acquire, any additional parcels near or adjacent to the Project Site (URS, 2009).	Updated response is as follows: The only residential property that is near/adjacent to the Project Site is in the northwestern portion of the Controlled Area. In 2011, Hydrogen Energy International, LLC (HEI) acquired this property. The Applicant has the option to acquire this property from HEI. At this time, the Applicant has not acquired, and is not trying to acquire, any additional residential parcels near or adjacent to the Project Site.
2009 Data Request No. 55. Please provide, when available, the Federal Lands Manager's (FLM) official acceptance of the PSD Class 1 modeling analysis.	The Federal Lands Manager's acceptance of the Class I modeling will be forwarded to the CEC when it is received (URS, 2009).	Updated response is as follows: As noted in the response to 2012 Data Request No. A24, on April 18, 2012, the U.S. Forest Service confirmed that a revised Air-Quality–Related Values (AQRV) analysis would not be required for the HECA Project; therefore, no Class I Area AQRV analysis was conducted.
2009 Data Request No. 56. Please identify the appropriate DOE air quality contact for this project, and provide their e-mail and phone number.	The appropriate contact at the DOE for air quality is: Mr. R. Paul Detwiler Email: Ralph.detwiler@netl.doe.gov (412) 386-4839 Office (412) 651-2201 Mobile (URS, 2009)	No change to previous response.

References

URS 2009. URS/D. Shileikis (tn 54064). Applicant's Responses to CEC Data Requests Set 1, dated 11/11/09. Submitted to CEC/Docket Unit on 11/12/09.

URS, 2010. URS/D. Shileikis (tn 54762). Applicant's Response to Energy Commission Data Requests Set One (#1, 2, 11, 17, 31b, 32, 33, 36, 64f, 85 through 90, and 125 through 132), dated 1/8/10. Submitted to CEC/Docket Unit on 1/8/10.

BACKGROUND: CONSTRUCTION EMISSIONS ESTIMATE

The Amended Application for Certification (AFC) does not provide a clear explanation of all of the assumptions used to derive the equipment emission factors used for the construction on-road and off-road equipment emissions calculations, such as an explanation of whether any mitigation was included in the derivation of those emissions factors. Additionally, the fugitive dust emissions estimate for scrapers appears to use a questionable emission factor basis; the miles per day basis used in the motor graders fugitive dust emissions calculation is not reasonable; and the bulldozer fugitive dust emissions calculation uses an improper adjustment factor. Staff needs to understand the mitigation assumptions used to create the construction emissions estimate and needs the applicant to provide reasonable estimates for the fugitive dust emissions.

DATA REQUEST

A2. Please describe whether the on-road equipment EMission FACtors 2007 (EMFAC2007) model emissions factors assume the application of any emission control measures such as the use of recent model year vehicles.

RESPONSE

No emission control measures were assumed when running EMFAC2007. The emission factors represent a fleet mix of model years from 1966-2010.

DATA REQUEST

A3. Please describe whether the off-road equipment OFFROAD2007 model emissions factors assume the application of any emission control measures, such as the use of Tier 3 or higher equipment.

RESPONSE

No emission control measures were assumed in the OFFROAD2007 model. Emission factors are based on the expected fleet mix for Kern County in 2013.

DATA REQUEST

A4. Please revise the scraper fugitive dust emissions factors to use the AP-42 Section 11.9, Table 11.9-4; and Section 13.2.2 calculations/factors that are properly related to scraper loading/unloading and travel, versus the use of grading factors from that section, which are appropriate for motor graders operating at low speeds but not appropriate for scrapers.

RESPONSE

The Applicant believes the grading emission factor in Table 11.9-1 of U.S. Environmental Protection Agency's (USEPA) AP-42 guidance is appropriate for both the scraping and grading activities being performed at the site. The scraper will have a limited maximum speed of 10 miles per hour on unpaved areas of the construction site, as Staff's proposed Condition of Certification AQ-SC3c from the CEC's Hydrogen Energy California Project Preliminary Staff Assessment, Part I (August 2010) will ensure. When topsoil is removed, graders and scrapers are very similar equipment. The scrapers are expected to have very limited travel while not actively scraping; therefore, fugitive dust from unpaved road emission activity would be negligible per AP-42 Section 13.2.2. The fugitive dust from the travel during scraping activity is incorporated into the scrapping emission factor in AP-42 Table 11.9-1.

DATA REQUEST

A5. Please revise the daily vehicle miles traveled (VMT) numbers for the scrapers and motor graders to levels that are reasonable given their relative daily hours of use and speed while in use (motor graders at 3-5 mph, scrapers 5-30 at mph depending on operating function).

RESPONSE

Daily vehicle miles traveled (VMT) estimates for scrapers and motor graders have been adjusted to 0.91 mile per day for scrapers, and 1.44 miles per day for graders. The methodology used to arrive at this revision is in line with that used to develop emission factors in the California Emissions Estimator Model (CalEEMod) (ENVIRON, 2011). The total area of the site (453 acres converted to square meters) was divided by an assumed equipment width of 3 meters to calculate a total distance the scrapers and graders will have to cover. This assumed equipment width is more conservative than the CalEEMod default of 12 feet (3.7 m). It was assumed that the equipment would be required to make two passes over the extent of the site during the course of site preparation. Based on equipment inventory estimates, mileage per unit per day was calculated.

The Applicant believes that determining VMT based on the available equipment and the area required to be covered is more pertinent than mileage estimates based on hours of use and variable speeds of travel.

Updated emissions estimates are presented in Attachment A5-1, Revised Appendix E-2, Construction Criteria Pollutant and Greenhouse Gas Emissions.

References

ENVIRON, 2011. *Appendix A, Calculation Details for CalEEMod*. Available at http://www.aqmd.gov/caleemod/doc/AppendixA.pdf.

ATTACHMENT A5-1
REVISED APPENDIX E-2, CONSTRUCTION CRITERIA POLLUTANT AND GREENHOUSE GAS EMISSIONS

Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)						
Activity	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROG**	**NO_x**	**SO_2**
Project Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment - On-road	7.84	7.06	61.80	22.69	127.81	0.13
Construction Equipment - Off-road	13.28	12.22	126.21	38.72	181.10	0.32
Worker Vehicles	0.01	0.00	3.00	0.23	0.24	0.008
Delivery Trucks	1.824	1.654	2.205	1.359	5.138	0.004
Linear Combustion Emissions	0.00	0.00	155.42	44.31	258.98	0.00
On-Site Fugitive Emissions						
Construction Equipment - On-road	51.02	5.10				
Construction Equipment - Off-road	6.05	0.61				
Worker Vehicles	11.31	1.13				
Delivery Trucks	109.81	10.98				
Construction Activity	39.87	12.08				
Linear Fugitive Emissions	0.00	0.00				
Subtotal of Project Emissions	**241.02**	**50.83**	**348.63**	**107.31**	**573.26**	**0.46**
Off-Site Construction Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.39	0.20	230.14	7.08	27.55	0.272
Delivery Trucks	11.02	9.45	15.40	3.40	78.16	0.07
Off-Site Paved Road Fugitive Dust Emissions						
Worker Vehicles	0.85	0.21				
Delivery Trucks	13.87	3.40				
Subtotal of Off-Site Emissions	**26.13**	**13.26**	**245.54**	**10.48**	**105.71**	**0.35**
Total Maximum Daily Emissions (lbs/day)	**267**	**64**	**594**	**118**	**679**	**1**

Estimated Annual Maximum Construction Emissions of Criteria Pollutants (tons/yr)						
Activity	**PM_{10}**	**$PM_{2.5}$**	**CO**	**ROG**	**NO_x**	**SO_2**
Project Construction Emissions						
On-Site Combustion Emissions						
Construction Equipment - On-road	0.78	0.70	7.68	2.77	15.84	0.02
Construction Equipment - Off-road	1.48	1.37	17.68	5.41	26.24	0.03
Worker Vehicles	0.00	0.00	0.43	0.03	0.03	0.001
Delivery Trucks	0.158	0.143	0.291	0.179	0.678	0.001
Linear Combustion Emissions	0.14	0.13	12.89	3.86	21.52	0.03
On-Site Fugitive Emissions						
Construction Equipment - On-road	5.29	0.53				
Construction Equipment - Off-road	0.72	0.07				
Worker Vehicles	1.46	0.15				
Delivery Trucks	9.69	0.97				
Construction Activity	5.02	1.58				
Linear Fugitive Emissions	0.11	0.01				
Subtotal of Project Emissions	**27.42**	**5.64**	**38.98**	**12.25**	**64.31**	**0.08**
Off-Site Construction Emissions						
Off-Site Combustion Emissions						
Worker Vehicles	0.07	0.03	33.08	1.02	3.96	0.039
Delivery Trucks	1.00	0.86	2.03	0.45	10.32	0.01
Off-Site Paved Road Fugitive Dust Emissions						
Worker Vehicles	0.14	0.04				
Delivery Trucks	1.27	0.31				
Subtotal of Off-Site Emissions	**2.48**	**1.24**	**35.11**	**1.47**	**14.28**	**0.05**
Total Maximum Annual Emissions (tons/year)	**30**	**6.9**	**74**	**14**	**79**	**0**

Estimated Emissions of GHG Pollutants, Entire Construction Period (tons)				
Activity	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Project Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment - On-road	5,749.3	0.1	0.1	5,781.3
Construction Equipment - Off-road	9,143.5	1.6	0.2	9,243.2
Worker Vehicles	271.9	0.0	0.0	275.4
Delivery Trucks	388.2	0.0	0.0	390.0
Linear Combustion Emissions	2,682.5	0.3	0.0	2,701.6
Subtotal of Project Emissions	**18,235.3**	**2.0**	**0.4**	**18,391.6**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Worker Vehicles	15,381.0	3.6	1.8	16,023.5
Delivery Trucks	5,841.8	0.3	0.2	5,903.8
Subtotal of Off-Site Emissions	**21,222.8**	**3.9**	**2.0**	**21,927.3**
Total Maximum Daily Emissions (tons)	**39,458.2**	**5.9**	**2.4**	**40,318.8**

Estimated Emissions of GHG Pollutants, Entire Construction Period (metric tonnes)				
Activity	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Project Construction Emissions				
On-Site Combustion Emissions				
Construction Equipment - On-road	5,215.7	0.1	0.1	5,244.7
Construction Equipment - Off-road	8,294.8	1.4	0.2	8,385.2
Worker Vehicles	246.6	0.0	0.0	249.9
Delivery Trucks	352.2	0.0	0.0	353.8
Linear Combustion Emissions	2,433.5	0.3	0.0	2,450.9
Subtotal of Project Emissions	**16,542.8**	**1.8**	**0.3**	**16,684.5**
Off-Site On-Road Emissions				
Off-Site Combustion Emissions				
Worker Vehicles	13,953.4	3.3	1.7	14,536.2
Delivery Trucks	5,299.6	0.2	0.2	5,355.8
Subtotal of Off-Site Emissions	**19,253.0**	**3.5**	**1.8**	**19,892.1**
Total Maximum Daily Emissions (tonnes)	**35,795.8**	**5.3**	**2.2**	**36,576.6**

Hydrogen Energy California, Kern County Power Project
Carbon Monoxide (CO) Emissions by Month
8/14/2012

MONTHLY EMISSIONS (lbs/day)

CO	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	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	7	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	1	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	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	8	5	4	4	4	4	3	3	3	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	3	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	0	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	3	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	0	1	1	3	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	1	1	1	1	1	1	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	4	4	4	5	5	5	5	5	7	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	2	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	2	2	2	2	0	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	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
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	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	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	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	1	1	1	1
Man lifts - telescoping	0	0	0	0	0	0	0	0	0	5	5	9	9	9	9	9	9	9	9	14	14	14	14	19	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	5	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	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
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	1	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	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	0	0	0	0	0
BOOM TRUCK 12 TON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
CAT 325 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0
CAT 330 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	0	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
CAT DOZER D-6	0	0	0	0	0	0	0	0	0	0	0	0	9	9	0	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
CAT MODEL 12 MOTOR GRADER	0	0	0	0	0	0	0	0	0	0	0	0	6	6	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	0	0	0	0	0
CAT ROLLER-COMPACTOR 563	0	0	0	0	0	0	0	0	0	0	0	0	5	5	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
CAT RUBBER TIRE LOADER 966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
CAT SCRAPER 615	0	0	0	0	0	0	0	0	0	0	0	0	8	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
CRANE-ROUGH TERRAIN 45T	0	0	0	0	0	0	0	0	0	0	0	0	0	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
GENSET 5KW	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0
JOHN DEERE TRACTOR 9400	0	0	0	0	0	0	0	0	0	0	0	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
PICK-UP CRAFT	0	0	0	0	0	0	0	0	0	0	0	0	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
PICK-UP OVERHEAD	0	0	0	0	0	0	0	0	0	0	0	0	7	22	22	18	18	0	0	0	0	0	0	0	0	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 BALLAST REGULATOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
RAIL CLIP MACHINE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
RAIL MOVER-SHUTTLE WAGON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
RAIL TAMPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
RAIL WELDER	0	0	0	0	0	0	0	0	0	0	0	0	0	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
RAMEX WALK BEHIND COMPACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRI-AXLE DUMP TRUCK	0	0	0	0	0	0	0	0	0	0	0	0	5	8	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
TRUCK FLATBED 14 FOOT	0	0	0	0	0	0	0	0	0	0	0	0	1	1	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	0	0	0	0	0
TRUCK TRACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
WATER TRUCK, 4M ON-ROAD	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WELDING MACHINE 350 AMP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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 TOTAL (lbs/day)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**56**	**65**	**143**	**162**	**155**	**151**	**155**	**94**	**91**	**86**	**69**	**65**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
OFFSITE VEHICLES TOTAL (lbs/day)	**69**	**73**	**77**	**82**	**91**	**99**	**107**	**75**	**82**	**96**	**115**	**127**	**148**	**170**	**202**	**226**	**246**	**260**	**273**	**288**	**301**	**335**	**359**	**385**	**408**	**413**	**453**	**484**	**499**	**501**	**506**	**499**	**495**	**473**	**449**	**435**	**397**	**384**	**329**	**270**	**217**	**153**	**125**	**125**	**125**	**117**	**101**	**94**	**75**
TOTAL PROJECT (lbs/day)	215	224	257	263	276	300	281	229	227	245	327	350	449	503	530	562	594	550	559	586	584	612	582	624	638	638	671	719	735	727	726	700	690	663	624	593	555	551	482	400	330	262	190	190	186	159	138	127	98

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

Hydrogen Energy California, Kern County Power Project
Carbon Dioxide (CO2) Emissions by Month
8/14/2012

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
ON-SITE																								
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
Excavator - Earth Scraper 637	14,837	14,837	14,837	14,837	8,478	8,478	4,239	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
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
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
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
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
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
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
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
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
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
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
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
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	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
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
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
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
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
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
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
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
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
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
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**
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
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
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
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
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
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
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
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
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	572	572	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
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
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
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
Excavator - Trencher	0	0	0	0	0	0	0	0	0	0	0	427	427	427	427	427	427	427	427	427	427	427	0	0
Forklift	0	0	0	0	0	0	0	0	0	0	88	88	176	176	176	176	176	176	176	176	176	88	0	0
Welding Generator	0	0	0	0	0	0	0	0	0	0	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	0	0
3 to 5 Ton AC Roller	0	0	0	0	0	0	0	0	0	0	0	299	299	299	299	299	299	299	299	299	299	299	0	0
Pipe Bending Machine	0	0	0	0	0	0	0	0	0	0	347	347	694	694	694	694	694	694	694	347	347	0	0	0
RAIL																								
AIR COMPRESSOR 185	0	0	0	0	0	0	0	0	0	0	0	0	0	214	214	214	214	0	0	0	0	0	0	0
BOOM TRUCK 12 TON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	286	286	286	0	0	0	0	0	0	0
CAT 325 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	471	471	0	0	0	0	0	0	0	0	0	0
CAT 330 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	798	0	0	0	0	0	0	0	0	0
CAT DOZER D-6	0	0	0	0	0	0	0	0	0	0	0	0	1,429	1,429	0	0	714	0	0	0	0	0	0	0
CAT MODEL 12 MOTOR GRADER	0	0	0	0	0	0	0	0	0	0	0	0	861	861	431	431	431	0	0	0	0	0	0	0
CAT ROLLER-COMPACTOR 563	0	0	0	0	0	0	0	0	0	0	0	0	678	678	339	0	0	0	0	0	0	0	0	0
CAT RUBBER TIRE LOADER 966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,608	1,608	1,608	0	0	0	0	0	0	0
CAT SCRAPER 615	0	0	0	0	0	0	0	0	0	0	0	0	2,763	1,381	0	0	0	0	0	0	0	0	0	0
CRANE-ROUGH TERRAIN 45T	0	0	0	0	0	0	0	0	0	0	0	0	0	345	345	0	0	0	0	0	0	0	0	0
GENSET 5KW	0	0	0	0	0	0	0	0	0	0	0	0	0	302	151	0	0	0	0	0	0	0	0	0
JOHN DEERE TRACTOR 9400	0	0	0	0	0	0	0	0	0	0	0	0	1,602	0	0	0	0	0	0	0	0	0	0	0
PICK-UP CRAFT	0	0	0	0	0	0	0	0	0	0	0	0	4,725	4,725	4,725	4,725	4,725	0	0	0	0	0	0	0
PICK-UP OVERHEAD	0	0	0	0	0	0	0	0	0	0	0	0	1,320	3,959	3,959	3,299	3,299	0	0	0	0	0	0	0
RAIL BALLAST REGULATOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	660	660	0	0	0	0	0	0	0
RAIL CLIP MACHINE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	173	173	0	0	0	0	0	0	0
RAIL MOVER-SHUTTLE WAGON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	660	660	660	0	0	0	0	0	0	0
RAIL TAMPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	660	660	0	0	0	0	0	0	0
RAIL WELDER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101	51	0	0	0	0	0	0	0
RAMEX WALK BEHIND COMPACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0
TRI-AXLE DUMP TRUCK	0	0	0	0	0	0	0	0	0	0	0	0	1,144	1,717	572	0	0	0	0	0	0	0	0	0
TRUCK FLATBED 14 FOOT	0	0	0	0	0	0	0	0	0	0	0	0	286	286	858	858	858	0	0	0	0	0	0	0
TRUCK TRACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,116	1,116	0	0	0	0	0	0	0	0
WATER TRUCK, 4M ON-ROAD	0	0	0	0	0	0	0	0	0	0	0	0	286	286	286	286	286	0	0	0	0	0	0	0
WELDING MACHINE 350 AMP	0	0	0	0	0	0	0	0	0	0	0	0	51	51	51	51	51	0	0	0	0	0	0	0
LINEARS TOTAL (lbs/day)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9,373**	**11,062**	**29,431**	**31,502**	**31,623**	**30,352**	**30,581**	**15,906**	**15,692**	**15,113**	**11,830**	**11,395**	**0**	**0**
OFFSITE VEHICLES TOTAL (lbs/day)	**30,870**	**31,474**	**31,966**	**32,529**	**33,696**	**34,662**	**35,553**	**15,054**	**15,884**	**17,567**	**19,949**	**21,401**	**23,947**	**26,766**	**30,665**	**33,658**	**36,036**	**37,776**	**39,368**	**41,255**	**42,889**	**47,086**	**50,040**	**53,240**
TOTAL PROJECT (lbs/day)	62,826	64,158	69,705	70,193	70,082	73,748	68,903	42,343	41,144	42,416	55,611	59,032	80,654	87,192	92,316	95,312	100,288	88,441	89,847	94,538	93,692	96,956	90,069	95,795

CONSTRUCTION VEHICLES	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	0	0	858	858	858	858	286	286	286	0	0	0	0	0	0	0
Bus	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	286	286	286	286	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dump Truck	0	0	0	572	572	572	572	572	572	572	572	572	858	858	858	572	286	286	286	286	286	0	0	0	0
Diesel Tractor (Yard Dog)	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
Service Truck - 1 ton	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
Truck - Fuel/Lube	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
Trucks - Pickup 3/4 ton	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	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,144	858	858	858	858	572	572	572	286	286	286	286	0	0	0
Truck - Water	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	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	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
Bob cat loader	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	0	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	388	388	388	388	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concrete Trowel Machine	138	138	138	138	0	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
Cranes - Mobile 35 ton	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	1,381	1,381	1,381	1,381	1,381	690	690	690	690	690	690	690	690	690	690	690	345	345	0	0	0	0	0	0	0
Crane - Mobile 65 ton	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	345	0	0	0	0
Cranes 100 / 150 ton cap	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	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	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	0	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	318	318	318	318	0	0	0	0	0	0	318	318	318	0	0	0	0	0	0	0	0	0
Excavator - Motor Grader (CAT140H)	0	0	0	431	431	431	431	0	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	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)	409	409	409	409	409	409	409	409	246	246	246	164	164	164	164	164	164	164	164	164	164	164	82	82	82
Forklift	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
Heavy Haul / 600 tn Crane	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	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	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	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
Portable Compaction Roller	0	0	0	0	678	678	678	678	678	678	0	0	0	678	678	678	339	339	0	0	0	0	0	0	0
Portable Compaction - Vibratory Plate	0	0	0	56	56	56	56	0	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
Pumps	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	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	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	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	0	0	0	929	929	929	929	0	0	0	0	0	0	465	465	465	465	0	0	0	0	0	0	0	0
WORKER VEHICLES																									
Personal commuting vehicles	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
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
Import fill trucks	0	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)	**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	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
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
Import fill trucks	0	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	0	0	0	0	0	0	0	0	0	0	0	0
BOOM TRUCK 12 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
CAT 325 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 330 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT DOZER D-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
CAT MODEL 12 MOTOR GRADER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT ROLLER-COMPACTOR 563	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT RUBBER TIRE LOADER 966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT SCRAPER 615	0	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-ROUGH TERRAIN 45T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENSET 5KW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JOHN DEERE TRACTOR 9400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PICK-UP CRAFT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PICK-UP OVERHEAD	0	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 BALLAST REGULATOR	0	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 CLIP MACHINE	0	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 MOVER-SHUTTLE WAGON	0	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 TAMPER	0	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 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
RAMEX WALK BEHIND COMPACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRI-AXLE DUMP 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
TRUCK FLATBED 14 FOOT	0	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 TRACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WATER TRUCK, 4M ON-ROAD	0	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 MACHINE 350 AMP	0	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 TOTAL (lbs/day)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
OFFSITE VEHICLES TOTAL (lbs/day)	**56,134**	**56,706**	**61,586**	**65,403**	**67,281**	**67,614**	**68,204**	**67,327**	**66,781**	**64,123**	**61,105**	**59,424**	**54,701**	**53,174**	**46,283**	**39,046**	**32,524**	**24,568**	**21,152**	**21,127**	**21,127**	**20,118**	**18,223**	**17,337**	**14,949**
TOTAL PROJECT (lbs/day)	97,773	96,767	100,000	106,777	108,263	106,206	105,016	100,615	99,043	95,422	89,681	85,471	80,607	80,260	71,621	60,399	50,596	42,036	31,266	31,241	30,274	26,973	24,098	22,640	18,800

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

Hydrogen Energy California, Kern County Power Project
Methane (CH4) Emissions by Month
8/14/2012

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
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	0.1	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 Tractor (Yard Dog)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	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 - 1 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Trucks - Pickup 3/4 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - 3 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 Vehicles																																																	
Air Compressor 185 CFM	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	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.0	0.0
Air Compressor 750 CFM	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	0.2	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	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
Bob cat loader	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	0.2	0.2	0.2	0.2	0.2	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	0.1	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	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	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
Bulldozer D6C	0.2	0.2	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	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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	0.0	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	0.2	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Cranes - Mobile 45 ton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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	0.1	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
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	0.0	0.0	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	0.2	0.2	0.2	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
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	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	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
Diesel Powered Welder	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	0.2	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	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator - Backhoe/loader	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	0.1	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
Excavator - Earth Scraper 637	1.3	1.3	1.3	1.3	0.8	0.8	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavator - Motor Grader (CAT140H)	0.0	0.1	0.1	0.1	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	0.0	0.0	0.0	0.1	0.1	0.1	0.1	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
Excavator - Trencher (CAT320)	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	0.2	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
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
Forklift	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
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	0.1	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
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	0.1	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
Light Plants	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	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	0.0	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	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	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	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
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	0.3	0.3	0.3	0.3	0.3	0.3	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	0.1	0.1	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
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	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.0	1.0	1.0	1.0	0.6	0.6	0.6	0.6	0.6	0.6	0.3	0.3	0.3	0.1
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	0.1	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	0.1	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
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	0.0	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
Vibratory Roller Ingersol-Rand 20 ton	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	0.1	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
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	0.1	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
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)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Import fill trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	**2.8**	**2.9**	**3.3**	**3.3**	**3.2**	**3.4**	**2.9**	**2.6**	**2.6**	**2.8**	**2.9**	**2.9**	**2.9**	**3.2**	**3.2**	**3.7**	**3.7**	**3.8**	**3.9**	**4.3**	**4.4**	**4.4**	**4.7**	**5.0**	**4.8**	**4.7**	**4.5**	**4.8**	**4.8**	**4.5**	**4.4**	**4.0**	**3.8**	**3.7**	**3.4**	**3.0**	**3.0**	**3.1**	**2.8**	**2.3**	**2.1**	**2.1**	**1.4**	**1.4**	**1.3**	**0.8**	**0.7**	**0.6**	**0.4**
OFF-SITE																																																	
WORKER VEHICLES																																																	
Personal commuting vehicles	0.2	0.3	0.5	0.6	0.9	1.1	1.3	1.7	1.9	2.3	2.9	3.2	3.8	4.5	5.4	6.1	6.7	7.1	7.5	7.9	8.3	9.3	10.0	10.7	11.4	11.6	12.7	13.6	14.1	14.1	14.3	14.1	13.9	13.3	12.6	12.2	11.1	10.7	9.1	7.4	5.9	4.0	3.2	3.2	3.2	2.9	2.5	2.3	1.7
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	1.1	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	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
Bore Machine (Hydraulic)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	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	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	0.0	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	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
RAIL																																																	
AIR COMPRESSOR 185	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRUCK 12 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 325 BACKHOE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 330 BACKHOE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT DOZER D-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	0.2	0.2	0.0	0.0	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
CAT MODEL 12 MOTOR GRADER	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT ROLLER-COMPACTOR 563	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT RUBBER TIRE LOADER 966	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT SCRAPER 615	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	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
CRANE-ROUGH TERRAIN 45T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GENSET 5KW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JOHN DEERE TRACTOR 9400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP CRAFT	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP OVERHEAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RAIL BALLAST REGULATOR	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 CLIP MACHINE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MOVER-SHUTTLE WAGON	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TAMPER	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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
RAMEX WALK BEHIND COMPACTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRI-AXLE DUMP 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 FLATBED 14 FOOT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRACTOR	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER TRUCK, 4M ON-ROAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MACHINE 350 AMP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TOTAL (lbs/day)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.1**	**1.4**	**2.9**	**3.2**	**3.1**	**3.0**	**3.1**	**1.9**	**1.8**	**1.7**	**1.4**	**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**
OFFSITE VEHICLES TOTAL (lbs/day)	**1.6**	**1.8**	**1.9**	**2.0**	**2.3**	**2.5**	**2.7**	**2.1**	**2.3**	**2.7**	**3.3**	**3.6**	**4.2**	**4.9**	**5.8**	**6.5**	**7.0**	**7.5**	**7.8**	**8.3**	**8.7**	**9.7**	**10.3**	**11.1**	**11.8**	**11.9**	**13.1**	**14.0**	**14.4**	**14.5**	**14.6**	**14.4**	**14.3**	**13.7**	**13.0**	**12.6**	**11.4**	**11.1**	**9.5**	**7.8**	**6.2**	**4.3**	**3.5**	**3.5**	**3.5**	**3.3**	**2.8**	**2.6**	**2.1**
TOTAL PROJECT (lbs/day)	4.4	4.7	5.2	5.3	5.5	5.9	5.6	4.7	4.9	5.4	7.2	7.9	10.0	11.2	12.1	13.2	13.8	13.2	13.6	14.3	14.5	15.3	15.1	16.1	16.6	16.6	17.6	18.8	19.2	19.0	19.0	18.4	18.1	17.4	16.4	15.6	14.4	14.2	12.3	10.1	8.3	6.4	4.9	4.9	4.9	4.1	3.5	3.3	2.5

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

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
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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 Tractor (Yard Dog)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	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 - 1 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Trucks - Pickup 3/4 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	0.1	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
Trucks - 3 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 Vehicles																																																	
Air Compressor 185 CFM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	0.3	0.3	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Forklift	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Man lifts - telescoping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	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 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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
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	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Import fill trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	**0.6**	**0.6**	**0.7**	**0.7**	**0.7**	**0.7**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.6**	**0.6**	**0.6**	**0.7**	**0.7**	**0.8**	**0.8**	**0.9**	**0.9**	**0.9**	**0.9**	**1.0**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.8**	**0.8**	**0.7**	**0.7**	**0.7**	**0.6**	**0.5**	**0.5**	**0.6**	**0.5**	**0.4**	**0.4**	**0.4**	**0.2**	**0.2**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**
OFF-SITE																																																	
WORKER VEHICLES																																																	
Personal commuting vehicles	0.1	0.2	0.2	0.3	0.4	0.5	0.7	0.9	1.0	1.2	1.5	1.6	1.9	2.3	2.7	3.1	3.4	3.6	3.8	4.0	4.2	4.7	5.0	5.4	5.8	5.8	6.4	6.9	7.1	7.1	7.2	7.1	7.0	6.7	6.3	6.2	5.6	5.4	4.6	3.7	3.0	2.0	1.6	1.6	1.6	1.5	1.3	1.2	0.9
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)	0.2	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	0.2	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	0.2	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	0.2
Import fill trucks	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRUCK 12 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 325 BACKHOE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 330 BACKHOE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT DOZER D-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT MODEL 12 MOTOR GRADER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT ROLLER-COMPACTOR 563	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT RUBBER TIRE LOADER 966	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT SCRAPER 615	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-ROUGH TERRAIN 45T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GENSET 5KW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JOHN DEERE TRACTOR 9400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP CRAFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP OVERHEAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 BALLAST REGULATOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 CLIP MACHINE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MOVER-SHUTTLE WAGON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TAMPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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
RAMEX WALK BEHIND COMPACTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRI-AXLE DUMP 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 FLATBED 14 FOOT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRACTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER TRUCK, 4M ON-ROAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MACHINE 350 AMP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TOTAL (lbs/day)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.2**	**0.3**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**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**	**0.0**	**0.0**	**0.0**	**0.0**
OFFSITE VEHICLES TOTAL (lbs/day)	**1.0**	**1.1**	**1.1**	**1.2**	**1.3**	**1.5**	**1.6**	**1.1**	**1.2**	**1.4**	**1.7**	**1.9**	**2.2**	**2.5**	**3.0**	**3.3**	**3.6**	**3.8**	**4.0**	**4.2**	**4.4**	**4.9**	**5.3**	**5.7**	**6.0**	**6.1**	**6.6**	**7.1**	**7.3**	**7.4**	**7.4**	**7.3**	**7.3**	**6.9**	**6.6**	**6.4**	**5.8**	**5.6**	**4.8**	**4.0**	**3.2**	**2.3**	**1.8**	**1.8**	**1.8**	**1.7**	**1.5**	**1.4**	**1.1**
TOTAL PROJECT (lbs/day)	1.6	1.7	1.8	1.9	2.0	2.2	2.2	1.7	1.7	1.9	2.4	2.7	3.1	3.5	4.0	4.4	4.7	4.9	5.1	5.4	5.6	6.1	6.2	6.6	6.9	7.0	7.5	8.0	8.2	8.2	8.2	8.0	8.0	7.6	7.2	6.9	6.4	6.2	5.4	4.4	3.6	2.6	2.1	2.1	2.0	1.9	1.6	1.5	1.2

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

Hydrogen Energy California, Kern County Power Project
Nitrogen Oxides (NOx) Emissions by Month
8/14/2012

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	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	0	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	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	5	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	0	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	5	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	7	7	7	7	7	7	7	7	7	7	7	3	3	0	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	9	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	2	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	3	3	3	3	0	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	4	4	4	4	0	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	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	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	6	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	14	14	14	14	19	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	0	0	0	0	7	7	7	7	7	7	0	0	0	7	7	7	4	4	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	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
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	43	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	9	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 TRUCK 12 TON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
CAT 325 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0
CAT 330 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	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
CAT DOZER D-6	0	0	0	0	0	0	0	0	0	0	0	0	15	15	0	0	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
CAT MODEL 12 MOTOR GRADER	0	0	0	0	0	0	0	0	0	0	0	0	9	9	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	0	0	0	0	0
CAT ROLLER-COMPACTOR 563	0	0	0	0	0	0	0	0	0	0	0	0	7	7	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
CAT RUBBER TIRE LOADER 966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	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
CAT SCRAPER 615	0	0	0	0	0	0	0	0	0	0	0	0	27	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
CRANE-ROUGH TERRAIN 45T	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0
GENSET 5KW	0	0	0	0	0	0	0	0	0	0	0	0	0	3	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
JOHN DEERE TRACTOR 9400	0	0	0	0	0	0	0	0	0	0	0	0	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
PICK-UP CRAFT	0	0	0	0	0	0	0	0	0	0	0	0	28	28	28	28	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PICK-UP OVERHEAD	0	0	0	0	0	0	0	0	0	0	0	0	10	30	30	25	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
RAIL BALLAST REGULATOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
RAIL CLIP MACHINE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
RAIL MOVER-SHUTTLE WAGON	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RAIL TAMPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
RAIL WELDER	0	0	0	0	0	0	0	0	0	0	0	0	0	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
RAMEX WALK BEHIND COMPACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRI-AXLE DUMP TRUCK	0	0	0	0	0	0	0	0	0	0	0	0	11	17	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
TRUCK FLATBED 14 FOOT	0	0	0	0	0	0	0	0	0	0	0	0	3	3	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	0	0	0	0	0
TRUCK TRACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
WATER TRUCK, 4M ON-ROAD	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0
WELDING MACHINE 350 AMP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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 TOTAL (lbs/day)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**87**	**103**	**256**	**275**	**266**	**254**	**259**	**147**	**145**	**140**	**109**	**105**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
OFFSITE VEHICLES TOTAL (lbs/day)	**308**	**309**	**309**	**310**	**311**	**312**	**313**	**85**	**86**	**88**	**90**	**92**	**94**	**97**	**101**	**103**	**106**	**107**	**109**	**111**	**112**	**116**	**119**	**122**	**125**	**126**	**131**	**134**	**136**	**136**	**137**	**136**	**136**	**133**	**130**	**128**	**124**	**122**	**116**	**109**	**102**	**95**	**91**	**91**	**91**	**90**	**88**	**88**	**85**
TOTAL PROJECT (lbs/day)	606	614	665	665	659	688	637	349	328	328	430	450	608	647	651	653	679	578	575	602	579	574	485	513	506	493	483	515	514	493	477	443	434	422	393	367	362	373	350	307	270	258	185	185	176	153	142	136	121

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

Hydrogen Energy California, Kern County Power Project
PM10 Emissions by Month - from Combustion Sources
8/14/2012

PM10 - Combustion

MONTHLY EMISSIONS (lbs/day) — Months 1–25

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
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
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
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
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
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
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
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
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
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
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
Trucks - 3 ton	0.18	0.18	0.18	0.18	0.18	0.35	0.35	0.35	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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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	0.00
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
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	0.00	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
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	0.93	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
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
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
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
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
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
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
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
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
Portable Compaction - Vibratory Plate	0.00	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	0.00	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
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	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
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
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
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	0.30	0.30	0.30	0.45	0.45	0.45
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
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
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
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
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ONSITE TOTAL (lbs/day)	**15.35**	**15.91**	**19.57**	**19.83**	**20.91**	**22.95**	**20.26**	**17.53**	**16.22**	**16.85**	**17.27**	**17.64**	**17.56**	**18.91**	**19.13**	**20.13**	**20.79**	**21.10**	**20.77**	**22.48**	**22.71**	**22.36**	**23.42**	**25.15**	**24.23**
OFF-SITE																									
WORKER VEHICLES																									
Personal commuting vehicles	0.07	0.12	0.16	0.21	0.31	0.39	0.46	0.62	0.69	0.83	1.03	1.15	1.36	1.60	1.92	2.18	2.37	2.52	2.65	2.81	2.95	3.30	3.54	3.81	4.05
DELIVERY TRUCKS																									
Light delivery truck (e.g. Fed-Ex)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Heavy delivery truck (e.g. flat beds carrying construction eqp)	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
Import fill trucks	8.31	8.31	8.31	8.31	8.31	8.31	8.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINEARS																									
ON ROAD																									
Dump Truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.71	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	0.71	0.71	0.00	0.00	0.00
Service Truck (MHD-DSL)	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	0.53	0.53	0.53	0.53	0.53	0.53	0.00	0.00	0.00
Pipe Haul Truck and Trailer (HHDT-DSL)	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	0.53	0.53	0.35	0.35	0.35	0.35	0.35	0.35	0.00	0.00	0.00
3/4 Ton Pickup (MHD-DSL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.69	0.69	0.69	0.69	0.69	1.03	1.03	1.03	1.03	1.03	1.03	0.00	0.00	0.00
Truck - water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.35	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.35	0.35	0.00	0.00	0.00
OFF ROAD																									
Air Compressor (185 CFM)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.46	0.46	0.69	0.69	0.69	0.69	0.46	0.46	0.23	0.23	0.00	0.00	0.00
Bore Machine (Hydraulic)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00
12 Ton Hydra Crane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.60	0.60	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.60	0.60	0.00	0.00	0.00
Backhoe/loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06	1.06	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.06	1.06	0.00	0.00	0.00
Excavator - Trencher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.08	0.00	0.00	0.00
Welding Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	0.00	0.00	0.00
3 to 5 Ton AC Roller	0.00	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	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.00	0.00	0.00
Pipe Bending Machine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.25	0.25	0.00	0.00	0.00	0.00
RAIL																									
AIR COMPRESSOR 185	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.23	0.23	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BOOM TRUCK 12 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	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT 325 BACKHOE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT 330 BACKHOE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT DOZER D-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.84	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT MODEL 12 MOTOR GRADER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	0.77	0.39	0.39	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT ROLLER-COMPACTOR 563	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.61	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT RUBBER TIRE LOADER 966	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.45	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT SCRAPER 615	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRANE-ROUGH TERRAIN 45T	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GENSET 5KW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JOHN DEERE TRACTOR 9400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PICK-UP CRAFT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.91	0.91	0.91	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PICK-UP OVERHEAD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	1.56	1.56	1.30	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL BALLAST REGULATOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL CLIP MACHINE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL MOVER-SHUTTLE WAGON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL TAMPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL 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	0.06	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAMEX WALK BEHIND COMPACTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRI-AXLE DUMP 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	0.71	1.06	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCK FLATBED 14 FOOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.53	0.53	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCK TRACTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER TRUCK, 4M ON-ROAD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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
WELDING MACHINE 350 AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINEARS TOTAL (lbs/day)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**6.05**	**6.97**	**15.26**	**16.71**	**15.65**	**14.98**	**15.45**	**9.91**	**9.68**	**9.34**	**7.39**	**7.06**	**0.00**	**0.00**	**0.00**
OFFSITE VEHICLES TOTAL (lbs/day)	**11.09**	**11.14**	**11.19**	**11.23**	**11.33**	**11.41**	**11.49**	**3.33**	**3.40**	**3.54**	**3.74**	**3.86**	**4.08**	**4.31**	**4.64**	**4.89**	**5.09**	**5.23**	**5.37**	**5.52**	**5.66**	**6.01**	**6.26**	**6.53**	**6.77**
TOTAL PROJECT (lbs/day)	26.44	27.06	30.75	31.07	32.24	34.36	31.75	20.86	19.62	20.40	27.06	28.47	36.90	39.93	39.41	40.00	41.33	36.24	35.82	37.35	35.76	35.44	29.68	31.68	31.00

MONTHLY EMISSIONS (lbs/day) — Months 26–49

CONSTRUCTION VEHICLES	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	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	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	0.18	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dump Truck	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	0.00	0.00	0.00	0.00
Diesel Tractor (Yard Dog)	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	0.35	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
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	0.07	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
Trucks - Pickup 3/4 ton	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	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	0.71	0.53	0.53	0.53	0.53	0.35	0.35	0.35	0.18	0.18	0.18	0.18	0.00	0.00	0.00
Truck - Water	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	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	0.95	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
Bob cat loader	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00
Concrete Trowel Machine	0.12	0.12	0.12	0.00	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
Cranes - Mobile 35 ton	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	0.76	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane - Mobile 65 ton	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	0.60	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	0.75	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	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	0.00	0.28	0.28	0.28	0.28	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
Excavator - Motor Grader (CAT140H)	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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)	0.13	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	0.31	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
Heavy Haul / 600 tn Crane	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	0.00	0.00	0.00	0.00	0.00
Light Plants	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	0.13	0.13	0.13	0.13	0.13	0.10	0.10	0.05	0.05
Man lifts - telescoping	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
Portable Compaction Roller	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	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	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
Pumps	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
Portable Power Generators	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	0.93	0.93	0.93	0.37
Truck Crane - Greater than 300 ton	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	0.45	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	0.00	0.00	0.47	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
WORKER VEHICLES																								
Personal commuting vehicles	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
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
Import fill trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ONSITE TOTAL (lbs/day)	**23.67**	**22.88**	**24.89**	**25.09**	**23.86**	**23.21**	**21.16**	**20.62**	**19.99**	**18.17**	**16.43**	**16.57**	**17.55**	**16.34**	**13.83**	**11.85**	**11.61**	**6.73**	**6.73**	**6.21**	**4.44**	**3.81**	**3.47**	**2.53**
OFF-SITE																								
WORKER VEHICLES																								
Personal commuting vehicles	4.10	4.51	4.83	4.99	5.01	5.06	4.99	4.94	4.72	4.47	4.33	3.93	3.81	3.23	2.63	2.08	1.42	1.13	1.13	1.13	1.04	0.88	0.81	0.61
DELIVERY TRUCKS																								
Light delivery truck (e.g. Fed-Ex)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Heavy delivery truck (e.g. flat beds carrying construction eqp)	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
Import fill trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINEARS																								
ON ROAD																								
Dump 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
Service Truck (MHD-DSL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Haul Truck and Trailer (HHDT-DSL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3/4 Ton Pickup (MHD-DSL)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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 - water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OFF ROAD																								
Air Compressor (185 CFM)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bore Machine (Hydraulic)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 Ton Hydra 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	0.00	0.00	0.00	0.00	0.00
Backhoe/loader	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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 - Trencher	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forklift	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welding Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 to 5 Ton AC Roller	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Bending Machine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL																								
AIR COMPRESSOR 185	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BOOM TRUCK 12 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT 325 BACKHOE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT 330 BACKHOE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT DOZER D-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT MODEL 12 MOTOR GRADER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT ROLLER-COMPACTOR 563	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT RUBBER TIRE LOADER 966	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT SCRAPER 615	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRANE-ROUGH TERRAIN 45T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GENSET 5KW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JOHN DEERE TRACTOR 9400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PICK-UP CRAFT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PICK-UP OVERHEAD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL BALLAST REGULATOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL CLIP MACHINE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL MOVER-SHUTTLE WAGON	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL TAMPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAIL 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
RAMEX WALK BEHIND COMPACTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRI-AXLE DUMP 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
TRUCK FLATBED 14 FOOT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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 TRACTOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER TRUCK, 4M ON-ROAD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELDING MACHINE 350 AMP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINEARS TOTAL (lbs/day)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
OFFSITE VEHICLES TOTAL (lbs/day)	**6.82**	**7.22**	**7.54**	**7.70**	**7.73**	**7.78**	**7.70**	**7.66**	**7.44**	**7.18**	**7.04**	**6.65**	**6.52**	**5.94**	**5.34**	**4.79**	**4.13**	**3.84**	**3.84**	**3.84**	**3.76**	**3.60**	**3.52**	**3.33**
TOTAL PROJECT (lbs/day)	30.49	30.10	32.43	32.79	31.58	30.99	28.86	28.28	27.43	25.35	23.47	23.22	24.07	22.29	19.17	16.65	15.73	10.57	10.57	10.05	8.19	7.41	6.99	5.86

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

Hydrogen Energy California, Kern County Power Project
PM2.5 Emissions by Month - from Combustion Sources
8/14/2012

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	0.2	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	0.0	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	0.0	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	0.2	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	0.2	0.2	0.2	0.2	0.2	0.2	0.2	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	0.1	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	0.7	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	0.7	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.4	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	0.3	0.3	0.3	0.3	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	0.0	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	0.4	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	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	0.6	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	3.4	2.6	2.6	2.6	2.6	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	0.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	**14.0**	**14.6**	**17.9**	**18.1**	**19.1**	**20.9**	**18.5**	**16.0**	**14.8**	**15.4**	**15.8**	**16.1**	**16.0**	**17.2**	**17.5**	**18.4**	**19.0**	**19.2**	**19.0**	**20.5**	**20.7**	**20.4**	**21.4**	**23.0**	**22.1**	**21.6**	**20.9**	**22.7**	**22.9**	**21.8**	**21.2**	**19.3**	**18.8**	**18.2**	**16.5**	**15.0**	**15.1**	**16.0**	**14.9**	**12.6**	**10.8**	**10.6**	**6.1**	**6.1**	**5.7**	**4.0**	**3.5**	**3.2**	**2.3**
OFF-SITE																																																	
WORKER VEHICLES																																																	
Personal commuting vehicles	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	1.0	1.1	1.2	1.3	1.4	1.5	1.5	1.7	1.9	2.0	2.1	2.2	2.4	2.5	2.6	2.6	2.7	2.6	2.6	2.5	2.3	2.3	2.1	2.0	1.7	1.4	1.1	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.3
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)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Import fill trucks	7.1	7.1	7.1	7.1	7.1	7.1	7.1	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
LINEARS																																																	
ON ROAD																																																	
Dump Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	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	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	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.3	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5	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	0.0	0.0	0.0	0.0
3/4 Ton Pickup (MHD-DSL)	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	0.9	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
Truck - water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	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	0.0	0.0	0.0	0.0
OFF ROAD																																																	
Air Compressor (185 CFM)	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	0.4	0.6	0.6	0.6	0.6	0.4	0.4	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	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	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	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	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
Excavator - Trencher	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	0.3	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	0.0	0.0	0.0	0.0
Forklift	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	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	0.3	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	0.0	0.0	0.0	0.0
Pipe Bending Machine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	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	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	0.0	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	0.0	0.0	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 TRUCK 12 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	0.2	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 325 BACKHOE	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 330 BACKHOE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT DOZER D-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	0.8	0.8	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT MODEL 12 MOTOR GRADER	0.0	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	0.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT ROLLER-COMPACTOR 563	0.0	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	0.3	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
CAT RUBBER TIRE LOADER 966	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT SCRAPER 615	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	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
CRANE-ROUGH TERRAIN 45T	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GENSET 5KW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	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
JOHN DEERE TRACTOR 9400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP CRAFT	0.0	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	0.8	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP OVERHEAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.4	1.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 BALLAST REGULATOR	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 CLIP MACHINE	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MOVER-SHUTTLE WAGON	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TAMPER	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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	0.1	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
RAMEX WALK BEHIND COMPACTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRI-AXLE DUMP 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	0.6	1.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRUCK FLATBED 14 FOOT	0.0	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	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRACTOR	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER TRUCK, 4M ON-ROAD	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MACHINE 350 AMP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TOTAL (lbs/day)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**5.5**	**6.4**	**14.0**	**15.3**	**14.3**	**13.7**	**14.1**	**9.0**	**8.8**	**8.5**	**6.7**	**6.4**	**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**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
OFFSITE VEHICLES TOTAL (lbs/day)	**9.5**	**9.5**	**9.5**	**9.6**	**9.6**	**9.7**	**9.7**	**2.6**	**2.7**	**2.8**	**2.9**	**2.9**	**3.0**	**3.2**	**3.3**	**3.5**	**3.6**	**3.6**	**3.7**	**3.8**	**3.9**	**4.0**	**4.2**	**4.3**	**4.4**	**4.5**	**4.7**	**4.9**	**4.9**	**4.9**	**5.0**	**4.9**	**4.9**	**4.8**	**4.7**	**4.6**	**4.4**	**4.3**	**4.0**	**3.7**	**3.4**	**3.1**	**2.9**	**2.9**	**2.9**	**2.9**	**2.8**	**2.7**	**2.6**
TOTAL PROJECT (lbs/day)	23.5	24.1	27.4	27.7	28.7	30.6	28.2	18.6	17.5	18.1	24.1	25.4	33.0	35.7	35.1	35.5	36.7	31.9	31.5	32.8	31.3	30.9	25.6	27.3	26.6	26.1	25.6	27.6	27.8	26.7	26.1	24.2	23.7	23.0	21.2	19.6	19.5	20.3	18.9	16.3	14.2	13.6	9.0	9.0	8.6	6.9	6.3	5.9	4.9

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

Hydrogen Energy California, Kern County Power Project
Sulfur Dioxide (SO2) Emissions by Month
8/14/2012

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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 Tractor (Yard Dog)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - 1 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Trucks - Pickup 3/4 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - 3 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 Vehicles																																																	
Air Compressor 185 CFM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Forklift	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
Man lifts - telescoping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Import fill trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	**0.3**	**0.3**	**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**	**0.3**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.5**	**0.5**	**0.4**	**0.4**	**0.5**	**0.4**	**0.4**	**0.4**	**0.4**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.2**	**0.2**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.0**
OFF-SITE																																																	
WORKER VEHICLES																																																	
Personal commuting vehicles	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	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.2	0.2	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)	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	0.1	0.1
Import fill trucks	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRUCK 12 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 325 BACKHOE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 330 BACKHOE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT DOZER D-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT MODEL 12 MOTOR GRADER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT ROLLER-COMPACTOR 563	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT RUBBER TIRE LOADER 966	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT SCRAPER 615	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-ROUGH TERRAIN 45T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GENSET 5KW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JOHN DEERE TRACTOR 9400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP CRAFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP OVERHEAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 BALLAST REGULATOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 CLIP MACHINE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MOVER-SHUTTLE WAGON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TAMPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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
RAMEX WALK BEHIND COMPACTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRI-AXLE DUMP 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 FLATBED 14 FOOT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRACTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER TRUCK, 4M ON-ROAD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MACHINE 350 AMP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TOTAL (lbs/day)	**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**	**0.3**	**0.3**	**0.3**	**0.2**	**0.2**	**0.2**	**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**
OFFSITE VEHICLES TOTAL (lbs/day)	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.1**	**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**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.6**	**0.6**	**0.6**	**0.6**	**0.7**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.5**	**0.5**	**0.4**	**0.4**	**0.3**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.1**
TOTAL PROJECT (lbs/day)	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.4	0.4	0.4	0.6	0.6	0.8	0.9	1.0	1.0	1.0	0.9	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

Hydrogen Energy California, Kern County Power Project
Reactive Organic Gases (ROG) Emissions by Month
8/14/2012

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	0.6	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	1.2	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	0.0	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	1.5	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	0.0	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	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	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	0.9	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	0.8	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	0.0
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5	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	0.4	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	0.4	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	0.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.7	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.4	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	1.1	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	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	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	0.3	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
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	14.3	14.3	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	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	0.7	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	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
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	1.1	1.1	1.1	1.1	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	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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)	**46.2**	**47.6**	**57.7**	**58.6**	**62.9**	**68.5**	**61.3**	**51.5**	**46.9**	**48.9**	**50.5**	**52.6**	**50.8**	**54.5**	**55.5**	**58.9**	**63.0**	**63.8**	**62.1**	**68.1**	**68.8**	**67.6**	**71.5**	**77.9**	**75.8**	**74.1**	**72.2**	**77.0**	**76.7**	**73.9**	**72.1**	**67.3**	**65.7**	**64.3**	**60.1**	**51.4**	**52.0**	**53.7**	**49.3**	**41.4**	**35.6**	**35.0**	**20.8**	**20.8**	**19.9**	**13.8**	**11.7**	**10.4**	**7.8**
OFF-SITE																																																	
WORKER VEHICLES																																																	
Personal commuting vehicles	0.2	0.4	0.5	0.6	0.9	1.2	1.4	1.8	2.1	2.5	3.1	3.4	4.1	4.8	5.7	6.5	7.1	7.5	7.9	8.4	8.8	9.8	10.6	11.4	12.1	12.2	13.5	14.4	14.9	15.0	15.1	14.9	14.8	14.1	13.3	12.9	11.7	11.4	9.6	7.8	6.2	4.2	3.4	3.4	3.4	3.1	2.6	2.4	1.8
DELIVERY TRUCKS																																																		
Light delivery truck (e.g. Fed-Ex)	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	0.1	0.1
Heavy delivery truck (e.g. flat beds carrying construction eqp)	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	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	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Import fill trucks	10.3	10.3	10.3	10.3	10.3	10.3	10.3	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
LINEARS																																																	
ON ROAD																																																	
Dump Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	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	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	1.2	1.2	1.2	1.2	1.2	1.2	1.9	1.9	1.9	1.9	1.9	1.9	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
Pipe Haul Truck and Trailer (HHDT-DSL)	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	1.9	1.9	1.2	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	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6	0.6	0.6	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
Truck - water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	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	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	1.0	1.0	2.0	2.0	2.9	2.9	2.9	2.9	2.0	2.0	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
Bore Machine (Hydraulic)	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.9	1.8	1.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	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
Backhoe/loader	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.9	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	1.9	1.9	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
Excavator - Trencher	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	0.6	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	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	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	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	0.0	0.0	0.0	0.0
Welding Generator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	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	0.0	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	0.0	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	1.2	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	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.9	0.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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
RAIL																																																	
AIR COMPRESSOR 185	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRUCK 12 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	0.6	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 325 BACKHOE	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 330 BACKHOE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT DOZER D-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	2.0	2.0	0.0	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
CAT MODEL 12 MOTOR GRADER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT ROLLER-COMPACTOR 563	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT RUBBER TIRE LOADER 966	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT SCRAPER 615	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	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
CRANE-ROUGH TERRAIN 45T	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GENSET 5KW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	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
JOHN DEERE TRACTOR 9400	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP CRAFT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.7	2.7	2.7	2.7	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP OVERHEAD	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	3.5	3.5	2.9	2.9	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
RAIL BALLAST REGULATOR	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 CLIP MACHINE	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MOVER-SHUTTLE WAGON	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TAMPER	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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	0.2	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
RAMEX WALK BEHIND COMPACTOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRI-AXLE DUMP 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	2.5	3.7	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 FLATBED 14 FOOT	0.0	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	1.9	1.9	1.9	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
TRUCK TRACTOR	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER TRUCK, 4M ON-ROAD	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MACHINE 350 AMP	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TOTAL (lbs/day)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**18.1**	**20.8**	**43.5**	**47.3**	**45.8**	**44.0**	**44.3**	**29.2**	**28.2**	**27.1**	**21.4**	**20.2**	**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**
OFFSITE VEHICLES TOTAL (lbs/day)	**13.9**	**14.0**	**14.1**	**14.3**	**14.6**	**14.8**	**15.0**	**5.2**	**5.5**	**5.9**	**6.5**	**6.8**	**7.5**	**8.2**	**9.1**	**9.9**	**10.5**	**10.9**	**11.3**	**11.8**	**12.2**	**13.2**	**14.0**	**14.8**	**15.5**	**15.6**	**16.9**	**17.8**	**18.3**	**18.4**	**18.5**	**18.3**	**18.1**	**17.5**	**16.7**	**16.3**	**15.1**	**14.8**	**13.0**	**11.2**	**9.6**	**7.6**	**6.8**	**6.8**	**6.8**	**6.5**	**6.0**	**5.8**	**5.2**
TOTAL PROJECT (lbs/day)	60.1	61.6	71.8	72.9	77.5	83.3	76.4	56.8	52.4	54.8	75.1	80.2	101.8	110.0	110.4	112.8	117.8	104.0	101.6	107.0	102.4	101.1	85.5	92.7	91.3	89.7	89.1	94.8	95.0	92.2	90.6	85.6	83.8	81.8	76.8	67.7	67.1	68.4	62.3	52.6	45.2	42.6	27.6	27.6	26.7	20.3	17.7	16.2	13.0

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

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-SITE																																																	
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	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	0	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	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	349	349	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	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	0	0	0	0	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	413	248	248	248	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	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	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	0	685	685	685	342	342	0	0	0	0	0	0	0
Portable Compaction - Vibratory Plate	0	0	0	0	0	0	0	0	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	75	75	75	75	75	38	38	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	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	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	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	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**
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	0	0	0	0	0	0	0	0	0
Excavator - Trencher	0	0	0	0	0	0	0	0	0	0	0	430	430	430	430	430	430	430	430	430	430	430	0	0	0	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	90	90	179	179	179	179	179	179	179	179	179	90	0	0	0	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	1,832	1,832	1,832	1,832	1,832	1,832	1,832	1,832	1,832	1,832	1,832	1,832	0	0	0	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	303	303	303	303	303	303	303	303	303	303	303	0	0	0	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	351	351	701	701	701	701	701	701	701	351	351	0	0	0	0	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	217	217	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	0	0	0	0	0
BOOM TRUCK 12 TON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	288	288	288	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 325 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	472	472	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 330 BACKHOE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	799	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT DOZER D-6	0	0	0	0	0	0	0	0	0	0	0	0	1,432	1,432	0	0	716	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT MODEL 12 MOTOR GRADER	0	0	0	0	0	0	0	0	0	0	0	0	864	864	432	432	432	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT ROLLER-COMPACTOR 563	0	0	0	0	0	0	0	0	0	0	0	0	680	680	340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT RUBBER TIRE LOADER 966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,610	1,610	1,610	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT SCRAPER 615	0	0	0	0	0	0	0	0	0	0	0	0	2,768	1,384	0	0	0	0	0	0	0	0	0	0	0	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-ROUGH TERRAIN 45T	0	0	0	0	0	0	0	0	0	0	0	0	0	346	346	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GENSET 5KW	0	0	0	0	0	0	0	0	0	0	0	0	0	303	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	0	0	0	0	0	0	0
JOHN DEERE TRACTOR 9400	0	0	0	0	0	0	0	0	0	0	0	0	1,604	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PICK-UP CRAFT	0	0	0	0	0	0	0	0	0	0	0	0	4,730	4,730	4,730	4,730	4,730	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PICK-UP OVERHEAD	0	0	0	0	0	0	0	0	0	0	0	0	1,322	3,965	3,965	3,304	3,304	0	0	0	0	0	0	0	0	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 BALLAST REGULATOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	661	661	0	0	0	0	0	0	0	0	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 CLIP MACHINE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	174	174	0	0	0	0	0	0	0	0	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 MOVER-SHUTTLE WAGON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	661	661	661	0	0	0	0	0	0	0	0	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 TAMPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	661	661	0	0	0	0	0	0	0	0	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 WELDER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	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	0	0	0	0	0	0	0
RAMEX WALK BEHIND COMPACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRI-AXLE DUMP TRUCK	0	0	0	0	0	0	0	0	0	0	0	0	1,151	1,726	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	0	0	0	0	0	0	0
TRUCK FLATBED 14 FOOT	0	0	0	0	0	0	0	0	0	0	0	0	288	288	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	0	0	0	0	0
TRUCK TRACTOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,117	1,117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WATER TRUCK, 4M ON-ROAD	0	0	0	0	0	0	0	0	0	0	0	0	288	288	288	288	288	0	0	0	0	0	0	0	0	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 MACHINE 350 AMP	0	0	0	0	0	0	0	0	0	0	0	0	51	51	51	51	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	0	0	0	0	0	0	0
LINEARS TOTAL (lbs/day)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9,460**	**11,166**	**29,595**	**31,683**	**31,804**	**30,529**	**30,765**	**16,058**	**15,841**	**15,256**	**11,944**	**11,503**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
OFFSITE VEHICLES TOTAL (lbs/day)	**31,217**	**31,847**	**32,359**	**32,946**	**34,162**	**35,168**	**36,096**	**15,446**	**16,310**	**18,063**	**20,545**	**22,058**	**24,710**	**27,647**	**31,708**	**34,827**	**37,304**	**39,117**	**40,776**	**42,741**	**44,443**	**48,816**	**51,893**	**55,226**	**58,242**	**58,838**	**63,921**	**67,898**	**69,854**	**70,201**	**70,816**	**69,903**	**69,333**	**66,564**	**63,420**	**61,669**	**56,748**	**55,158**	**47,979**	**40,440**	**33,645**	**25,358**	**21,799**	**21,773**	**21,773**	**20,722**	**18,747**	**17,824**	**15,337**
TOTAL PROJECT (lbs/day)	63,414	64,777	70,382	70,895	70,823	74,549	69,700	42,955	41,782	43,125	56,520	60,024	81,817	88,508	93,806	96,943	102,044	90,249	91,727	96,525	95,727	99,159	92,305	98,187	100,274	99,277	102,696	109,655	111,216	109,147	107,965	103,494	101,888	98,146	92,252	87,949	82,885	82,486	73,539	61,978	51,878	42,980	32,005	31,979	31,007	27,638	24,674	23,174	19,221

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.

Hydrogen Energy California, Kern County Power Project
PM10 Emissions by Month - from Fugitive Sources
8/14/2012

PM10 - 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	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	0.0	1.1	1.0	0.7	0.7	0.7	0.7	0.7	0.6	0.9	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	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
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	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
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	0.1	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	0.1	0.2	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	1.7	1.7	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	1.1
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	2.0	2.1	2.1	2.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	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	0.0	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	1.4	1.5	1.6	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	0.0	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	0.0	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	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	0.0	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	0.0	0.0	0.0	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	0.1	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	2.6	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	0.0	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	0.2	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	0.0	0.0	0.0	0.0	0.0	0.0	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	0.2	0.2	0.2	0.2	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
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	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Heavy delivery truck (e.g. flat beds carrying construction eqp)			20.5	19.9	19.6	18.9	18.2	17.8	17.4	12.4	11.7	11.3	11.1	11.1	10.6	10.4	10.3	10.0	10.0	10.0	9.9	9.9	9.9	9.6	9.5	9.4	9.4	9.3	9.0	9.0	8.8	8.7	8.6	8.5	8.5	8.5	8.5	8.5	8.6	8.7	8.8	9.0	9.3	9.9	10.0	10.0	10.0	10.0	10.3	10.5	11.2
Import fill trucks			104.0	101.3	99.5	96.0	92.6	90.3	88.6	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION ACTIVITY																																																			
Dirt Piling - Bob cat loader			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	0.1	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
Dirt Piling - 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt Piling - Backhoe/loader			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	0.1	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	0.1	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
Dirt Piling - loader			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	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grading - Earth Scraper 637			3.2	3.2	3.2	3.2	1.9	1.9	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grading - 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	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	1.5	1.5	1.5	1.5	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulldozing - Bulldozer D10R			25.5	25.5	25.5	17.0	17.0	17.0	17.0	17.0	17.0	8.5	8.5	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
Bulldozing - Bulldozer D6C			25.5	25.5	25.5	25.5	17.0	17.0	17.0	17.0	17.0	17.0	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5	8.5	8.5	8.5	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
Covered Storage Piles			1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6																																									
ONSITE TOTAL (lbs/day)			**227.5**	**227.9**	**233.3**	**221.3**	**216.7**	**218.1**	**212.8**	**100.0**	**100.7**	**92.7**	**85.5**	**79.3**	**89.1**	**92.4**	**96.7**	**87.6**	**91.8**	**94.1**	**93.4**	**97.2**	**99.1**	**101.4**	**104.5**	**107.6**	**111.0**	**109.9**	**113.1**	**128.1**	**128.6**	**127.3**	**125.8**	**114.4**	**113.8**	**110.6**	**106.3**	**106.3**	**103.2**	**102.2**	**95.0**	**84.1**	**76.4**	**70.6**	**50.7**	**50.7**	**45.5**	**43.0**	**39.4**	**38.7**	**32.1**
OFF-SITE																																																			
WORKER VEHICLES																																																			
Personal commuting vehicles			0.2	0.3	0.4	0.5	0.7	0.8	1.0	1.4	1.5	1.8	2.2	2.5	3.0	3.5	4.2	4.8	5.2	5.5	5.8	6.1	6.4	7.2	7.7	8.3	8.9	9.0	9.8	10.5	10.9	11.0	11.1	10.9	10.8	10.3	9.8	9.5	8.6	8.3	7.1	5.7	4.5	3.1	2.5	2.5	2.5	2.3	1.9	1.8	1.3
DELIVERY TRUCKS																																																			
Light delivery truck (e.g. Fed-Ex)			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
Heavy delivery truck (e.g. flat beds carrying construction eqp)			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	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	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Import fill trucks			10.2	10.2	10.2	10.2	10.2	10.2	10.2	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
LINEARS																																																			
ON ROAD																																																			
Dump Truck			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	1.6	1.6	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6	0.6	0.6	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	0.0	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	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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
OFF ROAD																																																			
Air Compressor (185 CFM)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.3	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	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.6	0.6	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	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	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
Pipe Bending Machine			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION ACTIVITY																																																			
Dirt piling - Backhoe			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - Excavator			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - CAT 325 BACKHOE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - CAT 330 BACKHOE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - CAT DOZER D-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - CAT RUBBER TIRE LOADER 966			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grading - CAT MODEL 12 MOTOR GRADER			0.0	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	0.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grading - CAT SCRAPER 615			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Piles													0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5																											
RAIL																																																			
AIR COMPRESSOR 185			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRUCK 12 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	0.3	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 325 BACKHOE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 330 BACKHOE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT DOZER D-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT MODEL 12 MOTOR GRADER			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT ROLLER-COMPACTOR 563			0.0	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	0.2	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
CAT RUBBER TIRE LOADER 966			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT SCRAPER 615			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-ROUGH TERRAIN 45T			0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GENSET 5KW			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JOHN DEERE TRACTOR 9400			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP CRAFT			0.0	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	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
PICK-UP OVERHEAD			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.9	1.9	1.6	1.6	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	0.0	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 BALLAST REGULATOR			0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 CLIP MACHINE			0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MOVER-SHUTTLE WAGON			0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TAMPER			0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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
RAMEX WALK BEHIND COMPACTOR			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRI-AXLE DUMP 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	1.6	2.4	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	0.0	0.0	0.0	0.0	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 FLATBED 14 FOOT			0.0	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	0.9	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
TRUCK TRACTOR			0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER TRUCK, 4M ON-ROAD			0.0	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	0.5	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
WELDING MACHINE 350 AMP			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TOTAL (lbs/day)			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**4.7**	**5.7**	**14.6**	**16.7**	**15.8**	**14.5**	**14.5**	**8.6**	**8.6**	**8.6**	**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**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
OFFSITE VEHICLES TOTAL (lbs/day)			**14.0**	**14.1**	**14.2**	**14.3**	**14.5**	**14.7**	**14.9**	**5.0**	**5.1**	**5.4**	**5.9**	**6.1**	**6.6**	**7.1**	**7.8**	**8.4**	**8.8**	**9.1**	**9.4**	**9.8**	**10.1**	**10.8**	**11.4**	**11.9**	**12.5**	**12.6**	**13.5**	**14.2**	**14.5**	**14.6**	**14.7**	**14.5**	**14.4**	**13.9**	**13.4**	**13.1**	**12.2**	**11.9**	**10.7**	**9.4**	**8.2**	**6.7**	**6.1**	**6.1**	**6.1**	**5.9**	**5.6**	**5.4**	**5.0**
TOTAL PROJECT (lbs/day)			241.5	242.0	247.5	235.7	231.2	232.8	227.6	105.0	105.8	98.2	96.0	91.2	110.3	116.2	120.3	110.5	115.1	111.8	111.4	115.6	115.8	118.3	115.8	119.6	123.5	122.5	126.6	142.3	143.1	141.9	140.5	128.9	128.2	124.5	119.7	119.4	115.4	114.1	105.7	93.5	84.5	77.3	56.8	56.8	51.5	48.9	45.0	44.1	37.0

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.
3. According to schedule on "onsite equipment" tab, site prep/pilling occurs in months 1-8. Assume onsite covered storage piles are only present during these months.
4. Assume linear covered storage piles are present during entire 12 months of linear construction, months 11-22.

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	0.0	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
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	0.1	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
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	0.3	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - 1 ton	10	0.5	0.4	0.4	0.4	0.8	0.7	0.7	0.7	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	0.2	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	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
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	0.5	0.5	0.5	0.5	0.4	0.4	0.4	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	0.2	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	0.1	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	0.0
Trucks - Pickup 3/4 ton	10	0.5	1.0	1.0	1.0	0.9	0.9	1.1	1.2	1.0	1.8	1.7	1.7	1.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.5	1.5	1.5	1.0	1.0	1.0	1.0	0.6
Trucks - 3 ton	2	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.1	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
Truck - Water	4	1	0.8	0.8	0.8	0.8	0.7	0.7	0.4	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	0.1	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	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	0.4	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	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 lift - scissor	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	0.0	0.0	0.0
WORKER VEHICLES																																																			
Personal commuting vehicles			0.2	0.4	0.5	0.6	0.9	1.1	1.3	1.3	1.3	1.5	1.9	2.1	2.4	2.7	3.3	3.6	3.9	4.1	4.3	4.6	4.8	5.2	5.6	5.9	6.2	6.3	6.7	7.1	7.2	7.2	7.1	7.0	6.9	6.6	6.2	6.1	5.6	5.4	4.7	3.9	3.2	2.3	1.9	1.9	1.8	1.7	1.5	1.4	1.1
DELIVERY TRUCKS																																																			
Light delivery truck (e.g. Fed-Ex)			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	0.1	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
Heavy delivery truck (e.g. flat beds carrying construction eqp)			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	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Import fill trucks			10.4	10.1	10.0	9.6	9.3	9.0	8.9	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION ACTIVITY																																																			
Dirt Piling - 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt Piling - 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt Piling - 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt Piling - 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grading - Earth Scraper 637			0.3	0.3	0.3	0.3	0.2	0.2	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
Grading - Motor Grader (CAT140H)			0.0	0.1	0.1	0.1	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	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulldozing - Bulldozer D10R			8.5	8.5	8.5	5.6	5.6	5.6	5.6	5.6	5.6	2.8	2.8	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	0.0	0.0	0.0	0.0	0.0
Bulldozing - Bulldozer D6C			8.5	8.5	8.5	8.5	5.6	5.6	5.6	5.6	5.6	5.6	2.8	2.8	2.8	2.8	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	2.8	2.8	2.8	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
Covered Storage Piles			0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3																																									
ONSITE TOTAL (lbs/day)			**34.8**	**34.8**	**35.3**	**32.2**	**29.8**	**29.9**	**29.3**	**18.1**	**18.0**	**15.2**	**12.5**	**9.9**	**10.9**	**11.2**	**11.6**	**8.8**	**9.2**	**9.4**	**9.4**	**9.7**	**9.9**	**10.2**	**10.5**	**10.8**	**11.1**	**11.0**	**11.3**	**14.8**	**14.8**	**14.7**	**14.6**	**11.4**	**11.4**	**11.1**	**10.6**	**10.6**	**10.3**	**10.2**	**9.5**	**8.4**	**7.7**	**7.1**	**5.1**	**5.1**	**4.5**	**4.3**	**3.9**	**3.9**	**3.2**
OFF-SITE																																																			
WORKER VEHICLES																																																			
Personal commuting vehicles			0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.6	0.6	0.7	0.9	1.0	1.2	1.3	1.4	1.4	1.5	1.6	1.8	1.9	2.0	2.2	2.2	2.4	2.6	2.7	2.7	2.7	2.7	2.7	2.5	2.4	2.3	2.1	2.0	1.7	1.4	1.1	0.8	0.6	0.6	0.6	0.6	0.5	0.4	0.3
DELIVERY TRUCKS																																																			
Light delivery truck (e.g. Fed-Ex)			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	0.1	0.1
Heavy delivery truck (e.g. flat beds carrying construction eqp)			0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Import fill trucks			2.5	2.5	2.5	2.5	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.2	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	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
OFF ROAD																																																			
Air Compressor (185 CFM)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION																																																			
Dirt piling - Backhoe			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - Excavator			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - CAT 325 BACKHOE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - CAT 330 BACKHOE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - CAT DOZER D-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dirt piling - CAT RUBBER TIRE LOADER 966			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grading - CAT MODEL 12 MOTOR GRADER			0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grading - CAT SCRAPER 615			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Storage Piles													0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1																											
RAIL																																																			
AIR COMPRESSOR 185			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRUCK 12 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 325 BACKHOE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT 330 BACKHOE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT DOZER D-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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT MODEL 12 MOTOR GRADER			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT ROLLER-COMPACTOR 563			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT RUBBER TIRE LOADER 966			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAT SCRAPER 615			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-ROUGH TERRAIN 45T			0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GENSET 5KW			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
JOHN DEERE TRACTOR 9400			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP CRAFT			0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PICK-UP OVERHEAD			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	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	0.0	0.0	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 BALLAST REGULATOR			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 CLIP MACHINE			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MOVER-SHUTTLE WAGON			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TAMPER			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 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
RAMEX WALK BEHIND COMPACTOR			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRI-AXLE DUMP 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	0.2	0.2	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
TRUCK FLATBED 14 FOOT			0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TRACTOR			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER TRUCK, 4M ON-ROAD			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 MACHINE 350 AMP			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 TOTAL (lbs/day)			**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.5**	**0.6**	**1.5**	**1.7**	**1.6**	**1.5**	**1.5**	**0.9**	**0.9**	**0.9**	**0.7**	**0.7**	**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**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
OFFSITE VEHICLES TOTAL (lbs/day)			**3.4**	**3.5**	**3.5**	**3.5**	**3.6**	**3.6**	**3.7**	**1.2**	**1.3**	**1.3**	**1.4**	**1.5**	**1.6**	**1.7**	**1.9**	**2.1**	**2.2**	**2.2**	**2.3**	**2.4**	**2.5**	**2.7**	**2.8**	**2.9**	**3.1**	**3.1**	**3.3**	**3.5**	**3.6**	**3.6**	**3.6**	**3.6**	**3.5**	**3.4**	**3.3**	**3.2**	**3.0**	**2.9**	**2.6**	**2.3**	**2.0**	**1.6**	**1.5**	**1.5**	**1.5**	**1.4**	**1.4**	**1.3**	**1.2**
TOTAL PROJECT (lbs/day)			38.2	38.3	38.8	35.7	33.3	33.5	33.0	19.3	19.2	16.5	14.5	12.1	14.0	14.7	15.2	12.3	12.9	12.6	12.6	13.0	13.1	13.5	13.2	13.7	14.2	14.1	14.6	18.3	18.4	18.3	18.2	15.0	14.9	14.5	13.9	13.9	13.3	13.2	12.1	10.7	9.7	8.7	6.6	6.6	6.0	5.7	5.3	5.2	4.4

Notes:

1. According to schedules provided by Fluor, Linear construction (except rail) takes place in months 11-22.
2. According to schedules provided by Fluor, Rail construction occurs in months 13-17.
3. According to schedule on "onsite equipment" tab, site prep/pilling occurs in months 1-8. Assume covered storage piles are only present during these months.
4. Assume linear covered storage piles are present during entire 12 months of linear construction, months 11-22.

Hydrogen Energy California, Kern County Power Project

Calculation of maximum short-term (daily) and annual emissions
8/14/2012

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	13	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
8/14/2012

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

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Emission Factors for Onroad Vehicles
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ONSITE - 5 MPH							EF (lbs/mile)									
Onroad Vehicle	Fuel Type	Vehicle Type	Daily Vehicle Count	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	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

Hydrogen Energy California, Kern County Power Project
Onsite Fugitive Dust Emissions
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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)

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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 63	0.909	67%	0.463	0.050
Excavator - Motor Grader (C/	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)
I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height (wind speed percentage and
0.3 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

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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
8/14/2012

VEHICLE INVENTORY BY MONTH	Vehicle Weight	MONTHLY VEHICLE COUNT (#)																												
Vehicle Type	**(tons)**	**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 Proj
Calculation of Mean Vehicle Weight by Month
8/14/2012

VEHICLE INVENTORY BY MONTH	Vehicle Weight																						
Vehicle Type	(tons)	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**

Hydrogen Energy California, Kern County Power Project
Calculation of Mean Vehicle Weight by Month
8/14/2012

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**

Hydrogen Energy California, Kern County Power Proj
Calculation of Mean Vehicle Weight by Month
8/14/2012

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
8/14/2012

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	Sum
# 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	760
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
8/14/2012

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

Dirt Piling or Material Handling

$E = k * (0.0032) * (U/5)^{\wedge 1.3} / (M/2)^{\wedge 1.4}$ 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
		# pieces of equip:	0	0	0	0	0	0	0	0	0	0	6	7	14	14
Backhoe	67%	tons/day material handled:	0	0	0	0	0	0	0	0	0	0	5454	4675	3896	3896
Excavator	67%		0	0	0	0	0	0	0	0	0	0	0	779	390	390
CAT 325 BACKHOE	67%		0	0	0	0	0	0	0	0	0	0	0	0	390	390
CAT 330 BACKHOE	67%		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	779	779
CAT RUBBER TIRE LOADER 966	67%		0	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	5454	5454	5454	5454

MATERIAL HANDLED (tons/day)	Mitigation Efficiency[1]	MONTH:	15	16	17	18	19	20	21	22	23	24	25	26	27	28
		# pieces of equip:	14	13	14	11	11	11	7	7	0	0	0	0	0	0
Backhoe	67%	tons/day material handled:	3896	4195	3896	4958	4958	4958	4675	4675	0	0	0	0	0	0
Excavator	67%		390	420	390	496	496	496	779	779	0	0	0	0	0	0
CAT 325 BACKHOE	67%		0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT 330 BACKHOE	67%		390	0	0	0	0	0	0	0	0	0	0	0	0	0
CAT DOZER D-6	67%		0	0	390	0	0	0	0	0	0	0	0	0	0	0
CAT RUBBER TIRE LOADER 966	67%		779	839	779	0	0	0	0	0	0	0	0	0	0	0
TOTAL material handled			5454	5454	5454	5454	5454	5454	5454	5454	0	0	0	0	0	0

MATERIAL HANDLED (tons/day)	Mitigation Efficiency[1]	MONTH:	29	30	31	32	33	34	35	36	37	38	39	40	41	42
		# pieces of equip:	0	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	0
Excavator	67%		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
CAT 330 BACKHOE	67%		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
CAT RUBBER TIRE LOADER 966	67%		0	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	0

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

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

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

Off-Site Linears Fugitive Dust Emissions
8/14/2012

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
8/14/2012

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
8/14/2012

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
8/14/2012

					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

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)

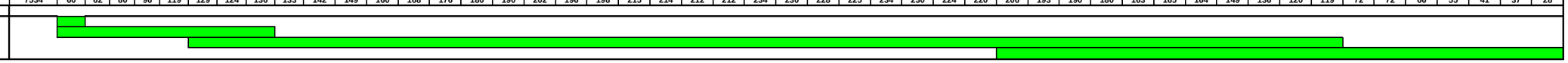
- N_2O factors for off-road vehicles are derived from California Climate Action Registry General Reporting Protocol Version 3.0 (April 2008), Table C.5 (distillate fuel factors for the industrial sector) using the following to convert from kg/gallon to lb/hp-hour, and then multiplying by the rated horsepower 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)
8/14/2012

		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	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	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
8/14/2012

					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)
8/14/2012

EQUIPMENT	Month	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
	# of units																																																		
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**	**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

Hydrogen Energy California, Kern County Power Project
Model Inputs - Fugitive Sources
8/14/2012

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

Hydrogen Energy California, Kern County Power Project
Model Inputs - Fugitive Sources
8/14/2012

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

DATA REQUEST

A6. Please correct the bulldozer fugitive dust emissions estimate by removing the engine use capacity factor, which is an engine emissions adjustment factor and not a fugitive dust emission adjustment factor.

RESPONSE

The engine use capacity factor was removed. However, given that the emissions are based on hours of operation, and accounting for the fact that the bulldozers are not operating continuously over the 10-hour construction period, the hours of operation were adjusted to 6 hours per day at 100 percent capacity.

Updated emissions estimates are presented in Attachment A5-1, Revised Appendix E-2, Construction Criteria Pollutant and Greenhouse Gas Emissions.

DATA REQUEST

A7. Please correct the construction particulate matter (PM) PM10 and PM2.5 modeling analysis if the fugitive dust emissions corrections noted above create a new worst case 24-hour or annual emissions period.

RESPONSE

In the course of reviewing the USEPA AP-42 emission factors relating to fugitive dust during construction, the Applicant revised the unpaved road emission factor used for vehicles traveling on the site. According to AP-42 Section 13.2.2.2, the unpaved road emission factor for fugitive dust (Equation 1-a) is intended to be used with the average weight of vehicles traveling on a given road. Accordingly, a monthly weighted mean vehicle weight was calculated for the site based on the estimated number of worker vehicles, delivery vehicles, and equipment inventory provided in Attachment A5-1 (Revised Appendix E-2, Construction Criteria Pollutant and Greenhouse Gas Emissions). From this monthly average vehicle weight, monthly PM_{10} and $PM_{2.5}$ emission factors (in pounds per vehicle mile traveled [lbs/VMT]) were calculated and applied.

The net result of the changes discussed in the responses to Data Request Nos. A5 and A6, and this change in emissions from unpaved roads, have resulted in a decrease in the maximum daily emissions of particulate matter 10 microns in diameter or less (PM_{10}) from 290 pounds per day to 271 pounds per day; particulate matter 2.5 microns in diameter or less ($PM_{2.5}$) has decreased from 66 pounds per day to 64 pounds per day. Annual emissions have also decreased from 32 tons per year (tpy) to 30 tpy of PM_{10}, and from 7.0 to 6.9 tpy of $PM_{2.5}$. Since the worst-case 24-hour and annual emissions have decreased, modeled impacts would be less than previously modeled, and the PM_{10} and $PM_{2.5}$ construction modeling analysis will not be revised.

Updated emissions estimates are presented in Attachment A5-1.

BACKGROUND: GASIFIER FEEDSTOCK MIX EFFECTS

Staff understands that in the Amended AFC the gasifier feedstock mix is assumed to be a blend of 75 percent coal and 25 percent petroleum coke; however, the Amended AFC in its discussion of feedstock flexibility (Amended AFC Section 2.1.11.4) does not provide information on the potential flexibility in the feedstock mix. Staff needs to understand the applicant's intent for the short-term and long-term flexibility of the feedstock mix and how that could impact air quality emissions estimates.

DATA REQUEST

A8. It is unclear if the feedstock mix of 75 percent coal and 25 percent petroleum coke is both a short-term and long-term assumption, and if this assumption would be stipulated to by the applicant or if there could be a wide range of variability in the short-term and long-term feedstock mix. Please provide any short-term or long-term stipulations on the range of the feedstock mix, and given such stipulation(s) please identify the potential short-term (i.e., instantaneous/hourly/daily feedstock mix range) and long-term (i.e., annual average) range of feedstock blends that could be used in the gasifier.

RESPONSE

It is important for the HECA Project to maintain sufficient fuel diversity and maximize the number of potential fuel suppliers; this is necessary to minimize fuel costs and avoid curtailment caused by short-term disruptions in fuel supply that can occur in the absence of sufficient flexibility. Furthermore, pursuant to its obligations under a Cooperative Agreement between the HECA Project and the U.S. Department of Energy (DOE), the HECA Project must use coal for at least 75 percent of the energy input for the operation of the power plant facilities during the demonstration period, on a fuel input (British thermal unit [Btu]) basis. Accordingly, the Applicant is willing to consider a long-term target of 75 percent coal for the HECA Project's gasification feedstock (heat input basis), provided this is computed on an annual averaging basis, and there is sufficient margin to allow the HECA Project to run above the average during this period to ensure meeting the minimum average DOE requirement. Likewise, HECA needs to retain the capability to run more than 25 percent petroleum coke (petcoke), either for economic reasons, or in response to fuel supply disruptions.

DATA REQUEST

A9. Please provide stationary source emissions estimates, where they exceed the current stationary source emissions estimates, for the potential range of gasifier feedstock fuel blends. If the stationary emissions estimates from other potential gasifier feedstock blends would not increase the emissions from those currently estimated, then please describe why that is the case.

RESPONSE

Although the feedstock may vary a little in the short-term, the annual blend is intended to remain constant at a 75 percent coal/25 percent petcoke mix. The gasifier operates so that variability in feedstock will not affect stationary source emissions estimates.

HECA's emission estimates were prepared at the full unit capacity of the respective emission sources, rather than at a single and distinct overall operating point. The scenarios resulting in maximum emissions were used (e.g., feedstock with maximum [instead of average] sulfur content that would result in the highest sulfur emissions); these would not be exceeded in the event of variability from the 75 percent coal/25 percent petcoke feedstock mix. This approach was necessary to provide the fuel flexibility described in the response to Data Request No. A8. As an example, the emissions from the Power Block and cooling towers were based on operating at full rate throughout the year, even though the Power Block output will be turned down daily, and the cooling towers will only operate at full capacity during the hottest months of the year. This approach overstates the actual emissions from the plant, and required the acquisition and retirement of emission reduction credits in excess of the actual emissions.

DATA REQUEST

A10. Please discuss the feedstock transportation trip, and other associated transportation trip (gasifier solids, sulfur, etc.) effects and the related transportation air quality emission effects over the desired flexibility for the range of the gasifier feedstock mix.

RESPONSE

Emissions from daily transportation are based on the maximum delivery of feedstock or removal of products that could occur, which is between 1.2 to 2 times greater than the maximum amount of feedstock that could be used in a day, or product that could be produced in a day. This accounts for feedstock and product accumulation necessary to accommodate normal loading and shipping cycles. These peak daily transportation needs are unlikely to all occur on the same day, but maximum daily emissions are conservatively based on that occurring.

Annual transportation emission estimates are based on the use of a 75 percent coal/25 percent petcoke feedstock mix at maximum plant operating capacity. Although the feedstock may vary a little in the short-term, the annual blend is intended to remain constant. Therefore, the related transportation air quality emission effects over the 75/25 feedstock mix have been addressed based on these conservative modeling assumptions.

BACKGROUND: COMBINED CYCLE GAS TURBINE/HRSG OPERATING PROFILE

Staff understands that the combined cycle gas turbine/heat recovery steam generator (HRSG) will not be strictly operated as a base load electrical generating facility, but will vary output based on need and also operate in a manner that will allow for a certain amount of dispatchability. Staff needs more information to understand the exact expected operation of the combined cycle gas turbine/HRSG and the impacts of operating this facility in such a manner.

DATA REQUEST

A11. Please identify the expected normal daily operating profile for the gas turbine and duct burners, the anticipated overnight minimum load operating condition, and associated daily net Megawatt hour (MWh) production.

RESPONSE

HECA proposes to vary the electrical output at the gas and steam turbines on a scheduled daily basis between a maximum operation at 100 percent load, and minimum output of about 70 percent. The daily net output will vary with seasonal temperatures, but will produce between 5,100 and 6,000 megawatt-hours (MWh) each day.

DATA REQUEST

A12. Please identify the expected criteria and Green House Gas (GHG) emissions profile for the combined cycle gas turbine/HRSG (lbs/hr per load condition and lbs/day) for the expected normal daily operating profile.

RESPONSE

Emissions were estimated for the normal daily operation of the combustion turbine generator/ heat recovery steam generator (CTG/HRSG) at peak and off-peak capacity, and were presented in Appendices E-3, Operational Criteria Pollutant Emissions, and E-6, Operational Greenhouse Gas Emissions, of the 2012 Amended AFC.

DATA REQUEST

A13. Please identify if the intended partial dispatchability of the combined cycle gas turbine/HRSG would increase the potential for upsets leading to increased flaring and Carbon Dioxide (CO_2) venting events, or lead to upsets that could increase other wastes, such as off-spec fertilizer products.

RESPONSE

No additional increase in the potential for upsets, venting, flaring, wastes, or production of off-spec products is expected. It is important to note that all equipment remains in operation (with no additional startups and shutdowns) and the variation in power output is achieved within prescribed equipment ramp rates and is not considered cyclic operation under American Society of Mechanical Engineers definitions.

BACKGROUND: GASIFICATION AND FERTILIZER MANUFACTURE PROCESS ENERGY AND MASS BALANCE AND OPERATIONS DESCRIPTION

The Amended AFC does not provide the detailed energy and mass balances that are necessary for staff to fully understand the gasification technology and its emission sources. Staff needs this information to understand any changes to the gasification process and the new processes to complete both its criteria pollutant impact analysis and its GHG impact analysis. A mass and energy balance was requested and provided for the original project design. The response and the level of information provided by the applicant in that data response can be viewed in the following document, dated 08/10/2010, Data Response number 11, beginning at page 8: (http://www.energy.ca.gov/sitingcases/hydrogen_energy/documents/08-AFC-8/index.html). Staff is requesting this level of information for the new and revised processes.

DATA REQUEST

A14. Please provide energy and mass balance data for the gasification process for both petroleum coke and coal, including the new coal dryer. The mass balance data should clearly show carbon (and carbon compounds), water, sulfur, volatile organic compounds (VOC), toxic air contaminants (TACs), and total solids contents throughout the process. The energy balance should identify each stream's phase (gas/liquid/solid) and include the temperature at the various steps through the processes.

RESPONSE

Figure A14-1, Mass Balance of Carbon, Sulfur, and Inert Solids, and Figure A14-2, Mass Balance of Water, present the overall material balances, temperatures, and stream phase (i.e., solid, liquid, or gas) for carbon, sulfur, inert solids, and water in the plant feeds, products, by-products, emissions, and wastes for the entire Project.

Fugitive emission of carbon in the form of carbon dioxide (CO_2) and sulfur emission from the combustion of syngas in the Power Block are excluded from material balances shown in Figures A14-1 and A14-2, because these quantities are negligible (less than 0.1 percent) compared to the plant feed rates of carbon and sulfur.

In the response to Data Request No. A16, plant-wide fugitive emissions were revised. Table A16-1 presents fugitive emissions of greenhouse gas (GHG), criteria pollutants, and toxic air contaminants (TACs). Attachment A16-1 (Revised Appendix M) Public Health and Safety, is a block flow diagram that shows which fugitive emissions are generated by each process unit.

GHG, volatile organic compound (VOC), TAC, and sulfur emissions from combustion sources and process vent streams are presented in the 2012 Amended AFC.

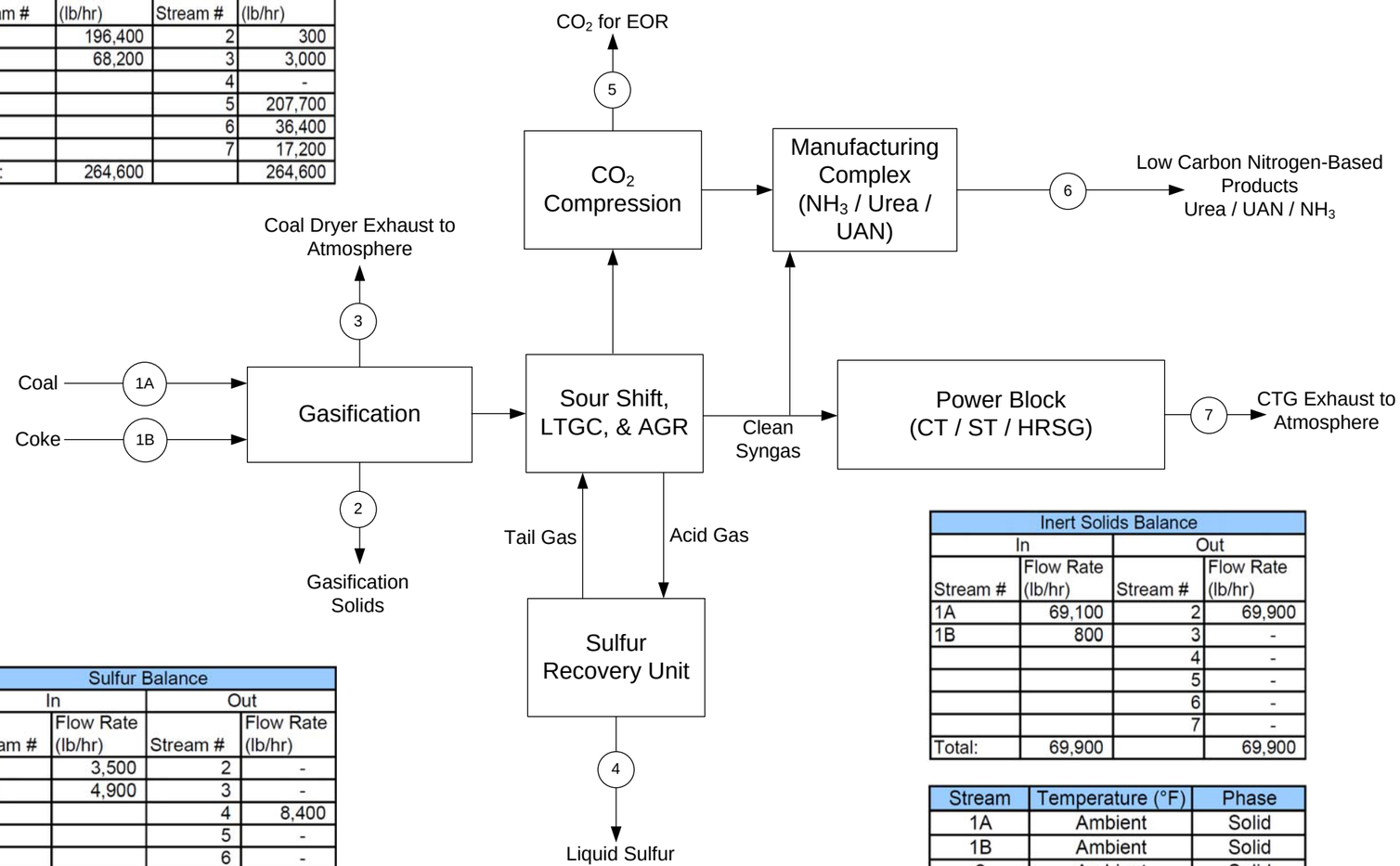
Unlike a petroleum processing facility, sources of VOC emissions are fairly limited in this plant. The largest quantities of potential fugitive VOC emissions are the methanol solvent and propylene refrigerant used in the Rectisol process. The resulting fugitive emissions of VOC from these materials are reported in the response to Data Request No. A16. Other VOC emission sources include syngas combustion in the combined-cycle unit, residual methanol in the intermittent CO_2 vent stream, and the various intermittent natural gas combustion sources in the plant, as described in the 2012 Amended AFC.

TAC and VOC emissions from the Manufacturing Complex are also fairly limited, because the purified hydrogen, nitrogen, and CO_2 feeds contain virtually no residual TACs or VOCs. The

ammonia oxidizer and nitrogen dioxide (NO_2) absorber in the nitric acid plant are close-coupled, so that fugitive emissions of NO_2 from piping components are minimized. NO_2 and nitric acid fugitive emissions are included in the response to Data Request No. A16. Other fugitive emissions from the Manufacturing Complex include ammonia from each unit, as well as CO_2 from the Urea Unit. Combustion source and process vent emissions from the Manufacturing Complex are shown in the 2012 Amended AFC.

75% Coal / 25% Coke
Average Daily Basis

Carbon Balance			
In		Out	
Stream #	Flow Rate (lb/hr)	Stream #	Flow Rate (lb/hr)
1A	196,400	2	300
1B	68,200	3	3,000
		4	-
		5	207,700
		6	36,400
		7	17,200
Total:	264,600		264,600



Inert Solids Balance			
In		Out	
Stream #	Flow Rate (lb/hr)	Stream #	Flow Rate (lb/hr)
1A	69,100	2	69,900
1B	800	3	-
		4	-
		5	-
		6	-
		7	-
Total:	69,900		69,900

Sulfur Balance			
In		Out	
Stream #	Flow Rate (lb/hr)	Stream #	Flow Rate (lb/hr)
1A	3,500	2	-
1B	4,900	3	-
		4	8,400
		5	-
		6	-
		7	-
Total:	8,400		8,400

Stream	Temperature (°F)	Phase
1A	Ambient	Solid
1B	Ambient	Solid
2	Ambient	Solid
3	200	Gas
4	280	Liquid
5	110	Gas
6	Ambient	Liquid/Solid
7	200	Gas

Acronyms

AGR	Acid Gas Removal	lb/hr	pounds per hour
CO_2	carbon dioxide	LTGC	Low Temperature Gas Cooling
CT	combustion turbine	NH_3	ammonia
CTG	combustion turbine generator	ST	steam turbine
EOR	Enhanced Oil Recovery	UAN	Urea Ammonium Nitrate
HRSG	heat recovery steam generator		

Source: Fluor, 2012

MASS BALANCE OF CARBON, SULFUR AND INERT SOLIDS

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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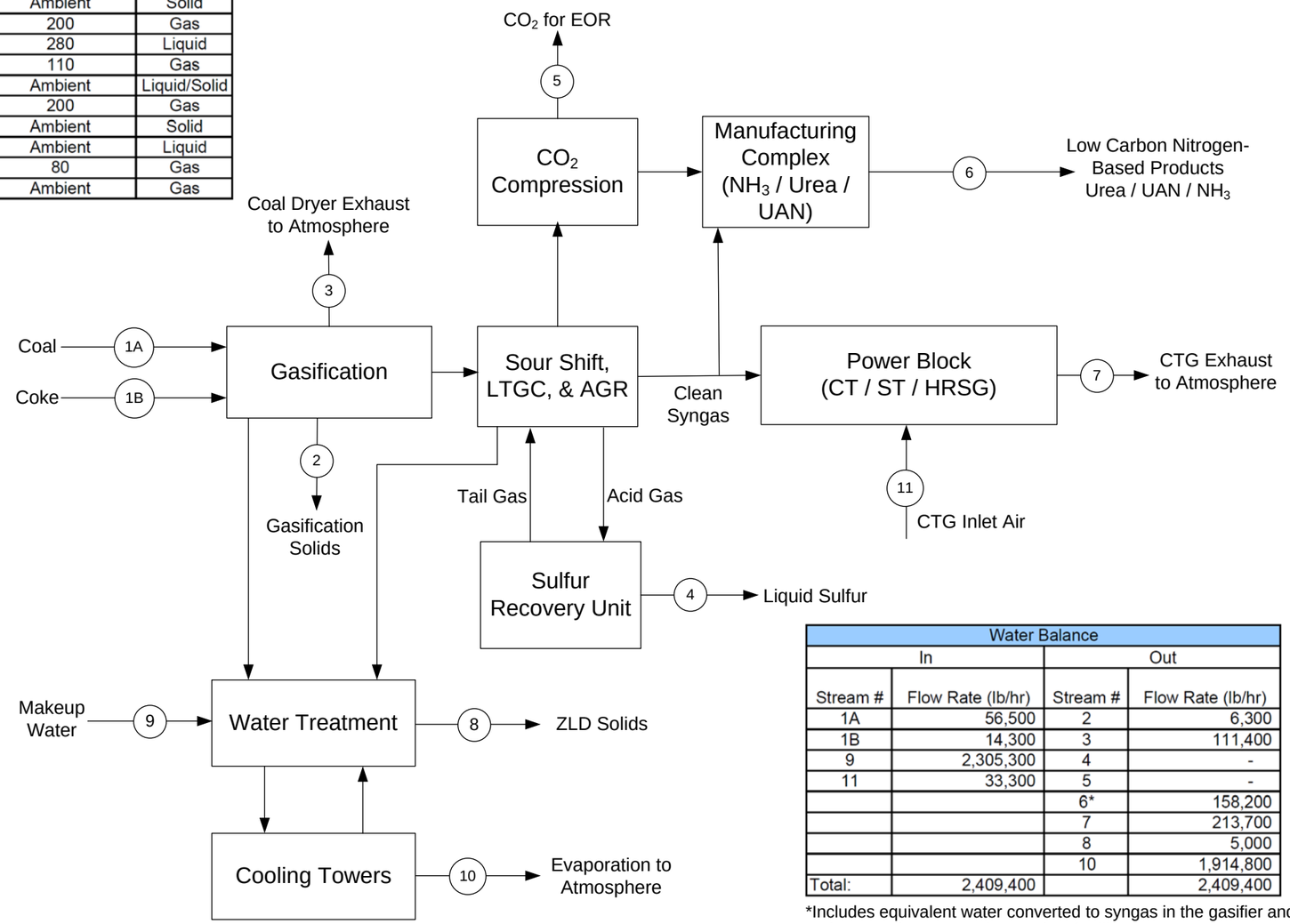
FIGURE A14-1

8/21/12 vsa. T:\HECA-SCS 2012\Data Requests\Aug 2012\FigA14-1_mass_balance_C_S_inert.ai

75% Coal / 25% Coke
Average Daily Basis

Stream	Temperature (°F)	Phase
1A	Ambient	Solid
1B	Ambient	Solid
2	Ambient	Solid
3	200	Gas
4	280	Liquid
5	110	Gas
6	Ambient	Liquid/Solid
7	200	Gas
8	Ambient	Solid
9	Ambient	Liquid
10	80	Gas
11	Ambient	Gas



Water Balance			
In		Out	
Stream #	Flow Rate (lb/hr)	Stream #	Flow Rate (lb/hr)
1A	56,500	2	6,300
1B	14,300	3	111,400
9	2,305,300	4	-
11	33,300	5	-
		6*	158,200
		7	213,700
		8	5,000
		10	1,914,800
Total:	2,409,400		2,409,400

*Includes equivalent water converted to syngas in the gasifier and subsequently converted to product fertilizers.

Acronyms

AGR	Acid Gas Removal	lb/hr	pounds per hour
CO_2	carbon dioxide	LTGC	Low Temperature Gas Cooling
CT	combustion turbine	NH_3	ammonia
CTG	combustion turbine generator	ST	steam turbine
EOR	Enhanced Oil Recovery	UAN	Urea Ammonium Nitrate
HRSG	heat recovery steam generator	ZLD	zero liquid discharge

Source: Fluor, 2012

MASS BALANCE OF WATER

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A14-2

8/21/12 vsa. T:\HECA-SCS 2012\Data Requests\Aug 2012\Fig\A14-2_mass_balance_water.ai

DATA REQUEST

A15. Please provide energy and mass balance data for the various fertilizer manufacturing processes, including the nitric acid plant. The mass balance data should clearly show, as applicable, carbon (and carbon compounds), water, sulfur, volatile organic compounds (VOC), nitrogen oxides (NOx), toxic air contaminants (TACs), and total solids contents throughout the process. The energy balance should identify each stream's phase (gas/liquid/solid) and include the temperature at the various steps through the processes.

RESPONSE

The response to Data Request No. A14 provides the overall material balance, which includes the Manufacturing Complex.

BACKGROUND: FUGITIVE EMISSIONS FROM FERTILIZER MANUFACTURE

The fugitive emissions estimates from the various system piping components include the emissions from valve and flanges but seem to be missing the pumps and compressors, where staff's review shows pumps, and perhaps compressors, in service with high concentration ammonia and nitric acid streams, as well as in service for high percentage Carbon Dioxide or Hydrogen Sulfide (CO_2 or H_2S) gas streams.

DATA REQUEST

A16. Please review the piping component list again and amend the piping component fugitive emissions estimate in Appendix E and Appendix M to include the appropriate pumps and compressors.

RESPONSE

The updated piping component counts are based on the latest available Applicant and licensor piping and instrumentation diagrams (P&IDs) or example P&IDs for similar, representative units. A multiplier was applied to the valve and connector counts to approximate the additional sources, which will probably be identified during detailed design. The associated process stream compositions were updated based on the latest design, and used in the revised emission calculations. Table A16-1 presents the updated process streams and associated piping component counts for the entire facility. Figure A16-1, Overall Block Flow Diagram with Locations of Fugitive Emissions from Process Streams, indicates the principal process unit(s) in which each of the process streams will be located by showing the process stream number from the summary table in the appropriate process unit blocks on the figure.

Fugitive emissions from the updated piping component list and process stream compositions were estimated using the same technique outlined in the 2012 Amended AFC; that is, the Synthetic Organic Chemical Manufacturing Industry (SOCMI) emission factors in the USEPA guidance, *Protocol for Equipment Leak Emission Estimates*. A leak detection and repair (LDAR) program will be implemented on select process areas with the largest estimated TAC and VOC fugitive emissions.

The LDAR program will be implemented in the following areas in the Gasification Block: Stream 1 (methanol), Stream 5 (propylene), Stream 7 (hydrogen sulfide [H_2S]–laden methanol), Stream 8 (CO_2-laden methanol), Stream 9 (acid gas), and Stream 10 (ammonia-laden gas), and all portions of the Manufacturing Complex (Streams 13-21). These streams were selected because they had the largest uncontrolled emission estimates for methanol, propylene, H_2S, and ammonia.

Table A16-2 presents a summary of the annual fugitive emissions of GHG, criteria pollutants, and TACs.

The revised total annual operational emissions of carbon monoxide (CO) and VOC are 276.6 and 38.7 tons per year, respectively, which is a respective increase of 1.4 tons (0.5 percent) and 3.3 tons (9.3 percent). Annual TAC emissions increase 3.7 tons, or 2.0 percent. Annual GHG emissions increase by 30 metric tons, or 0.006 percent. These relatively small increases in emissions are not expected to substantively change the results of the modeling for CO or TACs. The health risk assessment modeling of the TAC emissions was driven

primarily by diesel particulate matter, which did not increase; thus, this small increase in fugitive TACs is not expected to significantly change the risks predicted by the model. Detailed emission calculations using the revised component count are presented in Attachment A16-1.

TABLE A16-1
ESTIMATED FUGITIVE EMISSION SOURCES

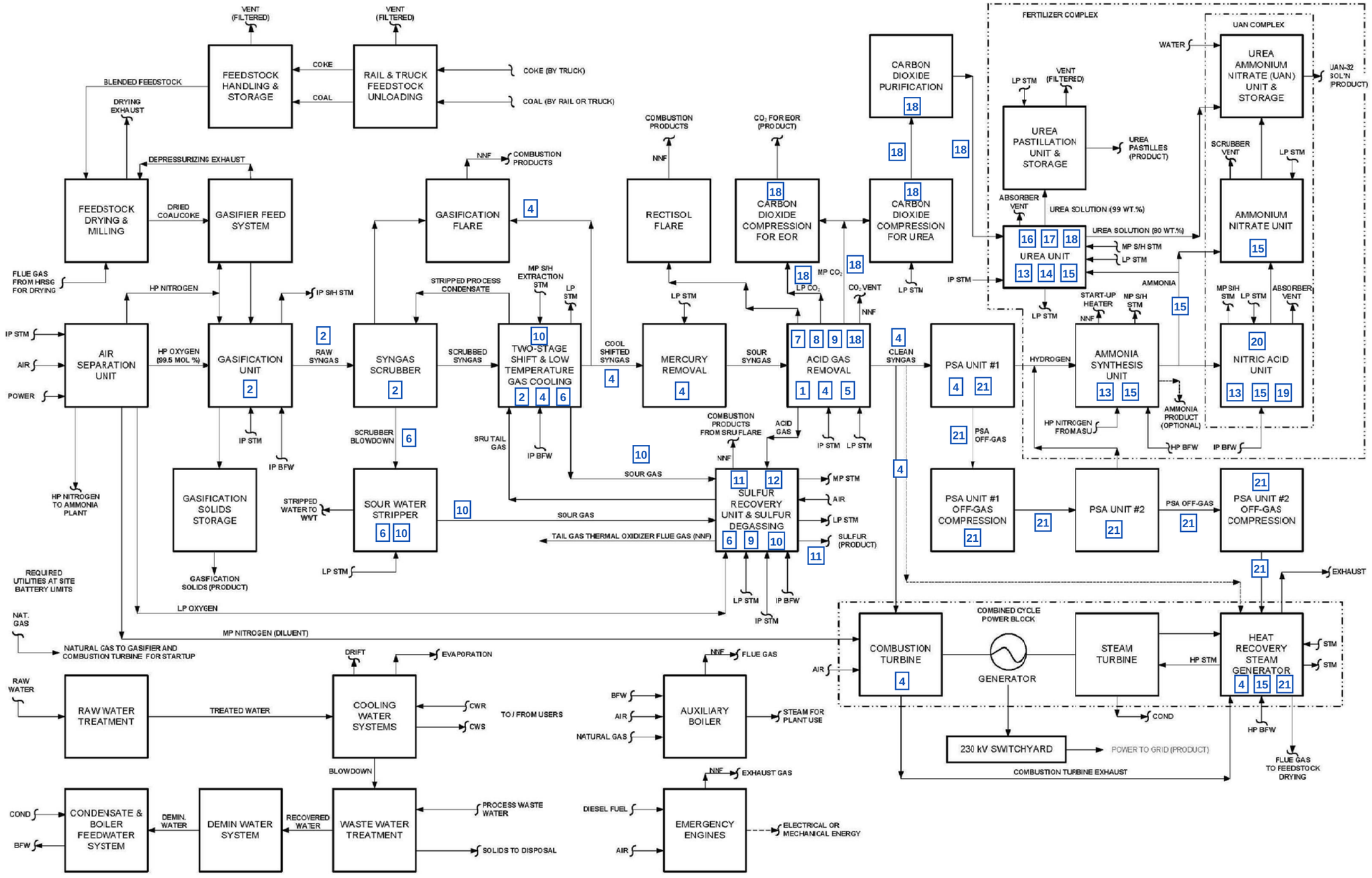
Representative Stream Compositions	Stream 1 Methanol	Stream 2 Syn Gas	Stream 3 *Not Used*	Stream 4 Shifted Syn Gas	Stream 5 Propylene	Stream 6 Sour Water	Stream 7 H2S Laden Methanol	Stream 8 CO2 Laden Methanol	Stream 9 Acid Gas	Stream 10 Ammonia-Laden Gas	Stream 11 Sulfur	Stream 12 SRU Tail Gas	Stream 13 Low NH3 Concentration	Stream 14 Moderate NH3 Concentration	Stream 15 High NH3 Concentration	Stream 16 Low CO2 Concentration	Stream 17 Moderate CO2 Concentration	Stream 18 High CO2 Concentration	Stream 19 NO2	Stream 20 HNO3	Stream 21 PSA Off Gas
Fluid Phase	liquid	vapor	-	vapor	liquid & vapor	liquid	liquid	liquid	vapor	vapor	liquid	vapor	liquid & vapor	liquid & vapor	liquid & vapor	liquid & vapor	vapor	vapor	vapor	liquid	vapor
Component	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %	weight %
CO2	0.00	8.02	0.00	59.9	0.00	1.98	15.6	27.3	49.8	60.6	0.00	65.3	5.77	37.5	0.76	18.9	37.5	97.8	0.00	0.00	14.7
CO	0.00	43.3	0.00	2.97	0.00	0.01	0.01	0.01	2.05	0.22	0.00	2.46	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	8.58
CH4	0.00	0.59	0.00	0.60	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	3.10
H2S	0.00	0.58	0.00	0.62	0.00	0.05	0.92	0.00	28.5	1.35	0.02	1.99	0.00	0.00	0.00	0.00	0.00	1.56	0.00	0.00	0.00
COS	0.00	0.24	0.00	0.00	0.00	0.08	0.00	0.00	2.71	2.09	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
CH3OH	99.7	0.00	0.00	0.00	0.00	0.00	79.1	72.4	1.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.03
C3H6	0.00	0.00	0.00	0.00	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NH3	0.00	0.14	0.00	0.11	0.00	0.70	0.00	0.00	0.00	20.2	0.00	0.00	15.6	49.2	98.0	31.3	49.2	0.00	0.00	0.00	0.00
HCN	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.12	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HCl	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HNO3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	56.2	0.00
NO2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.28	0.00	0.00
Other Components	0.26	47.2	0.00	35.8	0.00	97.1	4.35	0.27	12.4	15.6	100.0	29.6	78.6	13.3	1.26	49.7	13.3	0.26	92.7	43.8	73.6
Total	100	100	0.00	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
VOC[1]	99.7	0.24	0.00	0.00	100	0.08	79.06	72.4	4.23	2.09	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.03
Number of Sources[2]																					
Compressors[3]	0	0	0	0	2	0	0	0	0	0	0	5	0	0	0	0	0	12	0	0	5
Pumps - Light Liquid	4	0	0	0	0	0	6	6	0	0	0	0	6	0	4	6	0	0	0	2	0
Pumps - Heavy Liquid	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Valves - Gas	0	69	0	342	36	0	0	0	122	98	0	66	197	6	147	20	6	506	5	0	164
Valves - Light Liquid	257	0	0	0	546	0	290	285	0	0	0	0	105	2	206	107	0	0	0	66	0
Valves - Heavy Liquid	0	0	0	0	0	366	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0
Connectors	824	208	0	1024	1642	958	962	932	388	252	118	276	826	44	886	400	34	1446	34	188	540

Note 1: VOC (volatile organic compounds) include CH3OH, C3H6, and COS.
Note 2: Values shown for number of sources were multiplied by the following factors to account for unknown emission sources: Valves: 1.5; Connectors: 2.
Note 3: Each compressor stage considered as a separate compressor.

Table A16-2
Summary of Annual Fugitive Emissions

Compound	Name	Emissions (ton/year)
CO_2	Carbon dioxide	71.07
CH_4	Methane	0.66
CO	Carbon monoxide	6.01
NO_2	Nitrogen dioxide	0.0047
SO_2	Sulfur dioxide	0.11
H_2S	Hydrogen Sulfide	1.49
NH_3	Ammonia	4.13
COS	Carbonyl Sulfide	0.14
CH_3OH	Methanol	7.41
C_3H_6	Propylene	9.15
HCN	Hydrogen Cyanide	0.0017
HNO_3	Nitric acid	0.36
HCl	Hydrogen chloride	0.0087
Total VOC	Volatile organic compounds	16.71

Note: The following compounds are included in total VOC: CH_3OH, C_3H_6, COS, and HCN.



OVERALL BLOCK FLOW DIAGRAM WITH LOCATIONS OF FUGITIVE EMISSIONS FROM PROCESS STREAMS

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

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FIGURE A16-1

Source:
Fluor; HECA-SCS, 2012 AFC Update; Overall Block Flow Diagram With Emission Sources;
Drawing No: A4UV-000-25-BFD-0002, Rev. 1 (3/29/12); revised August 2012.

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ATTACHMENT A16-1
REVISED APPENDIX M, PUBLIC HEALTH AND SAFETY

Facility Wide HAP and TAC Emissions Summary

Hydrogen Energy California, LLC
Hydrogen Energy California (HECA) Project

15-Aug-2012

Compound	CAS #	Annual Rate	CTG/HRSG Stack	Coal Dryer Stack	Cooling Tower (Power Block)	Cooling Tower (Process Area)	Cooling Tower (ASU)	Auxiliary Boiler	Ammonia Plant Startup Heater	Emergency Generators	Fire Water Pump	Gasification Flare	SRU Flare	Rectisol Flare	TG Thermal Oxidizer	CO_2 Vent	Manufacturing Complex	Onsite Truck	Onsite Train	Fugitives
		(TPY)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)
Acetaldehyde	75-07-0	2.15E-02	3.66E+01	6.46E+00																
Ammonia*	7664-41-7	1.58E+02	1.56E+05	2.75E+04				1.03E+03									1.22E+05			8.26E+03
Antimony	7440-36-0	1.32E-02	2.24E+01	3.95E+00																
Arsenic	7440-38-2	2.88E-02	4.88E+01	8.61E+00	5.33E-02	8.70E-02	2.40E-02	8.89E-02	1.47E-03			1.43E-02	7.75E-04	3.78E-03	2.13E-02					
Benzene	71-43-2	2.94E-02	4.88E+01	8.61E+00				9.33E-01	1.54E-02			1.50E-01	8.14E-03	3.97E-02	2.24E-01					
Beryllium	7440-41-7	3.11E-03	5.28E+00	9.33E-01				5.33E-03	8.80E-05			8.56E-04	4.65E-05	2.27E-04	1.28E-03					
Cadmium	7440-43-9	1.15E-01	1.95E+02	3.44E+01				4.89E-01	8.07E-03			7.85E-02	4.26E-03	2.08E-02	1.17E-01					
Carbon Disulfide	75-15-0	5.50E-01	9.35E+02	1.65E+02																
Carbonyl Sulfide	463-58-1	2.80E+00														5.32E+03				2.79E+02
Chromium	7440-47-3	6.55E-03	1.04E+01	1.83E+00				6.22E-01	1.03E-02			9.99E-02	5.42E-03	2.64E-02	1.49E-01					
Chromium (hexavalent)	18540-29-9	1.83E-03	3.11E+00	5.49E-01																
Cobalt	7440-48-4	3.14E-03	5.28E+00	9.33E-01				3.73E-02	6.16E-04			5.99E-03	3.25E-04	1.59E-03	8.95E-03					
Copper*	7440-50-8	2.93E-04			1.03E-02	1.69E-02	4.66E-03	3.78E-01	6.23E-03			6.06E-02	3.29E-03	1.61E-02	9.06E-02					
Cyanides	57-12-5	6.99E-02	1.16E+02	2.04E+01																3.46E+00
Fluoride*	1101	1.44E-03			9.31E-01	1.52E+00	4.20E-01													
Formaldehyde	50-00-0	2.28E-01	3.46E+02	6.10E+01				3.33E+01	5.50E-01			5.35E+00	2.91E-01	1.42E+00	7.99E+00					
Hexane	110-54-3	5.87E-01						8.00E+02	1.32E+01			1.28E+02	6.97E+00	3.40E+01	1.92E+02					
Hydrochloric Acid	7647-01-0	1.64E-01	2.64E+02	4.66E+01																1.75E+01
Hydrogen Fluoride (hydrofluoric acid)	7664-39-3	5.98E-01	1.02E+03	1.79E+02																
Hydrogen Sulfide	7783-06-4	2.99E+00														3.01E+03				2.97E+03
Lead	7439-92-1	6.70E-03	1.14E+01	2.01E+00																
Manganese	7439-96-5	1.67E-02	2.11E+01	3.73E+00	2.66E+00	4.35E+00	1.20E+00	1.69E-01	2.79E-03			2.71E-02	1.47E-03	7.18E-03	4.05E-02					
Mercury	7439-97-6	7.71E-03	1.03E+01	4.98E+00				1.16E-01	1.91E-03			1.85E-02	1.01E-03	4.91E-03	2.77E-02					
Methanol	67-56-1	7.41E+00																		1.48E+04
Methyl Bromide (Bromomethane)	74-83-9	5.70E-01	9.70E+02	1.71E+02																
Methylene Chloride (Dichloromethane)	75-09-2	2.63E-02	4.47E+01	7.89E+00																
Naphthalene	91-20-3	3.01E-02	5.08E+01	8.97E+00				2.71E-01	4.47E-03			4.35E-02	2.36E-03	1.15E-02	6.50E-02					
Nickel	7440-02-0	5.35E-03	7.93E+00	1.40E+00				9.33E-01	1.54E-02			1.50E-01	8.14E-03	3.97E-02	2.24E-01					
Nitric Acid*	7697-37-2	3.58E-01																		7.16E+02
Phenol	108-95-2	4.40E-01	7.48E+02	1.32E+02																
Propylene*	115-07-1	9.15E+00																		1.83E+04
Selenium	7782-49-2	6.77E-03	1.14E+01	2.01E+00	4.43E-02	7.23E-02	2.00E-02	1.07E-02	1.76E-04			1.71E-03	9.30E-05	4.53E-04	2.56E-03					
Sulfuric Acid and Sulfates*	7664-93-9	1.14E+00	1.93E+03	3.41E+02																
Toluene	108-88-3	1.50E-03	6.71E-01	1.18E-01				1.51E+00	2.49E-02			2.43E-01	1.32E-02	6.42E-02	3.62E-01					
Vanadium*	7440-62-2	7.50E-04						1.02E+00	1.69E-02			1.64E-01	8.91E-03	4.34E-02	2.45E-01					
Diesel Particulate Matter*	DPM	6.79E-02								4.51E+01	1.84E+00							1.48E+01	7.41E+01	
2-Methylnaphthalene	91-57-6	7.83E-06						1.07E-02	1.76E-04			1.71E-03	9.30E-05	4.53E-04	2.56E-03					
3-Methylchloranthrene	56-49-5	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
7,12-Dimethylbenz(a)anthracene	57-97-6	5.22E-06						7.11E-03	1.17E-04			1.14E-03	6.20E-05	3.02E-04	1.71E-03					
Acenaphthene	83-32-9	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Acenaphthylene	208-96-8	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Anthracene	120-12-7	7.83E-07						1.07E-03	1.76E-05			1.71E-04	9.30E-06	4.53E-05	2.56E-04					
Benz(a)anthracene	56-55-3	2.81E-05	4.68E-02	8.25E-03				8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Benzo(a)pyrene	50-32-8	3.91E-07						5.33E-04	8.80E-06			8.56E-05	4.65E-06	2.27E-05	1.28E-04					
Benzo(b)fluoranthene	205-99-2	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Benzo(g,h,i)perylene	191-24-2	3.91E-07						5.33E-04	8.80E-06			8.56E-05	4.65E-06	2.27E-05	1.28E-04					
Benzo(k)fluoranthene	207-08-9	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Chrysene	218-01-9	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Dibenzo(a,h)anthracene	53-70-3	3.91E-07						5.33E-04	8.80E-06			8.56E-05	4.65E-06	2.27E-05	1.28E-04					
Dichlorobenzene	106-46-7	3.91E-04						5.33E-01	8.80E-03			8.56E-02	4.65E-03	2.27E-02	1.28E-01					
Fluoranthene	206-44-0	9.78E-07						1.33E-03	2.20E-05			2.14E-04	1.16E-05	5.67E-05	3.20E-04					
Fluorene	86-73-7	9.13E-07						1.24E-03	2.05E-05			2.00E-04	1.08E-05	5.29E-05	2.98E-04					
Indeno(1,2,3-cd)pyrene	193-39-5	5.87E-07						8.00E-04	1.32E-05			1.28E-04	6.97E-06	3.40E-05	1.92E-04					
Phenanathrene	85-01-8	5.54E-06						7.55E-03	1.25E-04			1.21E-03	6.59E-05	3.21E-04	1.81E-03					
Pyrene	129-00-0	1.63E-06						2.22E-03	3.67E-05			3.57E-04	1.94E-05	9.44E-05	5.33E-04					
Total Combined HAPs and TACs (tpy)		**185.12**	**81.44**	**14.37**	**0.00**	**0.00**	**0.00**	**0.93**	**0.01**	**0.02**	**0.00**	**0.07**	**0.00**	**0.02**	**0.10**	**4.17**	**61.24**	**0.01**	**0.04**	**2.27E+01**
Total HAPs* (tpy)		**16.74**	**2.46**	**0.44**	**0.00**	**0.00**	**0.00**	**0.42**	**0.01**	**0.00**	**0.00**	**0.07**	**0.00**	**0.02**	**0.10**	**4.17**	**0.00**	**0.00**	**0.00**	**9.05E+00**

Note:

* Denotes pollutants that are not listed as Federal HAPs. These pollutants are not included in the HAP total provided. As shown, combined annual HAP emissions are less than 25 tons per year. Additionally, individual HAP emissions are below 10 tons per year.

Hydrogen Energy California, LLC
Hydrogen Energy California (HECA) Project

15-Aug-2012

Annual emissions based on 100 percent load at annual average temperature (65°F)

CT Fuel Input (Yearly Average - 65°F) =	2,537	10^6 Btu/hr (higher heating value)
Duct Burner Heat Input (Yearly Average - 65°F) =	290	10^6 Btu/hr (higher heating value)
Total HRSG Heat Input (Yearly Average - 65°F) =	2,827	10^6 Btu/hr (higher heating value)

Hourly emissions based on 100 percent load at average high ambient temperature (97°F)

CT Fuel Input (Avg. High Ambient - 97°F) =	2,583	10^6 Btu/hr (higher heating value)
Duct Burner Heat Input (97°F) =	278	10^6 Btu/hr (higher heating value)
Total HRSG Heat Input (97°F) =	2,861	10^6 Btu/hr (higher heating value)

HRSG		
HRSG (Firing Syngas) Normal Operating Hours =	8000	hr/yr
HRSG (Firing Natural Gas) Normal Operating Hours =	336	hr/yr
HRSG Startup Hours =	105	hr/yr
HRSG Shutdown Hours =	18	hr/yr
Total HRSG Operating Hours	**8,459**	**hr/yr**

Coal Dryer		
Coal Dryer Normal Operating Hours =	8000	hr/yr
Coal Dryer Startup Hours =	102	hr/yr
Coal Dryer Shutdown Hours =	8	hr/yr
Total Coal Dryer Operating Hours	**8,110**	**hr/yr**

Exhaust from HRSG normal operation would be splitted into	**85%**	**to HRSG stack**
	15%	**to coal dryer stack**

			HRSG + Coal Dryer					
			Toal Hourly Combined Emission	**Total Annual Combined Emissions**	**CTG/HRSG Stack**		**Coal Dryer Stack**	
Compound	**CAS #**	**Emission Factor** ($lb/10^{12}$ Btu coal)	**Hourly** (lb/hr)	**Annual** (lb/yr)	**Hourly** (lb/hr)	**Annual** (lb/yr)	**Hourly** (lb/hr)	**Annual** (lb/yr)
Acetaldehyde	75-07-0	1.8	5.15E-03	4.30E+01	4.38E-03	3.66E+01	7.72E-04	6.46E+00
Ammonia	7664-41-7	5 ppm	2.17E+01	1.84E+05	1.85E+01	1.56E+05	3.20E+00	2.75E+04
Antimony	7440-36-0	1.1	3.15E-03	2.63E+01	2.68E-03	2.24E+01	4.72E-04	3.95E+00
Arsenic	7440-38-2	2.4	6.87E-03	5.74E+01	5.84E-03	4.88E+01	1.03E-03	8.61E+00
Benz(a)anthracene	56-55-3	0.0023	6.58E-06	5.50E-02	5.59E-06	4.68E-02	9.87E-07	8.25E-03
Benzene	71-43-2	2.4	6.87E-03	5.74E+01	5.84E-03	4.88E+01	1.03E-03	8.61E+00
Beryllium	7440-41-7	0.26	7.44E-04	6.22E+00	6.32E-04	5.28E+00	1.12E-04	9.33E-01
Cadmium	7440-43-9	9.6	2.75E-02	2.30E+02	2.33E-02	1.95E+02	4.12E-03	3.44E+01
Carbon disulfide	75-15-0	46	1.32E-01	1.10E+03	1.12E-01	9.35E+02	1.97E-02	1.65E+02
Chromium (hexavalent)	18540-29-9	0.15	4.38E-04	3.66E+00	3.72E-04	3.11E+00	6.57E-05	5.49E-01
Chromium	7440-47-3	0.51	1.46E-03	1.22E+01	1.24E-03	1.04E+01	2.19E-04	1.83E+00
Cobalt	7440-48-4	0.26	7.44E-04	6.22E+00	6.32E-04	5.28E+00	1.12E-04	9.33E-01
Cyanides	57-12-5	5.7	1.63E-02	1.36E+02	1.39E-02	1.16E+02	2.45E-03	2.04E+01
Formaldehyde	50-00-0	17	4.86E-02	4.07E+02	4.13E-02	3.46E+02	7.30E-03	6.10E+01
Hydrochloric acid	7647-01-0	13	3.72E-02	3.11E+02	3.16E-02	2.64E+02	5.58E-03	4.66E+01
Hydrogen fluoride (Hydrofluoric acid)	7664-39-3	50	1.43E-01	1.20E+03	1.22E-01	1.02E+03	2.15E-02	1.79E+02
Lead	7439-92-1	0.56	1.60E-03	1.34E+01	1.36E-03	1.14E+01	2.40E-04	2.01E+00
Manganese	7439-96-5	1.0	2.98E-03	2.49E+01	2.53E-03	2.11E+01	4.46E-04	3.73E+00
Mercury	7439-97-6	see notes	1.83E-03	1.53E+01	1.21E-03	1.03E+01	6.14E-04	4.98E+00
Methyl bromide (Bromomethane)	74-83-9	47.7	1.36E-01	1.14E+03	1.16E-01	9.70E+02	2.05E-02	1.71E+02
Methylene chloride (Dichloromethane)	75-09-2	2.2	6.29E-03	5.26E+01	5.35E-03	4.47E+01	9.44E-04	7.89E+00
Naphthalene	91-20-3	2.5	7.15E-03	5.98E+01	6.08E-03	5.08E+01	1.07E-03	8.97E+00
Nickel	7440-02-0	0.39	1.12E-03	9.33E+00	9.48E-04	7.93E+00	1.67E-04	1.40E+00
Phenol	108-95-2	36.8	1.05E-01	8.80E+02	8.95E-02	7.48E+02	1.58E-02	1.32E+02
Selenium	7782-49-2	0.56	1.60E-03	1.34E+01	1.36E-03	1.14E+01	2.40E-04	2.01E+00
Sulfuric acid and sulfates	7664-93-9	95	2.72E-01	2.27E+03	2.31E-01	1.93E+03	4.08E-02	3.41E+02
Toluene	108-88-3	0.033	9.44E-05	7.89E-01	8.03E-05	6.71E-01	1.42E-05	1.18E-01

Notes:

1) For the normal operating scenario, the unit will primarily fire syngas with natural gas as a backup fuel.

2) Emission factors are taken from Wabash River test data and the National Energy Technology Laboratory, U.S. Dept of Energy, Major Environmental Aspects of Gasification-based Power Generation Technologies, Final Report, December 2002.

3) Ammonia slip from the SCR (5 parts per million volume dry @ 15 percent O_2) - provided by Fluor - see Criteria Pollutant emission spreadsheet for details.

4) Btu = British thermal units.

5) Mercury (Hg) emission estimates are based on the following assumptions:

Total gasifier coal feed rate	4850	stpd	
Hg concentration in coal feed	0.09	ppmw	
Total Hg in coal feed	0.873	lb/day	= 0.09 lb Hg/10^6 lb coal x 2000 lb/ton
Uncontrolled coal dryer Hg emission (5.5% of feed) from volatilization	0.048	lb/day	
Coal dryer Hg emissions control efficiency	80%		
Controlled coal dryer Hg emission from volatilization	0.0096	lb/day	
Total Controlled coal dryer Hg emission from volatilization + HRSG flue gas	0.0147	lb/day	
Hg in syngas from gasifier	0.863	lb/day	
Control efficiency of the mercury cleanup in the syngas	96%		
Controlled HG emissions in HRSG flue gas	0.034	lb/day	
Controlled HG emissions from the HRSG stack	0.029	lb/day	

6) The emission rates of natural gas firing (startup, shutdown, and 336 hours of steady state operation) were calculated based on the emission factors used for the syngas firing.

7) Approximiately 15% of the HRSG exhaust is directed to the coal dryer where is passes over pulverized coal to dry it before it is injected into the gasifier. Therefore, it was assumed that HRSG/coal dryer exhaust is split based on 85%/15%. No exhaust will be directed to the coal dryer during natural gas operations or portions of startup and shutdown.

8) Annual emissions for both HRSG and coal dryer based on the higher hours of operation of the HRSG

Hydrogen Energy California, LLC *15-Aug-2012*
Hydrogen Energy California (HECA) Project

Cooling Tower Operating Parameters

	Power Block	Process Area	ASU
Cooling water (CW) circulation rate, gpm =	95,500	162,582	44,876
CW circulation rate (million lb/hr) =	48	81	22
CW dissolved solids (ppmw) =	9,000	9,000	2,000
Drift, fraction of circulating CW =	0.0005%	0.0005%	0.0005%
Cooling Tower Operating Hours	8,668	8,314	8,314
Number of cells in tower	12	13	4

Assumed maximum TDS in circulating cooling water, normally TDS will be less.

Power Block Cooling Tower

Compound	CAS # / OEHHA reference #	Emission Factor (ppm)	Hourly (lb/hr)	Annual (lb/yr)	Hourly per Cell (lb/hr)	Annual per Cell (lb/yr)
Arsenic	7440-38-2	0.026	6.15E-06	5.33E-02	5.12E-07	4.44E-03
Copper	7440-50-8	0.005	1.19E-06	1.03E-02	9.95E-08	8.62E-04
Fluoride	1101	0.45	1.07E-04	9.31E-01	8.95E-06	7.76E-02
Manganese	7439-96-5	1.29	3.07E-04	2.66E+00	2.56E-05	2.22E-01
Selenium	7784-49-2	0.02	5.11E-06	4.43E-02	4.26E-07	3.69E-03

Notes:

1) The emissions are based on the concentrations of each constituent found in the raw cooling water analysis, cycles of concentration, and drift rate.
2) Arsenic ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
3) Copper ppm value shown is one-half of stated detection limit.
4) Fluoride ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
5) Manganese ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
6) Selenium ppm value shown taken as average of analytical test results (DWR).

Process Area Cooling Tower

Compound	CAS # / OEHHA reference #	Emission Factor (ppm)	Hourly (lb/hr)	Annual (lb/yr)	Hourly per Cell (lb/hr)	Annual per Cell (lb/yr)
Arsenic	7440-38-2	0.026	1.05E-05	8.70E-02	8.05E-07	6.69E-03
Copper	7440-50-8	0.005	2.03E-06	1.69E-02	1.56E-07	1.30E-03
Fluoride	1101	0.45	1.83E-04	1.52E+00	1.41E-05	1.17E-01
Manganese	7439-96-5	1.29	5.23E-04	4.35E+00	4.02E-05	3.34E-01
Selenium	7784-49-2	0.02	8.70E-06	7.23E-02	6.69E-07	5.56E-03

Notes:

1) The emissions are based on the concentrations of each constituent found in the raw cooling water analysis, cycles of concentration, and drift rate.
2) Arsenic ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
3) Copper ppm value shown is one-half of stated detection limit.
4) Fluoride ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
5) Manganese ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
6) Selenium ppm value shown taken as average of analytical test results (DWR).

ASU Cooling Tower

Compound	CAS # / OEHHA reference #	Emission Factor (ppm)	Hourly (lb/hr)	Annual (lb/yr)	Hourly per Cell (lb/hr)	Annual per Cell (lb/yr)
Arsenic	7440-38-2	0.026	2.89E-06	2.40E-02	7.22E-07	6.00E-03
Copper	7440-50-8	0.005	5.61E-07	4.66E-03	1.40E-07	1.17E-03
Fluoride	1101	0.45	5.05E-05	4.20E-01	1.26E-05	1.05E-01
Manganese	7439-96-5	1.29	1.44E-04	1.20E+00	3.61E-05	3.00E-01
Selenium	7784-49-2	0.02	2.40E-06	2.00E-02	6.00E-07	4.99E-03

Notes:

1) The emissions are based on the concentrations of each constituent found in the raw cooling water analysis, cycles of concentration, and drift rate.
2) Arsenic ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
3) Copper ppm value shown is one-half of stated detection limit.
4) Fluoride ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
5) Manganese ppm value shown taken as average of analytical test results (Fruit Growers Laboratory).
6) Selenium ppm value shown taken as average of analytical test results (DWR).

Auxiliary Boiler — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*

Hydrogen Energy California (HECA) Project

Operating Parameters

Auxiliary Boiler Heat Input =	213	10^6 Btu/hr (HHV)
Natural gas heating value =	1,050	Btu/scf
Fuel usage =	0.203	10^6 scf/hr
Auxiliary Boiler Operating Hours =	2,190	hours per year

Compound	CAS #	Emission Factor ($lb/10^6$ scf)	Hourly (lb/hr)	Annual (lb/yr)
Ammonia	7664-41-7	5 ppm	4.69E-01	1.03E+03
Arsenic	7440-38-2	2.00E-04	4.06E-05	8.89E-02
Benzene	71-43-2	2.10E-03	4.26E-04	9.33E-01
Beryllium	7440-41-7	1.20E-05	2.43E-06	5.33E-03
Cadmium	7440-43-9	1.10E-03	2.23E-04	4.89E-01
Chromium	7440-47-3	1.40E-03	2.84E-04	6.22E-01
Cobalt	7440-48-4	8.40E-05	1.70E-05	3.73E-02
Copper	7440-50-8	8.50E-04	1.72E-04	3.78E-01
Formaldehyde	50-00-0	7.50E-02	1.52E-02	3.33E+01
Hexane	110-54-3	1.80E+00	3.65E-01	8.00E+02
Manganese	7439-96-5	3.80E-04	7.71E-05	1.69E-01
Mercury	7439-97-6	2.60E-04	5.27E-05	1.16E-01
Naphthalene	91-20-3	6.10E-04	1.24E-04	2.71E-01
Nickel	7440-02-0	2.10E-03	4.26E-04	9.33E-01
Selenium	7782-49-2	2.40E-05	4.87E-06	1.07E-02
Toluene	108-88-3	3.40E-03	6.90E-04	1.51E+00
Vanadium	7440-62-2	2.30E-03	4.67E-04	1.02E+00
Benzo(a)pyrene	50-32-8	1.20E-06	2.43E-07	5.33E-04
Benz(a)anthracene	56-55-3	1.80E-06	3.65E-07	8.00E-04
Benzo(b)fluoranthene	205-99-2	1.80E-06	3.65E-07	8.00E-04
Chrysene	218-01-9	1.80E-06	3.65E-07	8.00E-04
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	2.43E-07	5.33E-04
Dichlorobenzene	106-46-7	1.20E-03	2.43E-04	5.33E-01
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	3.65E-07	8.00E-04
2-Methylnaphthalene	91-57-6	2.40E-05	4.87E-06	1.07E-02
3-Methylchloranthrene	56-49-5	1.80E-06	3.65E-07	8.00E-04
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	3.25E-06	7.11E-03
Acenaphthene	83-32-9	1.80E-06	3.65E-07	8.00E-04
Acenaphthylene	208-96-8	1.80E-06	3.65E-07	8.00E-04
Anthracene	120-12-7	2.40E-06	4.87E-07	1.07E-03
Benzo(g,h,i)perylene	191-24-2	1.20E-06	2.43E-07	5.33E-04
Benzo(k)fluoranthene	207-08-9	1.80E-06	3.65E-07	8.00E-04
Fluoranthene	206-44-0	3.00E-06	6.09E-07	1.33E-03
Fluorene	86-73-7	2.80E-06	5.68E-07	1.24E-03
Phenanathrene	85-01-8	1.70E-05	3.45E-06	7.55E-03
Pyrene	129-00-0	5.00E-06	1.01E-06	2.22E-03

Notes:

1) Emission factors (lb/106 scf) are from EPA AP-42, Chapter 1.4, Table 1.4-3 and 1.4-4.

2) Ammonia slip from the SCR (5 parts per million volume dry @ 15 percent O_2) - provided by Fluor - see Criteria Pollutant emission spreadsheet for details.

Ammonia Plant Startup Heater — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*
Hydrogen Energy California (HECA) Project

Operating Parameters

Heat Input =	55	10^6 Btu/hr (HHV)
Natural gas heating value =	1,050	Btu/scf
Fuel usage =	0.052	10^6 scf/hr
Operating Hours =	140	hours per year

Compound	CAS #	Emission Factor ($lb/10^6$ scf)	Hourly (lb/hr)	Annual (lb/yr)
Arsenic	7440-38-2	2.00E-04	1.05E-05	1.47E-03
Benzene	71-43-2	2.10E-03	1.10E-04	1.54E-02
Beryllium	7440-41-7	1.20E-05	6.29E-07	8.80E-05
Cadmium	7440-43-9	1.10E-03	5.76E-05	8.07E-03
Chromium	7440-47-3	1.40E-03	7.33E-05	1.03E-02
Cobalt	7440-48-4	8.40E-05	4.40E-06	6.16E-04
Copper	7440-50-8	8.50E-04	4.45E-05	6.23E-03
Formaldehyde	50-00-0	7.50E-02	3.93E-03	5.50E-01
Hexane	110-54-3	1.80E+00	9.43E-02	1.32E+01
Manganese	7439-96-5	3.80E-04	1.99E-05	2.79E-03
Mercury	7439-97-6	2.60E-04	1.36E-05	1.91E-03
Naphthalene	91-20-3	6.10E-04	3.20E-05	4.47E-03
Nickel	7440-02-0	2.10E-03	1.10E-04	1.54E-02
Selenium	7782-49-2	2.40E-05	1.26E-06	1.76E-04
Toluene	108-88-3	3.40E-03	1.78E-04	2.49E-02
Vanadium	7440-62-2	2.30E-03	1.20E-04	1.69E-02
Benzo(a)pyrene	50-32-8	1.20E-06	6.29E-08	8.80E-06
Benz(a)anthracene	56-55-3	1.80E-06	9.43E-08	1.32E-05
Benzo(b)fluoranthene	205-99-2	1.80E-06	9.43E-08	1.32E-05
Chrysene	218-01-9	1.80E-06	9.43E-08	1.32E-05
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	6.29E-08	8.80E-06
Dichlorobenzene	106-46-7	1.20E-03	6.29E-05	8.80E-03
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	9.43E-08	1.32E-05
2-Methylnaphthalene	91-57-6	2.40E-05	1.26E-06	1.76E-04
3-Methylchloranthrene	56-49-5	1.80E-06	9.43E-08	1.32E-05
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	8.38E-07	1.17E-04
Acenaphthene	83-32-9	1.80E-06	9.43E-08	1.32E-05
Acenaphthylene	208-96-8	1.80E-06	9.43E-08	1.32E-05
Anthracene	120-12-7	2.40E-06	1.26E-07	1.76E-05
Benzo(g,h,i)perylene	191-24-2	1.20E-06	6.29E-08	8.80E-06
Benzo(k)fluoranthene	207-08-9	1.80E-06	9.43E-08	1.32E-05
Fluoranthene	206-44-0	3.00E-06	1.57E-07	2.20E-05
Fluorene	86-73-7	2.80E-06	1.47E-07	2.05E-05
Phenanathrene	85-01-8	1.70E-05	8.90E-07	1.25E-04
Pyrene	129-00-0	5.00E-06	2.62E-07	3.67E-05

Notes:

1) Emission factors (lb/106 scf) are from EPA AP-42, Chapter 1.4, Table 1.4-3 and 1.4-4.

Gasification Flare — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*
Hydrogen Energy California (HECA) Project

Operating Parameters

Reference HHV =	1,050	btu/scf

Gasification Flare - Normal Operating Emissions From Pilot

Total Hours of Pilot Operation =	8,760	hr/yr
Flare Pilot Fuel Use =	0.5	10^6 Btu/hr

Gasification Flare - Operating Emissions During Gasifier Startup and Shutdown

	10^6 Btu/yr	Hours per year
Total Flare SU/SD Operation =	70,528	28
Flaring NG-Firing Rate =	2,926	6
Wet Unshifted Gas-Firing Rate =	2,386	4
Dry Shifted Gas-Firing Rate =	2,413	18

Compound	CAS #	Emission Factor ($lb/10^6$ scf)	Emission Factor ($lb/10^6$ Btu)	Hourly (lb/hr)	Annual (lb/yr)
Arsenic	7440-38-2	2.00E-04	1.90E-07	5.57E-04	1.43E-02
Benzene	71-43-2	2.10E-03	2.00E-06	5.85E-03	1.50E-01
Beryllium	7440-41-7	1.20E-05	1.14E-08	3.34E-05	8.56E-04
Cadmium	7440-43-9	1.10E-03	1.05E-06	3.07E-03	7.85E-02
Chromium	7440-47-3	1.40E-03	1.33E-06	3.90E-03	9.99E-02
Cobalt	7440-48-4	8.40E-05	8.00E-08	2.34E-04	5.99E-03
Copper	7440-50-8	8.50E-04	8.10E-07	2.37E-03	6.06E-02
Formaldehyde	50-00-0	7.50E-02	7.14E-05	2.09E-01	5.35E+00
Hexane	110-54-3	1.80E+00	1.71E-03	5.02E+00	1.28E+02
Manganese	7439-96-5	3.80E-04	3.62E-07	1.06E-03	2.71E-02
Mercury	7439-97-6	2.60E-04	2.48E-07	7.25E-04	1.85E-02
Naphthalene	91-20-3	6.10E-04	5.81E-07	1.70E-03	4.35E-02
Nickel	7440-02-0	2.10E-03	2.00E-06	5.85E-03	1.50E-01
Selenium	7782-49-2	2.40E-05	2.29E-08	6.69E-05	1.71E-03
Toluene	108-88-3	3.40E-03	3.24E-06	9.48E-03	2.43E-01
Vanadium	7440-62-2	2.30E-03	2.19E-06	6.41E-03	1.64E-01
Benzo(a)pyrene	50-32-8	1.20E-06	1.14E-09	3.34E-06	8.56E-05
Benz(a)anthracene	56-55-3	1.80E-06	1.71E-09	5.02E-06	1.28E-04
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.71E-09	5.02E-06	1.28E-04
Chrysene	218-01-9	1.80E-06	1.71E-09	5.02E-06	1.28E-04
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.14E-09	3.34E-06	8.56E-05
Dichlorobenzene	106-46-7	1.20E-03	1.14E-06	3.34E-03	8.56E-02
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	1.71E-09	5.02E-06	1.28E-04
2-Methylnaphthalene	91-57-6	2.40E-05	2.29E-08	6.69E-05	1.71E-03
3-Methylchloranthrene	56-49-5	1.80E-06	1.71E-09	5.02E-06	1.28E-04
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	1.52E-08	4.46E-05	1.14E-03
Acenaphthene	83-32-9	1.80E-06	1.71E-09	5.02E-06	1.28E-04
Acenaphthylene	208-96-8	1.80E-06	1.71E-09	5.02E-06	1.28E-04
Anthracene	120-12-7	2.40E-06	2.29E-09	6.69E-06	1.71E-04
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.14E-09	3.34E-06	8.56E-05
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.71E-09	5.02E-06	1.28E-04
Fluoranthene	206-44-0	3.00E-06	2.86E-09	8.36E-06	2.14E-04
Fluorene	86-73-7	2.80E-06	2.67E-09	7.80E-06	2.00E-04
Phenanathrene	85-01-8	1.70E-05	1.62E-08	4.74E-05	1.21E-03
Pyrene	129-00-0	5.00E-06	4.76E-09	1.39E-05	3.57E-04

Notes:

1) Annual operation assumes total pilot operation of 8,760 hr/yr and plus gasifier startup and shutdown.

2) Emission factors ($lb/10^6$ scf) are from EPA AP-42, Chapter 1.4, Table 1.4-3 and 1.4-4.

SRU Flare — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*
Hydrogen Energy California (HECA) Project

Operating Parameters

Reference HHV =	1,050	btu/scf

SRU Flare - Normal Operating Emissions From Pilot

Total Hours of Pilot Operation =	8,760	hr/yr
Elevated Flare Pilot Fuel Use =	0.3	10^6 Btu/hr

SRU Flare - Operating Emissions During Gasifier Startup and Shutdown

Total Flare Operation During SU/SD =	40.0	hr/yr
Natural Gas Heat Rate (assist gas) =	36.0	10^6 Btu/hr

Compound	CAS #	Emission Factor ($lb/10^6$ scf)	Emission Factor ($lb/10^6$ Btu)	Hourly (lb/hr)	Annual (lb/yr)
Arsenic	7440-38-2	2.00E-04	1.90E-07	6.91E-06	7.75E-04
Benzene	71-43-2	2.10E-03	2.00E-06	7.26E-05	8.14E-03
Beryllium	7440-41-7	1.20E-05	1.14E-08	4.15E-07	4.65E-05
Cadmium	7440-43-9	1.10E-03	1.05E-06	3.80E-05	4.26E-03
Chromium	7440-47-3	1.40E-03	1.33E-06	4.84E-05	5.42E-03
Cobalt	7440-48-4	8.40E-05	8.00E-08	2.90E-06	3.25E-04
Copper	7440-50-8	8.50E-04	8.10E-07	2.94E-05	3.29E-03
Formaldehyde	50-00-0	7.50E-02	7.14E-05	2.59E-03	2.91E-01
Hexane	110-54-3	1.80E+00	1.71E-03	6.22E-02	6.97E+00
Manganese	7439-96-5	3.80E-04	3.62E-07	1.31E-05	1.47E-03
Mercury	7439-97-6	2.60E-04	2.48E-07	8.99E-06	1.01E-03
Naphthalene	91-20-3	6.10E-04	5.81E-07	2.11E-05	2.36E-03
Nickel	7440-02-0	2.10E-03	2.00E-06	7.26E-05	8.14E-03
Selenium	7782-49-2	2.40E-05	2.29E-08	8.30E-07	9.30E-05
Toluene	108-88-3	3.40E-03	3.24E-06	1.18E-04	1.32E-02
Vanadium	7440-62-2	2.30E-03	2.19E-06	7.95E-05	8.91E-03
Benzo(a)pyrene	50-32-8	1.20E-06	1.14E-09	4.15E-08	4.65E-06
Benz(a)anthracene	56-55-3	1.80E-06	1.71E-09	6.22E-08	6.97E-06
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.71E-09	6.22E-08	6.97E-06
Chrysene	218-01-9	1.80E-06	1.71E-09	6.22E-08	6.97E-06
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.14E-09	4.15E-08	4.65E-06
Dichlorobenzene	106-46-7	1.20E-03	1.14E-06	4.15E-05	4.65E-03
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	1.71E-09	6.22E-08	6.97E-06
2-Methylnaphthalene	91-57-6	2.40E-05	2.29E-08	8.30E-07	9.30E-05
3-Methylchloranthrene	56-49-5	1.80E-06	1.71E-09	6.22E-08	6.97E-06
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	1.52E-08	5.53E-07	6.20E-05
Acenaphthene	83-32-9	1.80E-06	1.71E-09	6.22E-08	6.97E-06
Acenaphthylene	208-96-8	1.80E-06	1.71E-09	6.22E-08	6.97E-06
Anthracene	120-12-7	2.40E-06	2.29E-09	8.30E-08	9.30E-06
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.14E-09	4.15E-08	4.65E-06
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.71E-09	6.22E-08	6.97E-06
Fluoranthene	206-44-0	3.00E-06	2.86E-09	1.04E-07	1.16E-05
Fluorene	86-73-7	2.80E-06	2.67E-09	9.68E-08	1.08E-05
Phenanathrene	85-01-8	1.70E-05	1.62E-08	5.88E-07	6.59E-05
Pyrene	129-00-0	5.00E-06	4.76E-09	1.73E-07	1.94E-05

Notes:

1) Annual operation assumes total pilot operation of 8,760 hr/yr plus gasifier startup and shutdown with assist gas.

2) Emission factors ($lb/10^6$ scf) are from EPA AP-42, Chapter 1.4, Table 1.4-3 and 1.4-4.

Rectisol Flare — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*
Hydrogen Energy California (HECA) Project

Operating Parameters

Reference HHV =	1,050	btu/scf

Operating Parameters - Normal Operating Emissions From Pilot

Rectisol Flare Pilot Firing Rate =	0.3	MMBtu/hr
Annual Operating Hours =	8,760	hr/yr

Rectisol Flare - Operating Emissions During Rectisol Startup and Shutdown

Total Flare Operation During SU/SD =	40	hr/yr
Heat Rate of Vent Gas, HHV =	430	10^6 Btu/hr

Compound	CAS Number	Emission Factor ($lb/10^6$ scf)	Emission Factor (lb/MMBtu)	Hourly (lb/hr)	Annual (lb/yr)
Arsenic	7440-38-2	2.00E-04	1.90E-07	8.20E-05	3.78E-03
Benzene	71-43-2	2.10E-03	2.00E-06	8.61E-04	3.97E-02
Beryllium	7440-41-7	1.20E-05	1.14E-08	4.92E-06	2.27E-04
Cadmium	7440-43-9	1.10E-03	1.05E-06	4.51E-04	2.08E-02
Chromium	7440-47-3	1.40E-03	1.33E-06	5.74E-04	2.64E-02
Cobalt	7440-48-4	8.40E-05	8.00E-08	3.44E-05	1.59E-03
Copper	7440-50-8	8.50E-04	8.10E-07	3.48E-04	1.61E-02
Formaldehyde	50-00-0	7.50E-02	7.14E-05	3.07E-02	1.42E+00
Hexane	110-54-3	1.80E+00	1.71E-03	7.38E-01	3.40E+01
Manganese	7439-96-5	3.80E-04	3.62E-07	1.56E-04	7.18E-03
Mercury	7439-97-6	2.60E-04	2.48E-07	1.07E-04	4.91E-03
Naphthalene	91-20-3	6.10E-04	5.81E-07	2.50E-04	1.15E-02
Nickel	7440-02-0	2.10E-03	2.00E-06	8.61E-04	3.97E-02
Selenium	7782-49-2	2.40E-05	2.29E-08	9.84E-06	4.53E-04
Toluene	108-88-3	3.40E-03	3.24E-06	1.39E-03	6.42E-02
Vanadium	7440-62-2	2.30E-03	2.19E-06	9.43E-04	4.34E-02
Benzo(a)pyrene	50-32-8	1.20E-06	1.14E-09	4.92E-07	2.27E-05
Benz(a)anthracene	56-55-3	1.80E-06	1.71E-09	7.38E-07	3.40E-05
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.71E-09	7.38E-07	3.40E-05
Chrysene	218-01-9	1.80E-06	1.71E-09	7.38E-07	3.40E-05
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.14E-09	4.92E-07	2.27E-05
Dichlorobenzene	106-46-7	1.20E-03	1.14E-06	4.92E-04	2.27E-02
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	1.71E-09	7.38E-07	3.40E-05
2-Methylnaphthalene	91-57-6	2.40E-05	2.29E-08	9.84E-06	4.53E-04
3-Methylchloranthrene	56-49-5	1.80E-06	1.71E-09	7.38E-07	3.40E-05
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	1.52E-08	6.56E-06	3.02E-04
Acenaphthene	83-32-9	1.80E-06	1.71E-09	7.38E-07	3.40E-05
Acenaphthylene	208-96-8	1.80E-06	1.71E-09	7.38E-07	3.40E-05
Anthracene	120-12-7	2.40E-06	2.29E-09	9.84E-07	4.53E-05
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.14E-09	4.92E-07	2.27E-05
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.71E-09	7.38E-07	3.40E-05
Fluoranthene	206-44-0	3.00E-06	2.86E-09	1.23E-06	5.67E-05
Fluorene	86-73-7	2.80E-06	2.67E-09	1.15E-06	5.29E-05
Phenanathrene	85-01-8	1.70E-05	1.62E-08	6.97E-06	3.21E-04
Pyrene	129-00-0	5.00E-06	4.76E-09	2.05E-06	9.44E-05

Notes:

1) Annual operation assumes total pilot operation of 8,760 hr/yr plus rectisol startup and shutdown.
2) Emission factors ($lb/10^6$ scf) are from EPA AP-42, Chapter 1.4, Table 1.4-3 and 1.4-4.

Tail Gas Thermal Oxidizer — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*
Hydrogen Energy California (HECA) Project

Operating Parameters

Normal Operations		
Tail Gas Thermal Oxidizer Heat Input =	13	10^6 Btu/hr (HHV)
Natural gas heating value =	1,050	Btu/scf
Fuel usage =	0.012	10^6 scf/hr
Tail Gas Thermal Oxidizer Operating Hours =	8,314	hr/yr
Startup Operations		
Heat Input =	80	10^6 Btu/hr (HHV)
Fuel usage =	0.076	10^6 scf/hr
Startup Hours per year =	48	hr/yr

Compound	CAS #	Emission Factor ($lb/10^6$ scf)	Hourly (lb/hr)	Annual (lb/yr)
Arsenic	7440-38-2	2.00E-04	1.77E-05	2.13E-02
Benzene	71-43-2	2.10E-03	1.86E-04	2.24E-01
Beryllium	7440-41-7	1.20E-05	1.06E-06	1.28E-03
Cadmium	7440-43-9	1.10E-03	9.74E-05	1.17E-01
Chromium	7440-47-3	1.40E-03	1.24E-04	1.49E-01
Cobalt	7440-48-4	8.40E-05	7.44E-06	8.95E-03
Copper	7440-50-8	8.50E-04	7.53E-05	9.06E-02
Formaldehyde	50-00-0	7.50E-02	6.64E-03	7.99E+00
Hexane	110-54-3	1.80E+00	1.59E-01	1.92E+02
Manganese	7439-96-5	3.80E-04	3.37E-05	4.05E-02
Mercury	7439-97-6	2.60E-04	2.30E-05	2.77E-02
Naphthalene	91-20-3	6.10E-04	5.40E-05	6.50E-02
Nickel	7440-02-0	2.10E-03	1.86E-04	2.24E-01
Selenium	7782-49-2	2.40E-05	2.13E-06	2.56E-03
Toluene	108-88-3	3.40E-03	3.01E-04	3.62E-01
Vanadium	7440-62-2	2.30E-03	2.04E-04	2.45E-01
Benzo(a)pyrene	50-32-8	1.20E-06	1.06E-07	1.28E-04
Benz(a)anthracene	56-55-3	1.80E-06	1.59E-07	1.92E-04
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.59E-07	1.92E-04
Chrysene	218-01-9	1.80E-06	1.59E-07	1.92E-04
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.06E-07	1.28E-04
Dichlorobenzene	106-46-7	1.20E-03	1.06E-04	1.28E-01
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	1.59E-07	1.92E-04
2-Methylnaphthalene	91-57-6	2.40E-05	2.13E-06	2.56E-03
3-Methylchloranthrene	56-49-5	1.80E-06	1.59E-07	1.92E-04
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	1.42E-06	1.71E-03
Acenaphthene	83-32-9	1.80E-06	1.59E-07	1.92E-04
Acenaphthylene	208-96-8	1.80E-06	1.59E-07	1.92E-04
Anthracene	120-12-7	2.40E-06	2.13E-07	2.56E-04
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.06E-07	1.28E-04
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.59E-07	1.92E-04
Fluoranthene	206-44-0	3.00E-06	2.66E-07	3.20E-04
Fluorene	86-73-7	2.80E-06	2.48E-07	2.98E-04
Phenanathrene	85-01-8	1.70E-05	1.51E-06	1.81E-03
Pyrene	129-00-0	5.00E-06	4.43E-07	5.33E-04

Notes:
1) Emission factors ($lb/10^6$ scf) are from EPA AP-42, Chapter 1.4, Table 1.4-3 and 1.4-4.

Intermittent CO_2 Vent — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*

Hydrogen Energy California (HECA) Project

Operating Parameters

Total Hours of Operation =	504	hr/yr
Total Flow =	761,400	lb/hr
Total Flow =	17,584	lbmol/hr
Molecular weight		
COS	60	lb/lbmol
H_2S	34	lb/lbmol

Compound	CAS #	Emission Factor (ppm)	Hourly (lb/hr)	Annual (lb/yr)
Carbonyl Sulfide	463-58-1	10	1.06E+01	5.32E+03
Hydrogen Sulfide	7783-06-4	10	5.98E+00	3.01E+03

Notes:

1) Emission rates based on plant design and 504 hours per year of full venting.

Emergency Diesel Generator — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*

Hydrogen Energy California (HECA) Project

Operating Parameters

Emergency Generator Specification =	2,922	Bhp
Emergency Generator Operating Hours =	50	hr/yr

PLEASE NOTE THAT THERE ARE TWO GENERATORS; EMISSION SHOWN IS FOR INDIVIDUAL GENERATORS.

Compound	CAS # /OEHHA reference #	Emission Factor (g/Bhp/hr)	Hourly (lb/hr)	Annual (lb/yr)
Diesel Particulate Matter	9901	0.07	4.51E-01	2.25E+01

Note:

1) Emission factor shown is based on U.S. EPA Tier 4 non-road diesel engine emissions standards.

2) Emission rate shown is for individual generator. There are two generators associated with the Project.

Emergency Diesel Firewater Pump — HAP Emissions Summary

Hydrogen Energy California, LLC — *15-Aug-2012*

Hydrogen Energy California (HECA) Project

Operating Parameters

Fire Water Pump Specification =	556	Bhp
Fire Water Pump Operating Hours =	100	hr/yr

Compound	CAS # /OEHHA reference #	Emission Factor (g/Bhp/hr)	Hourly (lb/hr)	Annual (lb/yr)
Diesel Particulate Matter	9901	0.015	1.84E-02	1.84E+00

Note:

1) Emission factor shown is based on U.S. EPA Tier 4 non-road diesel engine emissions standards.

Hydrogen Energy California, LLC *15-Aug-2012*
Hydrogen Energy California (HECA) Project

Urea HP Absorber

Urea HP Absorber Operating Hours = 8,052 hr/yr

Compound	CAS #	Hourly (lb/hr)	Annual (lb/yr)
Ammonia (NH3)	8013-59-0	11.14	89,675

Note:

1) Emission rate was estimated based on reference plant information. See criteria pollutant emission calculations. Annual operation includes hours for plant startup.

Urea LP Absorber

Urea LP Absorber Operating Hours = 8,052 hr/yr

Compound	CAS #	Hourly (lb/hr)	Annual (lb/yr)
Ammonia (NH3)	8013-59-0	2.02	16,305

Note:

1) Emission rate was estimated based on reference plant information. See criteria pollutant emission calculations. Annual operation includes hours for plant startup.

Urea Pastillation

Urea Pastillation Operating Hours = 8,052 hr/yr

Compound	CAS #	Hourly (lb/hr)	Annual (lb/yr)
Ammonia (NH3)	8013-59-0	1.02	8,224

Note:

1) Emission rate was estimated based on reference plant information. See criteria pollutant emission calculations. Annual operation includes hours for plant startup.

Nitric Acid Unit

Nitric Acid Unit Operating Hours = 8,052 hr/yr

Compound	CAS #	Hourly (lb/hr)	Annual (lb/yr)
Ammonia (NH3)	8013-59-0	1.03	8,282

Note:

1) Emission rate was estimated based on reference plant information. See criteria pollutant emission calculations. Annual operation includes hours for plant startup.

Data Supplied By Client						
	Onsite Petcoke and Coal Trucks(@ 10 mph)		Product Truck (@ 10 mph)		Miscellaneous Truck (@ 10 mph)	Onsite O&M Trucks (@ 15 mph)
Parameter	Running Emissions	Idling Emissions (at each Idle Point)	Running Emissions	Idling Emissions (at each Idle Point)	Running Emissions	Running Emissions Diesel LHDT2
Distance Traveled (mile)	0.96		2.49		2.20	1.00
Per Truck Idle Time (hour)		0.083		0.083		
No. Volume Sources	34	2	73	7	5	10
Maximum number of trucks or loads						
1-hour	6	6	13	13	5	10
Annual average	15,200	15,200	20,880	20,880	1,818	10000
EMFAC2007 Emission Factors (g/mi/trk or g/idle-hour/trk)						
PM_{10}	0.087	0.114	0.087	0.114	0.087	0.024

EMFAC emissions are for fleet year 2010. PM10 emission factor does not include tire wear or break wear contributions.
Feedstock and Product truck emissions are for HHD diesel trucks. O&M trucks are light heavy-duty 2 trucks.

PM10 Emission Rates

	Onsite Petcoke and Coal Trucks (@ 10 mph)		Product Trucks (@ 10 mph)		Miscellaneous Truck (@ 10 mph)	Onsite O&M Trucks (@ 15 mph)
Emission Rates for HARP	Running Emissions	Idling Emissions (at each Idle Point)	Running Emissions	Idling Emissions (at each Idle Point)	Running Emissions	Running Emissions Diesel LHDT2
1-hr PM_{10} (pounds per hour)	1.0E-03	1.2E-04	6.2E-03	2.7E-04	2.3E-03	5.3E-04
Annual PM_{10} (pounds per year)	2.8E+00	3.2E-01	1.0E+01	4.4E-01	7.7E-01	5.3E-01

HARP Inputs - Annual and Hourly Emission Rates per Volume Source

	Onsite Petcoke and Coal Trucks (@ 10 mph)		Product Trucks (@ 10 mph)		Miscellaneous Truck (@ 10 mph)	Onsite O&M Trucks (@ 15 mph)
	Running Emissions	Idling Emissions (at each Idle Point)	Running Emissions	Idling Emissions (at each Idle Point)	Running Emissions	Running Emissions
Max PM_{10} pounds per hour per volume source	3.0E-05	5.8E-05	8.5E-05	3.9E-05	4.6E-04	5.3E-05
PM_{10} pounds per year per volume source	8.2E-02	1.6E-01	1.4E-01	6.2E-02	1.5E-01	5.3E-02

Hydrogen Energy California, LLC *15-Aug-2012*
Hydrogen Energy California (HECA) Project

Maximum Number of Unit Trains	Coal Unit Train (incoming)	Product Unit Train (outgoing)	Maximum Total Trains per period
1-hour	1	1	1
Annual average	109	153	262

	Switching Engine	Line-haul Engine for Coal Train	Line-haul Engine for Product Train
PM10 Emission Factor (g/bhp-hr)	0.08	0.08	0.08
Conversion Factor (bhp-hr/gal)	15.2	20.8	20.8
PM10 Emissions (lbs/hr /engine)	0.046	0.039	0.026
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/year)	1248		
Number of Vome Sources in AERMOD/HARP	104		

Notes:

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

PM10 Emission Rates

	Switching Engine Emissions	Coal Line-haul Engine Emissions	Product Line-haul Engine Emissions
1-hr PM_{10} (pounds per hour)	0.05	0.08	0.00
Annual PM_{10} (pounds per year)	57.18	16.90	8.09

During a given hour either the line-haul engines for the coal train or product train operate, not both, thus emissions from the larger coal trains are only included in the peak hour emissions.

HARP Inputs - Annual and Hourly Emission Rates per Volume Source

Diesel Particulate Matter	Onsite Train Emissions
Max PM_{10} pounds per hour per volume source	1.2E-03
PM_{10} pounds per year per volume source	7.9E-01

Fugitive Emissions - Summary

Emissions Summary

Hydrogen Energy California, LLC
Hydrogen Energy California (HECA) Project

8/15/2012

		Total Uncontrolled Emissions		Total Controlled Emissions	
Compound	**Name**	**Emissions (lb/hr)**	**Emissions (tpy)**	**Emissions (lb/hr)**	**Emissions (tpy)**
CO_2	Carbon dioxide	34.48	151.03	16.17	71.07
CH_4	Methane	2.78E-01	1.22E+00	1.51E-01	6.61E-01
CO	Carbon monoxide	1.78	7.81	1.37	6.01
NO_2	Nitrogen dioxide	0.01	0.06	0.001	0.00
SO_2	Sulfur dioxide	0.12	0.51	0.02	0.11
H_2S	Hydrogen Sulfide	1.44	6.29	0.34	1.49
NH_3	Ammonia	10.18	44.57	0.94	4.13
HCl	Hydrogen Chloride	2.00E-03	8.74E-03	2.00E-03	8.74E-03
HNO_3	Nitric acid	0.81	3.53	0.08	0.36
COS	Carbonyl Sulfide	1.57E-01	6.88E-01	3.19E-02	1.40E-01
CH_3OH	Methanol	15.94	69.82	1.55	7.41
C_3H_6	Propylene	12.95	56.74	2.09	9.15
HCN	Hydrogen Cyanide	1.76E-03	7.72E-03	3.92E-04	1.73E-03
Total VOC	Volatile organic compounds	29.05	127.26	3.67	16.71

Note: The following compounds are included as VOCs, CH_3OH, C_3H_6, COS, and HCN

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	Total Uncontrolled Emissions		Total Controlled Emissions	
Compound	**Emissions (lb/hr)**	**Emissions (tpy)**	**Emissions (lb/hr)**	**Emissions (tpy)**
CO_2	14.14	61.93	8.82	38.89
CO	1.19	5.23	1.13	4.94
CH_4	6.34E-02	2.78E-01	6.21E-02	2.72E-01
H_2S	1.15	5.03	0.23	1.01
COS	1.55E-01	6.80E-01	3.12E-02	0.14
CH_3OH	15.87	69.49	1.52	7.29
C_3H_6	12.95	56.74	2.09	9.15
NH_3	0.50	2.21	0.08	0.33
HCN	1.75E-03	7.66E-03	3.86E-04	1.71E-03
SO2	1.16E-01	5.08E-01	2.47E-02	1.08E-01
HCl	2.00E-03	8.74E-03	2.00E-03	8.74E-03
Total VOC	**28.98**	**126.92**	**3.64**	**16.58**

EPA Table 2-1SOCMI Average Fugitive Emission Factors

Component Type	**Service Type**	**Emission Factor (1) (kg/hr/source)**	**Control Efficiency (%) (3)**
Valves	Gas	5.97E-03	92%
	Light Liquid	4.03E-03	88%
	Heavy Liquid	2.30E-04	
Pump Seals	Light Liquid	1.99E-02	75%
	Heavy Liquid	8.62E-03	
Compressors	Gas	2.28E-01	
Pressure Relief Valves	Gas	1.04E-01	
Connectors	All	1.83E-03	93%
Open-Ended Lines	All	1.70E-03	
Sampling Connections	All	1.50E-02	
Agitator Seals (2)	All	1.99E-02	

Note:
Source: EPA 1995, Protocol for Equipment Leak Emission Estimates
(1) Factors are for total organic compound emission rates. Emission factors assumed to be same for other constituents emitted from the stream.
(2) Factors for light liquid pump seals can be used to estimate the leak rate from agitator seals
(3) Control efficiencies for an LDAR program at a SOCMI process unit using HON reg neg
(control effectiveness attributable to requirements of the hazardous NESHAPS equipment leak regulations)
Emission are conservative since many of these streams are not as volatile as the streams that the SOCMI factors were developed for.
(4) Each Compressor stage considered as a separate compressor.

Area #1: Methanol

Component	**Service**	**Equipment Count (N)**	**Annual Hours of Operation**	**Uncontrolled Emissions (E_{TOC}) lb/hr**	**tpy**	**Controlled Emissions (E_{TOC}) lb/hr**	**tpy**
Valves	Gas	0	8760	-	-	-	-
Valves	Light Liquid	257	8760	2.27	9.96	0.27	1.19
Valves	Heavy Liquid	0	8760	-	-	-	-
Pump Seals	Light Liquid	4	8760	0.18	0.77	0.04	0.19
Pump Seals	Heavy Liquid	0	8760	-	-	-	-
Compressors	Gas	0	8760	-	-	-	-
Connectors	All	824	8760	3.32	14.52	0.23	1.02
			Total	**5.76**	**25.25**	**0.55**	**2.40**
			H_2S	6.18E-06	2.71E-05	5.89E-07	2.58E-06
			CH_3OH	5.76	25.25	0.55	2.40
			HCN	1.63E-04	7.12E-04	1.55E-05	6.78E-05

Area #2: Syn Gas

Component	**Service**	**Equipment Count (N)**	**Annual Hours of Operation**	**Uncontrolled Emissions (E_{TOC}) lb/hr**	**tpy**
Valves	Gas	69	8760	0.48	2.10
Valves	Light Liquid	0	8760	-	-
Valves	Heavy Liquid	0	8760	-	-
Pump Seals	Light Liquid	0	8760	-	-
Pump Seals	Heavy Liquid	0	8760	-	-
Compressors	Gas	0	8760	-	-
Connectors	All	208	8760	0.44	1.94
			Total	**0.92**	**4.04**
			CO_2	0.14	0.61
			CO	0.76	3.31
			CH_4	1.03E-02	4.51E-02
			H_2S	1.01E-02	4.41E-02
			COS	4.27E-03	1.87E-02
			NH_3	2.48E-03	1.09E-02
			HCN	1.29E-04	5.66E-04
			HCl	1.22E-05	5.36E-05

Area #4: Shifted Syn Gas

Component	**Service**	**Equipment Count (N)**	**Annual Hours of Operation**	**Uncontrolled Emissions (E_{TOC}) lb/hr**	**tpy**
Valves	Gas	342	8760	2.89	12.66
Valves	Light Liquid	0	8760	-	-
Valves	Heavy Liquid	0	8760	-	-
Pump Seals	Light Liquid	0	8760	-	-
Pump Seals	Heavy Liquid	0	8760	-	-
Compressors	Gas	0	8760	-	-
Connectors	All	1024	8760	2.65	11.61
			Total	**5.54**	**24.27**
			CO_2	5.17	22.65
			CO	2.56E-01	1.12E+00
			CH_4	5.17E-02	2.26E-01
			H_2S	5.33E-02	2.34E-01
			COS	3.28E-04	1.44E-03
			CH_3OH	8.63E-05	3.78E-04
			NH_3	9.18E-03	4.02E-02
			HCN	1.73E-05	7.56E-05

Area #5: Propylene

Component	**Service**	**Equipment Count (N)**	**Annual Hours of Operation**	**Uncontrolled Emissions (E_{TOC}) lb/hr**	**tpy**	**Controlled Emissions (E_{TOC}) lb/hr**	**tpy**
Valves	Gas	36	8760	0.47	2.08	0.04	0.17
Valves	Light Liquid	546	8760	4.85	21.25	0.58	2.55
Valves	Heavy Liquid	0	8760	-	-	-	-
Pump Seals	Light Liquid	0	8760	-	-	-	-
Pump Seals	Heavy Liquid	0	8760	-	-	-	-
Compressors	Gas	2	8760	1.01	4.40	1.01	4.40
Connectors	All	1642	8760	6.62	29.02	0.46	2.03
			Total	**12.95**	**56.74**	**2.09**	**9.15**
			C_3H_6	12.95	56.74	2.09	9.15

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Area #6: Sour Water

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy
Valves	Gas	0	8760	-	-
Valves	Light Liquid	0	8760	-	-
Valves	Heavy Liquid	366	8760	0.01	0.02
Pump Seals	Light Liquid	0	8760	-	-
Pump Seals	Heavy Liquid	8	8760	0.00	0.02
Compressors	Gas	0	8760	-	-
Connectors	All	958	8760	0.11	0.48
			Total	**0.12**	**0.53**
			CO_2	0.08	0.36
			CO	3.07E-04	1.34E-03
			CH_4	1.26E-05	5.52E-05
			H_2S	2.09E-03	9.15E-03
			COS	3.24E-03	1.42E-02
			NH_3	2.93E-02	0.13
			HCN	1.18E-04	5.15E-04
			HCl	1.98E-03	8.69E-03

Area #7: H_2S Laden Methanol

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	0	8760	-	-	-	-
Valves	Light Liquid	290	8760	2.46	10.77	0.30	1.29
Valves	Heavy Liquid	0	8760	-	-	-	-
Pump Seals	Light Liquid	6	8760	0.25	1.10	0.06	0.28
Pump Seals	Heavy Liquid	0	8760	-	-	-	-
Compressors	Gas	0	8760	-	-	-	-
Connectors	All	962	8760	3.71	16.26	0.26	1.14
			Total	**6.42**	**28.14**	**0.62**	**2.71**
			CO_2	1.05	4.60	0.10	0.44
			CO	3.76E-04	0.00	3.62E-05	1.58E-04
			CH_4	3.02E-04	1.32E-03	2.91E-05	1.27E-04
			H_2S	0.06	0.27	0.01	0.03
			COS	2.75E-04	1.21E-03	2.65E-05	1.16E-04
			CH_3OH	5.31	23.26	0.51	2.24
			HCN	2.01E-04	8.83E-04	1.94E-05	8.49E-05

Area #8: CO_2 Laden Methanol

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	0	8760	-	-	-	-
Valves	Light Liquid	285	8760	2.53	11.06	0.30	1.33
Valves	Heavy Liquid	0	8760	-	-	-	-
Pump Seals	Light Liquid	6	8760	0.26	1.15	0.07	1.15
Pump Seals	Heavy Liquid	0	8760	-	-	-	-
Compressors	Gas	0	8760	-	-	-	-
Connectors	All	932	8760	3.75	16.42	0.26	1.15
			Total	**6.54**	**28.64**	**0.63**	**3.63**
			CO_2	1.79	7.85	0.17	0.99
			CO	8.33E-04	0.00	8.04E-05	4.62E-04
			CH_4	8.46E-04	3.70E-03	8.16E-05	4.69E-04
			H_2S	6.56E-06	2.87E-05	6.33E-07	3.64E-06
			COS	5.87E-07	2.57E-06	5.67E-08	3.26E-07
			CH_3OH	4.74	20.78	0.46	2.63
			HCN	1.18E-04	5.17E-04	1.14E-05	6.55E-05

Area #9: Acid Gas

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	122	8760	1.40	6.14	0.11	0.49
Valves	Light Liquid	0	8760	-	-	-	-
Valves	Heavy Liquid	0	8760	-	-	-	-
Pump Seals	Light Liquid	0	8760	-	-	-	-
Pump Seals	Heavy Liquid	0	8760	-	-	-	-
Compressors	Gas	0	8760	-	-	-	-
Connectors	All	388	8760	1.37	6.01	0.10	0.42
			Total	**2.77**	**12.14**	**0.21**	**0.91**
			CO_2	1.57	6.90	0.12	0.52
			CO	6.47E-02	0.28	4.86E-03	2.13E-02
			CH_4	6.33E-05	2.77E-04	4.75E-06	2.08E-05
			H_2S	0.90	3.94	0.07	0.30
			COS	0.09	0.38	6.45E-03	0.03
			CH_3OH	4.78E-02	0.21	3.59E-03	1.57E-02
			HCN	7.28E-05	3.19E-04	5.46E-06	2.39E-05
			SO_2	9.86E-02	4.32E-01	7.40E-03	3.24E-02

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Area #10: Ammonia-Laden Gas

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	98	8760	1.08	4.75	0.09	0.38
Valves	Light Liquid	0	8760	-	-	-	-
Valves	Heavy Liquid	0	8760	-	-	-	-
Pump Seals	Light Liquid	0	8760	-	-	-	-
Pump Seals	Heavy Liquid	0	8760	-	-	-	-
Compressors	Gas	0	8760	-	-	-	-
Connectors	All	252	8760	0.86	3.76	0.06	0.26
			Total	**1.94**	**8.50**	**0.15**	**0.64**
			CO_2	1.39	6.10	0.11	0.46
			CO	4.99E-03	2.18E-02	3.77E-04	1.65E-03
			CH_4	2.00E-04	8.76E-04	1.51E-05	6.62E-05
			H_2S	0.03	0.14	2.34E-03	1.03E-02
			COS	4.80E-02	2.10E-01	3.62E-03	1.59E-02
			CH_3OH	5.06E-05	2.22E-04	3.82E-06	1.68E-05
			NH_3	0.46	2.03	0.04	0.15
			HCN	9.29E-04	4.07E-03	7.02E-05	3.08E-04

Area #11: Sulfur

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy
Valves	Gas	0	8760	-	-
Valves	Light Liquid	0	8760	-	-
Valves	Heavy Liquid	17	8760	1.52E-06	6.67E-06
Pump Seals	Light Liquid	0	8760	-	-
Pump Seals	Heavy Liquid	0	8760	-	-
Compressors	Gas	0	8760	-	-
Connectors	All	118	8760	8.66E-05	3.80E-04
			Total	**8.82E-05**	**3.86E-04**
			H_2S	8.82E-05	3.86E-04

Area #12: SRU Tail Gas

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy
Valves	Gas	66	8760	0.61	2.68
Valves	Light Liquid	0	8760	-	-
Valves	Heavy Liquid	0	8760	-	-
Pump Seals	Light Liquid	0	8760	-	-
Pump Seals	Heavy Liquid	0	8760	-	-
Compressors	Gas	5	8760	1.77	7.75
Connectors	All	276	8760	0.78	3.43
			Total	**3.16**	**13.86**
			CO_2	2.93	12.85
			CO	0.11	0.48
			H_2S	0.09	0.39
			COS	1.33E-02	5.80E-02
			SO_2	1.73E-02	7.57E-02

Note:
Please note that component counts listed in the tables above are only estimates, and do not represent exact component counts

E_{TOC} = $F_A * WF_{TOC} * N$

Where:
F_A = Applicable average emisison factor for equipment type
WF_{TOC} = Average weight fraction of TOC in the stream
N = Number of pieces of equipment of the applicable equipment type

The SOCMI emission factor does not need to be corrected for methane in the stream, because the emission factor is for total organic compounds.

Area Speciation

Comound	Wt % ($WF_{Constituents}$) Stream 1 Methanol	Stream 2 Syn Gas	Stream 4 Shifted Syn Gas	Stream 5 Propylene	Stream 6 Sour Water	Stream 7 H_2S Laden Methanol	Stream 8 CO_2 Laden Methanol	Stream 9 Acid Gas	Stream 10 Ammonia-Laden Gas	Stream 11 Sulfur	Stream 12 SRU Tail Gas
CO_2	0.0000%	8.0190%	59.8954%	0.0000%	1.9817%	15.6429%	27.3433%	49.7579%	60.5702%	0.0000%	65.2550%
CO	0.0000%	43.2679%	2.9653%	0.0000%	0.0073%	0.0056%	0.0127%	2.0450%	0.2169%	0.0000%	2.4573%
CH_4	0.0000%	0.5887%	0.5989%	0.0000%	0.0003%	0.0045%	0.0129%	0.0020%	0.0087%	0.0000%	0.0000%
H_2S	0.0001%	0.5758%	0.6176%	0.0000%	0.0497%	0.9249%	0.0001%	28.4604%	1.3471%	0.0182%	1.9854%
COS	0.0000%	0.2446%	0.0038%	0.0000%	0.0770%	0.0041%	0.00001%	2.7139%	2.0850%	0.0000%	0.2948%
CH_3OH	99.7400%	0.0000%	0.0010%	0.0000%	0.0000%	79.0583%	72.3583%	1.5120%	0.0022%	0.0000%	0.0000%
C_3H_6	0.0000%	0.0000%	0.0000%	100.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
NH_3	0.0000%	0.1422%	0.1063%	0.0000%	0.6969%	0.0000%	0.0000%	0.0000%	20.1544%	0.0000%	0.0000%
HCN	0.0028%	0.0074%	0.0002%	0.0000%	0.0028%	0.0030%	0.0018%	0.0023%	0.0404%	0.0000%	0.0000%
SO_2	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	3.1161%	0.0000%	0.0000%	0.3846%
HCl	0.0000%	0.0007%	0.0000%	0.0000%	0.0472%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
$WF_{Constituents}$ [1]	**99.74%**	**52.85%**	**64.19%**	**100.00%**	**2.86%**	**95.64%**	**99.73%**	**87.61%**	**84.42%**	**0.02%**	**70.38%**

Conversion Note:
1 kg = 2.20 pound

Note:
(1) $WF_{Constituents}$ does not always equal 100% due to the presence of inerts in the area not listed in table above.

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Component Count	Process Area 1	2	4	5	6	7	8	9	10	11	12
	Methanol	**Syn Gas**	**Shifted Syn Gas**	**Propylene**	**Sour Water**	**H_2S Laden Methanol**	**CO_2 Laden Methanol**	**Acid Gas**	**Ammonia-Laden Gas**	**Sulfur**	**SRU Tail Gas**
Valves - Gas	0	69	342	36	0	0	0	122	98	0	66
Valves - Light Liquid	257	0	0	546	0	290	285	0	0	0	0
Valves - Heavy Liquid	0	0	0	0	366	0	0	0	0	17	0
Pumps - Light Liquid	4	0	0	0	0	6	6	0	0	0	0
Pumps - Heavy Liquid	0	0	0	0	8	0	0	0	0	0	0
Compressors	0	0	0	2	0	0	0	0	0	0	5
Connectors	824	208	1024	1642	958	962	932	388	252	118	276
	1085	**277**	**1366**	**2226**	**1332**	**1258**	**1223**	**510**	**350**	**135**	**347**

	Process Area 1	2	4	5	6	7	8	9	10	11	12	
	Methanol	**Syn Gas**	**Shifted Syn Gas**	**Propylene**	**Sour Water**	**H_2S Laden Methanol**	**CO_2 Laden Methanol**	**Acid Gas**	**Ammonia-Laden Gas**	**Sulfur**	**SRU Tail Gas**	**Total**
Compound	**Annual Fugitive Emissions with LDAR Application (ton/yr)**											
CO_2		0.61	22.65		0.36	0.44	0.99	0.52	0.46		12.85	38.89
CO		3.31	1.12		1.34E-03	1.58E-04	4.62E-04	2.13E-02	1.65E-03		0.48	4.94
CH_4		4.51E-02	0.23		5.52E-05	1.27E-04	4.69E-04	2.08E-05	6.62E-05			0.27
H_2S	2.58E-06	4.41E-02	0.23		9.15E-03	2.62E-02	3.64E-06	0.30	1.03E-02	3.86E-04	0.39	1.01
COS		1.87E-02	1.44E-03		1.42E-02	1.16E-04	3.26E-07	0.03	0.02		5.80E-02	0.14
CH_3OH	2.40		3.78E-04			2.24	2.63	0.02	1.68E-05			7.29
C_3H_6				9.15								9.15
NH_3		1.09E-02	4.02E-02		0.13				0.15			0.33
HCN	6.78E-05	5.66E-04	7.56E-05		5.15E-04	8.49E-05	6.55E-05	2.39E-05	3.08E-04			1.71E-03
SO_2								3.24E-02			7.57E-02	0.11
HCl		5.36E-05			8.69E-03							8.74E-03
Total VOC	**2.40**	**0.02**	**1.89E-03**	**9.15**	**1.47E-02**	**2.24**	**2.63**	**0.04**	**0.02**	**0.00E+00**	**0.06**	**16.58**
Total percentage of VOC content of gas in each process area	99.74%	0.25%	0.01%	100.00%	0.08%	79.07%	72.36%	4.23%	2.13%	0.00%	0.29%	

Note: The following compounds are included as VOCs, although not all compounds are found in the gas in each process area.
CH_3OH, C_3H_6, COS, and HCN

Summary by Volume Source for Modeling - Emissions are divided by number of Volume Sources

"GASIFICATION" (Area #2)

	lb/hr	lb/yr
CO	0.252	2,207.60
H_2S	3.35E-03	29.38
NH_3	8.28E-04	7.26E+00
CH_3OH		
C_3H_6		
HCN	4.31E-05	3.78E-01
HCl	4.08E-06	3.57E-02

3 number of Volume Sources
28 horizontal dimension (m)
46.48 release ht (m)
13.02 horizontal dimension (m)
43.24 vertical dimension (m)
305 vertical dimension used for calcs (ft)

"SHIFT" (Area #4, 6)

	lb/hr	lb/yr
CO	1.28E-01	1,122.54
H_2S	2.77E-02	242.67
NH_3	1.92E-02	168.47
CH_3OH	4.32E-05	0.38
C_3H_6		
HCN	6.75E-05	0.59
HCl	9.92E-04	8.69

2 number of Volume Sources
35 horizontal dimension (m)
6.10 release ht (m)
16.28 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

"AGR" (Area #1, #5, #7, #8, #9)

	lb/hr	lb/yr
CO	5.00E-03	43.79
H_2S	7.36E-02	644.50
NH_3		
CH_3OH	1.66E+00	14575.10
C_3H_6	2.09E+00	18300.12
HCN	5.53E-05	0.48
HCl		
SO_2	7.40E-03	64.83

1 number of Volume Sources
48 horizontal dimension (m)
6.10 release ht (m)
22.33 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

"Sour Water Stripper" (Area #10)

	lb/hr	lb/yr
CO	3.77E-04	3.30
H_2S	2.34E-03	20.51
NH_3	3.50E-02	306.90
CH_3OH	3.82E-06	0.03
C_3H_6		
HCN	7.02E-05	0.62
HCl		

1 number of Volume Sources
16 horizontal dimension (m)
6.10 release ht (m)
7.44 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

"SRU" (Area #11, #12)

2 number of Volume Sources

	lb/hr	lb/yr
CO	5.52E-02	483.84
H_2S	4.47E-02	391.31
NH_3		
CH_3OH		
C_3H_6		
HCN		
HCl		
SO_2	8.64E-03	75.73

2 number of Volume Sources
16 horizontal dimension (m)
6.10 release ht (m)
7.44 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

Note: Selective LDAR program was applied to Areas # 1, #5, #7, #8, #9, #10 due to high uncontrolled emissions for the VOCs (methanol and propylene) and hydrogen sulfide

Fugitive Emissions - Fertilizer Complex

Hydrogen Energy California, LLC
Hydrogen Energy California (HECA) Project

	Total Uncontrolled Emissions		Total Controlled Emissions	
Compound	**Emissions (lb/hr)**	**Emissions (tpy)**	**Emissions (lb/hr)**	**Emissions (tpy)**
CO_2	20.34	89.11	7.35	32.18
CO	5.89E-01	2.58E+00	2.44E-01	1.07E+00
CH_4	2.14E-01	9.38E-01	8.87E-02	3.88E-01
H_2S	0.29	1.26	1.08E-01	0.47
COS	1.91E-03	8.35E-03	7.18E-04	3.15E-03
CH_3OH	0.08	0.33	0.03	0.13
NH_3	9.67	42.36	0.87	3.80
HCN	1.44E-05	6.30E-05	5.41E-06	2.37E-05
HNO_3	0.81	3.53	0.08	0.36
NO_2	1.48E-02	6.47E-02	1.08E-03	4.74E-03

EPA Table 2-1SOCMI Average Fugitive Emission Factors

Component Type	Service Type	Emission Factor (1) (kg/hr/source)	Control Efficiency (%) (3)
Valves	Gas	5.97E-03	92%
	Light Liquid	4.03E-03	88%
	Heavy Liquid	2.30E-04	
Pump Seals	Light Liquid	1.99E-02	75%
	Heavy Liquid	8.62E-03	
Compressor Seals	Gas	2.28E-01	
Pressure Relief Valves	Gas	1.04E-01	
Connectors	All	1.83E-03	93%
Open-Ended Lines	All	1.70E-03	
Sampling Connections	All	1.50E-02	
Agitator Seals (2)	All	1.99E-02	

Note:
Source: EPA 1995, Protocol for Equipment Leak Emission Estimates
(1) Factors are for total organic compound emission rates. Emission factors assumed to be same for other constituents emitted from the stream.
(2) Factors for light liquid pump seals can be used to estimate the leak rate from agitator seals
(3) Control efficiencies for an LDAR program at a SOCMI process unit using HON reg neg
(control effectiveness attributable to requirements of the hazardous NESHAPS equipment leak regulations)
It was assumed that factors for connectors can be used to estimate the leak rate from flanges.
Emission are conservative since these streams are not as volatile as the streams that the SOCMI factors were developed for.

Stream 13: Low NH3 Concentration

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	196.5	8760	0.55	2.42	0.04	0.19
Valves	Light Liquid	105	8760	0.20	0.87	0.02	0.10
Pumps	Light Liquid	6	8760	0.06	0.25	0.01	0.06
Compressors	All	0	8760	-	-	-	-
Connectors	All	826	8760	0.71	3.12	0.05	0.22
			Total	**1.52**	**6.66**	**0.13**	**0.58**
			CO_2	0.41	1.80	0.04	0.16
			NH_3	1.11	4.86	0.10	0.42

Stream 14: Moderate NH3 Concentration

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	6	8760	0.07	0.30	0.01	0.02
Valves	Light Liquid	2	8760	0.01	0.05	0.00	0.01
Pumps	Light Liquid	0	8760	-	-	-	-
Compressors	All	0	8760	-	-	-	-
Connectors	All	44	8760	0.15	0.67	0.01	0.05
			Total	**0.23**	**1.02**	**0.02**	**0.08**
			CO_2	0.10	0.44	0.01	0.03
			NH_3	0.13	0.58	0.01	0.04

Stream 15: High NH3 Concentration

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	147	8760	1.91	8.37	1.53E-01	6.69E-01
Valves	Light Liquid	206	8760	1.80	7.90	0.22	0.95
Pumps	Light Liquid	4	8760	0.17	0.76	0.04	0.19
Compressors	All	0	8760	-	-	-	-
Connectors	All	886	8760	3.53	15.46	2.47E-01	1.08E+00
			Total	**7.42**	**32.48**	**6.60E-01**	**2.89E+00**
			CO_2	0.06	0.25	5.07E-03	2.22E-02
			NH_3	7.36	32.23	0.65	2.87

Stream 16: Low CO2 Concentration

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	20	8760	0.13	0.56	1.03E-02	4.52E-02
Valves	Light Liquid	107	8760	0.48	2.08	0.06	0.25
Pumps	Light Liquid	6	8760	0.13	0.58	0.03	0.14
Compressors	All	0	8760	-	-	-	-
Connectors	All	400	8760	0.81	3.55	5.67E-02	2.48E-01
			Total	**1.55**	**6.77**	**1.57E-01**	**6.88E-01**
			CO_2	0.58	2.55	5.91E-02	2.59E-01
			NH_3	0.96	4.22	0.10	0.43

Stream 17: Moderate CO2 Concentration

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	6	8760	0.07	0.30	0.01	0.02
Valves	Light Liquid	0	8760	-	0.00E+00	0.00E+00	0.00E+00
Pumps	Light Liquid	0	8760	-	-	-	-
Compressors	All	0	8760	-	-	-	-
Connectors	All	34	8760	0.12	5.21E-01	8.32E-03	3.65E-02
			Total	**1.87E-01**	**8.21E-01**	**1.38E-02**	**6.05E-02**
			CO_2	8.11E-02	3.55E-01	5.98E-03	2.62E-02
			NH_3	1.06E-01	4.65E-01	7.83E-03	3.43E-02

Fugitive Emissions - Fertilizer Complex

Hydrogen Energy California, LLC
Hydrogen Energy California (HECA) Project

Stream 18: High CO2 Concentration

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	506	8760	6.64	29.07	5.31E-01	2.33
Valves	Light Liquid	0	8760	-	-	-	-
Pumps	Light Liquid	0	8760	-	-	-	-
Compressors	All	12	8760	6.02	26.35	6.02	26.35
Connectors	All	1446	8760	5.82	25.49	4.07E-01	1.78
			Total	**18.47**	**80.90**	**6.95E+00**	**30.46**
			CO_2	18.10	79.30	6.82	29.86
			CO	1.26E-03	5.52E-03	4.74E-04	2.08E-03
			CH_4	1.70E-03	7.46E-03	6.41E-04	2.81E-03
			H_2S	0.29	1.26	0.11	0.47
			COS	1.91E-03	8.35E-03	7.18E-04	3.15E-03
			CH_3OH	0.07	0.32	0.03	0.12
			HCN	1.44E-05	6.30E-05	5.41E-06	2.37E-05

Stream 19: NO2

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	5	8760	4.80E-03	2.10E-02	3.84E-04	1.68E-03
Valves	Light Liquid	0	8760	-	-	-	-
Pumps	Light Liquid	0	8760	-	-	-	-
Compressors	All	0	8760	-	-	-	-
Connectors	All	34	8760	1.00E-02	4.38E-02	7.00E-04	3.07E-03
			Total	**1.48E-02**	**6.48E-02**	**1.08E-03**	**4.75E-03**
			HNO_3	3.46E-05	1.51E-04	2.53E-06	1.11E-05
			NO_2	1.48E-02	6.47E-02	1.08E-03	4.74E-03

Stream 20: HNO3

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	0	8760	-	-	-	-
Valves	Light Liquid	66	8760	0.33	1.44	0.04	0.17
Pumps	Light Liquid	2	8760	4.93E-02	2.16E-01	1.23E-02	5.40E-02
Compressors	All	0	8760	-	-	-	-
Connectors	All	188	8760	0.43	1.87	2.99E-02	0.13
			Total	**0.81**	**3.53**	**0.08**	**0.36**
			HNO_3	0.81	3.53	0.08	0.36

Stream 21: PSA Off Gas

Component	Service	Equipment Count (N)	Annual Hours of Operation	Uncontrolled Emissions (E_{TOC}) lb/hr	Uncontrolled Emissions (E_{TOC}) tpy	Controlled Emissions (E_{TOC}) lb/hr	Controlled Emissions (E_{TOC}) tpy
Valves	Gas	164	8760	0.57	2.50	0.05	0.20
Valves	Light Liquid	0	8760	-	-	-	-
Pumps	Light Liquid	0	8760	-	-	-	-
Compressors	All	5	8760	0.66	2.91	0.66	2.91
Connectors	All	540	8760	0.58	2.52	0.04	0.18
			Total	**1.81**	**7.93**	**0.75**	**3.28**
			CO_2	1.01	4.42	0.42	1.83
			CO	0.59	2.57	2.44E-01	1.07
			CH_4	0.21	0.93	8.80E-02	0.39
			CH_3OH	1.83E-03	8.01E-03	7.58E-04	3.32E-03

Note:
Please note that component counts listed in the tables above are only estimates, and do not represent exact component counts

E_{TOC} = $F_A * WF_{TOC} * N$

Where:
F_A = Applicable average emisison factor for equipment type
WF_{TOC} = Average weight fraction of TOC in the stream
N = Number of pieces of equipment of the applicable equipment type

The SOCMI emission factor does not need to be corrected for methane in the stream, because the emission factor is for total organic compounds.

Stream Speciation

Comound	Wt % ($WF_{Constituent}$) Stream 13 Low NH3 Concentration	Stream 14 Moderate NH3 Concentration	Stream 15 High NH3 Concentration	Stream 16 Low CO2 Concentration	Stream 17 Moderate CO2 Concentration	Stream 18 High CO2 Concentration	Stream 19 NO2	Stream 20 HNO3	Stream 21 PSA Off Gas
CO_2	5.7714%	37.5330%	0.7583%	18.9000%	37.5330%	97.7605%	0.0000%	0.0000%	14.7155%
CO	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0068%	0.0000%	0.0000%	8.5794%
CH_4	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0092%	0.0000%	0.0000%	3.1006%
H_2S	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	1.5552%	0.0000%	0.0000%	0.0000%
COS	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0103%	0.0000%	0.0000%	0.0000%
CH_3OH	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.4003%	0.0000%	0.0000%	0.0267%
NH_3	15.5943%	49.1670%	97.9750%	31.3143%	49.1670%	0.0000%	0.0000%	0.0000%	0.0000%
HCN	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0001%	0.0000%	0.0000%	0.0000%
HNO_3	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0170%	56.2243%	0.0000%
NO_2	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	7.2766%	0.0000%	0.0000%
$WF_{Constituents}$ [1]	**21.4%**	**86.7%**	**98.7%**	**50.2%**	**86.7%**	**99.7%**	**7.3%**	**56.2%**	**26.4%**

Conversion Note:
1 kg = 2.20 pound

Note:
(1) $WF_{Constituent}$ only shows the constituants that are of concern for air quality permitting, such as VOCs, TACs, criteria pollutants and GHGs

	Stream 13 Low NH3 Concentration	Stream 14 Moderate NH3 Concentration	Stream 15 High NH3 Concentration	Stream 16 Low CO2 Concentration	Stream 17 Moderate CO2 Concentration	Stream 18 High CO2 Concentration	Stream 19 NO2	Stream 20 HNO3	Stream 21 PSA Off Gas
Valves - Gas	197	6	147	20	6	506	5	0	164
Valves - Light Liquid	105	2	206	107	0	0	0	66	0
Pumps - Light Liquid	6	0	4	6	0	0	0	2	0
Compressors	0	0	0	0	0	12	0	0	5
Connectors	826	44	886	400	34	1446	34	188	540
	1134	**52**	**1243**	**532**	**40**	**1964**	**39**	**256**	**709**

Compound	Stream 13 Low NH3 Concentration	Stream 14 Moderate NH3 Concentration	Stream 15 High NH3 Concentration	Stream 16 Low CO2 Concentration	Stream 17 Moderate CO2 Concentration	Stream 18 High CO2 Concentration	Stream 19 NO2	Stream 20 HNO3	Stream 21 PSA Off Gas	Total
	Annual Fugitive Emissions with LDAR Application (ton/yr)									
CO_2	0.16	0.03	0.02	0.26	2.62E-02	29.86			1.83	32.18
CO						2.08E-03			1.07	1.07
CH_4						2.81E-03			0.39	0.39
H_2S						0.47				0.47
COS						3.15E-03				0.00
CH_3OH						0.12			3.32E-03	0.13
NH_3	0.42	0.04	2.87	0.43	3.43E-02					3.80
HCN						2.37E-05				0.00
HNO_3							1.11E-05	3.58E-01		0.36
NO_2							4.74E-03			0.00

Fugitive Emissions - Fertilizer Complex

Hydrogen Energy California, LLC
Hydrogen Energy California (HECA) Project
Summary by Volume Source for Modeling - Emissions are divided by number of Volume Sources

UAN Unit — Streams 19, 20

	lb/hr	lb/yr
HNO_3	8.18E-02	7.16E+02
NO_2	1.08E-03	9.48E+00

1 number of Volume Sources
24 horizontal dimension (m)
6.10 release ht (m)
11.16 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

Urea Unit — Streams 14, 16, 17

	lb/hr	lb/yr
NH_3	5.79E-02	5.07E+02

2 number of Volume Sources
12 horizontal dimension (m)
6.10 release ht (m)
5.58 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

Ammonia Unit — Streams 13, 15

	lb/hr	lb/yr
NH_3	3.75E-01	3.29E+03

2 number of Volume Sources
24 horizontal dimension (m)
6.10 release ht (m)
11.16 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

CO2 Compression — Stream 18

	lb/hr	lb/yr
CO	4.74E-04	4.15E+00
H_2S	1.08E-01	9.50E+02
COS	7.18E-04	6.29E+00
CH_3OH	2.79E-02	2.44E+02
HCN	5.41E-06	4.74E-02

1 number of Volume Sources
24 horizontal dimension (m)
6.10 release ht (m)
11.16 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

PSA Unit — Stream 21

	lb/hr	lb/yr
CO	2.44E-01	2.13E+03
CH_3OH	7.58E-04	6.64E+00

1 number of Volume Sources
24 horizontal dimension (m)
6.10 release ht (m)
11.16 horizontal dimension (m)
5.67 vertical dimension (m)
40 vertical dimension used for calcs (ft)

Note: LDAR program was applied to All Areas (# 13 through #21)

HECA Project
Major Source Emission Calculations with Significance Thresholds for PSD

Total Reduced Sulfur

Pollutant	Annual Rate (tons per year)	TRS as H2S (tons/yr)	Molecular Wt	Source of emissions		
Hydrogen Sulfide	2.99	2.99	34	CO_2 vent and fugitives		
Carbonyl Sulfide	2.80	1.59	60	CO_2 vent and fugitives	**Significance Threshold (tons/yr)**	**Significant?**
	Total	**4.58**			10.00	no

TRS definition: the total reduced sulfur contained in hydrogen sulfide, mercaptans, dimethyl sulfide, dimethyl disulfide or other organic sulfide compounds, all expressed as hydrogen sulfide. Sulfur dioxide, sulfur trioxide, or sulfuric acid are not to be included in the determination of TRS.

Reduced Sulfur Compounds

Pollutant	Annual Rate (tons per year)	RSC as H2S (tons/yr)	Molecular Wt	Source of emissions		
Hydrogen Sulfide	2.99	2.99	34	CO_2 vent and fugitives		
Carbon Disulfide	0.55	0.25	76	CTG/HRSG and coal dryer		
Carbonyl Sulfide	2.80	1.59	60	CO_2 vent and fugitives	**Significance Threshold (tons/yr)**	**Significant?**
	Total	**4.83**			10.00	no

Reduced sulfur compounds means H2S, carbonyl sulfide (COS), and carbon disulfide (CS2).

Sulfuric Acid Mist

Pollutant	Annual Rate (tons per year)	Significance Threshold (tons/yr)	Significant ?	Source of emissions
Sulfuric Acid Mist	1.14	7.00	no	CTG/HRSG and coal dryer

Hydrogen Sulfide

Pollutant	Annual Rate (tons per year)	Significance Threshold (tons/yr)	Significant ?	Source of emissions
Hydrogen Sulfide	2.99	10.00	no	CO_2 vent and fugitives

Fluorides

Pollutant	Annual Rate (tons per year)	Significance Threshold (tons/yr)	Significant ?	Source of emissions
Fluoride	0.001	3.00	no	Cooling towers

Lead

Pollutant	Annual Rate (tons per year)	Significance Threshold (tons/yr)	Significant ?	Source of emissions
Lead	0.007	0.60	no	CTG/HRSG and coal dryer

Pollutants listed above are in 40 CFR 52.21 (as of Apr 6, 2012)

BACKGROUND: TRAIN EMISSIONS ASSUMPTIONS

The Amended AFC has train emissions assumptions that are not supported and that staff considers questionable. The onsite switcher locomotive is noted to have an engine of 260 horsepower. Staff's experience indicates switcher locomotive engines are generally 3 to 8 times larger, and a review of locomotive manufacturer's websites and other internet resources did not find any switcher locomotives with engines that small. The applicant has also assumed Tier 3 engines for both the switcher and line haul locomotives; however, in staff's experience the line-haul railroads, the Union Pacific (UP) and the Burlington Northern Santa Fe (BNSF and others will not guarantee the use of specific or dedicated locomotives. Staff needs the applicant to provide additional information to support these assumptions, or provide revised emissions calculations.

DATA REQUEST

A17. Please provide the manufacturer data, including engine tier information, for the assumed 260 horsepower switcher locomotive or if the engine size is changed after further review as suggested above, for the revised horsepower size.

RESPONSE

Specifications for the designated onsite switching engine are provided in Attachment A17-1. This engine, or a similar engine, will be used onsite to move feedstock and product rail cars. For additional information regarding the locomotive engine, see the response to Data Request No. A18.

ATTACHMENT A17-1
SWITCHING ENGINE SPECIFICATIONS

TITAN

TRACKMOBILE®
MOBILE RAILCAR MOVERS

Equa-Flex Pivoting Main Frame

Digital Instrumentation Display

Command Post Joystick

- Tier III Electronic Engine
- CAN-Bus Control System
- Larger Cab with controls integrated into seat
- Air Ride, High Back Swivel Seat with Joystick controls
- Automatic/Manual Power-Shift Transmission
- Digital Gauge Display
- On Board Diagnostics
- Neutral Braking
- Programmed Throttle Control
- Oscillating Frame for equalized wheel loading
- Air Suspension under cab & body frame
- 100 CFM Rotary Compressor

TITAN

TRACKMOBILE®
MOBILE RAILCAR MOVERS

1602 Executive Drive
LaGrange, Georgia 30240 USA
(706) 884-6651 Fax: (706) 884-0390
www.trackmobile.com

TRACKMOBILE®

TITAN SPECIFICATIONS

MAXIMUM TRACTIVE EFFORT:
- 49,500 lbs [22,453 kg] double coupled
- 33,100 lbs [15,014 kg] single coupled

DRIVE TRAIN CONFIGURATION:

Power transmitted through torque converter, transmission, and transfer case to No-Spin differential and planetary axle assemblies.
- **Engine:** Cummins QSB6.7 turbocharged diesel engine, 6 cylinder, 4 cycle, 260 HP [194 kW] Tier III, Max. torque 550 FT. LBF (748 N-M).
- **Transmission and Torque Converter:** Funk DF Series, four speed forward and reverse.
- **Transfer Case**: Heavy duty hardened alloy steel spur gears. Oil bath lubrication.
- **Rail Drive Axles:** Two Axletech Model PRLC, planetary type.
- **Roadwheel Drive:** Interlocking lug drive.

FRAME:

Heavy-duty, 2" [51 mm] welded frame.

BRAKES:
- **Rail & Road:** Hydraulic actuated disc brakes.
- **Train Brakes:** 100 CFM
- **Parking:** Spring applied, air released, disc/caliper arrangement
- **Neutral Braking:** Automatically applies brake in neutral.

RAIL WHEELS:

27" [686 mm] heat treated cast steel. (AAR) specification

ROAD WHEELS:

20 ply 12.00x20 heavy duty mine service, rubber tires

RAIL GAUGE:

Standard gauge: 56 1/2" [1435 mm]

ELECTRICAL SYSTEM:

12 Volt DC, 160 Amp Alternator, 925 CCA Dual Batteries

AIR INTAKE SYSTEM:

2 Stage filtration, primary + safety element

POWER STEERING:

Hydraulic steering system, pivoting steering wheel

HYDRAULIC SYSTEM:

Constant pressure hydraulic system, with piston pump

COUPLERS:

Two heavy-duty cast steel, AAR style. Air operated, electrically controlled knuckle release.

SANDERS:

Air operated, electrically controlled eight sanders

LIGHTS:

Operator's cab, interior dome, one clear, one red
Rail Mode & Road Mode - 6 halogen lights, 3 each front & rear
2 tail & stop combination, rear mounted
2 lateral work lights to illuminate roadbed
Step lights

OPERATOR CAB:

Totally enclosed 360 degree visibility. Sound level under 85 dBA. Two doors. Air-ride suspension with stabilizing shock absorbers for body frame and cab. Air suspension seat with 180° swival. Full instrumentation with digital video display. Cup holders. Rear coupler alignment camera. Arm rest controls. Sun visor. Strobe light. Windshield washers. Fold down jump seat.

WARNING SIGNAL:

Blast type air horn, automatic backup alarm for road operation. Electric alarm.

OPTIONS:

5 & 10# fire extinguishers, air conditioning, air intake pre-cleaner, auxiliary transmission oil cooler, battery wrap heater, cab window extension, camera location options, cold weather fluids, cylinder rod protectors, engine block heater, engine oil pan heater, foam filled tires, (GCS) Ground Control System, hydraulic tank heater, MAX-TRAC wheel slip control, MAX-TRAN® automatic weight transfer system, radio control, switch control spot light, train air charge indicator, transmission oil heater, track mirrors/cab side, track mirrors/off side, turn signals, V shaped snow plow, wide traverse couplers for sharp curves/long cars.

TITAN DIMENSIONS

	On Rail AAR Clearance Pattern Maintained		On Road	
Wheel Base	149.3"	3792 mm	82.5"	2096 mm
Length	194.8"	4948 mm	194.8"	4948 mm
Width	123.0"	3124 mm	123.0"	3124 mm
Height	**145.8"	3703 mm	156.8"	3983 mm
Weight	50,850 lbs. [23,065 kg]			

TABLE OF PERFORMANCE

Maximum Speed* (Both Directions)	On Rail		On Road	
Low	2.4 MPH	[3.9 km/h]	1.5 MPH	[2.4 km/h]
2nd gear	4.0 MPH	[6.4 km/h]	2.0 MPH	[3.2 km/h]
3rd gear	8.0 MPH	[12.8 km/h]	4.0 MPH	[6.4 km/h]
4th gear	14.0 MPH	[22.5 km/h]	8.0 MPH	[12.8 km/h]

*Actual speeds obtained will depend on grade, load, track conditions and other factors.

**Shipping height will increase by 1 1/2" due to rail flange plus any necessary truck blocking required.

Trackmobile® LLC reserves the right to change specifications at any time without prior notice.

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A Marmon Group/Berkshire Hathaway Company

DATA REQUEST

A18. Please provide guarantees from the line-haul railroad that they will use specific locomotives for this project and revise emissions to that specific guarantee, or use fleet average emissions factors from U.S. Environmental Protection Agency (U.S. EPA), as provided in EPA-420-F-09-025 (http://www.epa.gov/otaq/regs/nonroad/locomotv/420f09025.pdf), to revise the line-haul locomotive emissions estimates.

RESPONSE

The fleet mix of line-haul engines that will be used to move feedstock and products for HECA will meet or exceed USEPA Tier 2+ or 3. Tier 2+ engines are remanufactured engines that meet the revised 2008 standards and have the same emission limits as new Tier 3 engines. Currently, the fleet mix of line-haul engines in the South Coast Air Quality Management District (SCAQMD) meets these standards; and by 2017, when commercial operation will start, the state mix is expected to meet these standards. HECA will also specify that the rail contractor use engines for the Project that meet these standards.

In the 2012 Amended AFC, locomotive engine emissions were calculated using the emission standards outlined in 40 Code of Federal Regulations (CFR) Part 1033. Per the California Energy Commission's (CEC's) recommendation, locomotive engine emissions calculations were updated using the average emissions factors for line-haul and switch locomotives from the USEPA document "Technical Highlights: Emission Factors for Locomotives" for Tier 2+ and Tier 3 engines.

As presented in the 2012 Amended AFC, onsite 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 at Notch 1 horsepower, and offsite emissions were calculated based on an average locomotive load factor obtained from the "Port of Long Beach Air Emissions Inventory for 2007," which was based on data derived from USEPA. Offsite 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.

Updated transportation emissions are presented in Attachment A18-1 (Revised Appendix E-5) Offsite Operational Transportation Emissions; and Attachment A18-2 (Revised Appendix E-12) Operational Transportation Emissions for Alternative 2.

ATTACHMENT A18-1
REVISED APPENDIX E-5 OFFSITE OPERATIONAL TRANSPORTATION EMISSIONS

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

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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

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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) 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
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) Running Emissions	Liquid Sulfur Product Trucks (Max @ 50 or 60 Running Emissions	Gasification Product Trucks (Max @ 50 or 60 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	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 Mine to Boron, CA: 662 miles Total Distance: 794.2 miles	Line near Boron, CA to north pro	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.

8/05/2012 revision

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

8/05/2012 revision

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.

Summary of On-Site Operations Truck Emissions

Emissions Summary

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

ATTACHMENT A18-2
REVISED APPENDIX E-12 OPERATIONAL TRANSPORTATION EMISSIONS FOR ALTERNATIVE 2

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						

	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)	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)	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)	Coal Trucks (Max @ 50 or 60 mph)	Liquid Sulfur Product Trucks (Max @ 50 or 60	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	Total Truck Emission Rates (tons/yr)
	Running Emissions	Running Emissions	Running Emissions	Running Emissions	Running Emissions	Running Emissions	Running Emissions	Running Emissions	
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									
Distance		801 miles							
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.

8/05/2012 revision

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

DATA REQUEST

A19. On page 3 of 18 of Appendix E-12 there are non-zero values presented for the urea trains "Miles traveled per Train (mile/engine) – One Way" column, where there should be zero values as trains are not assumed to be used for product transportation in Alternative 2. Please confirm that these erroneous values did not impact the train emissions estimate.

RESPONSE

Those nonzero values were erroneous and have been corrected. They were multiplied by zero in later calculations, and therefore did not impact the train emissions estimate.

Updated emissions are provided in Attachment A18-2 (Revised Appendix E-12, Operational Transportation Emissions for Alternative 2.

BACKGROUND: COMPLIANCE WITH GHG REGULATIONS

The Amended AFC is not complete in terms of compliance with California Green House Gas (GHG) regulations, specifically Carbon Dioxide (CO_2) Cap and Trade and the Mandatory Reporting Regulation.

DATA REQUEST

A20. Please describe all of the separate entities that would be covered under the California Air Resources Board's (ARB's) Cap and Trade Program (electric generation, CO_2 supplier, etc.) and the compliance steps for each.

RESPONSE

The California Air Resources Board's (CARB or Board) Cap and Trade Regulation (Regulation) is complex in its implementation and unique in its applicability. The intent of the Regulation is to cover the entire California economy and its diverse set of GHG emitting sectors and sources.

Compliance with the Regulation is secured through submission of "compliance instruments" equal to the GHG emissions of a "covered entity" over an established time period known as a "compliance period." There are two types of compliance instruments—CARB issued allowances, and offsets (independently verified GHG reductions)—each of which can each be obtained in a variety of ways. Allowances can be received free from CARB (free allocation); purchased at a CARB auction; or purchased from a third party. Likewise, Board-approved offsets can be generated by the covered entity, or can be purchased from an offset provider. So long as a covered entity submits adequate compliance instruments on the date specified in the Regulation, equal to their reported emissions, the covered entity is considered in compliance.

A covered entity can consist of multiple operations, facilities, emission types, and/or processes, depending on the individual characteristics of the business. The Project is an example of a covered entity that has multiple operations and processes at a single location, but is considered to be a single "covered entity" with only one distinct compliance requirement. The Regulation *does not* impose separate and distinct compliance obligations within a covered entity for its various operations and processes. This approach differs from the traditional air quality permitting paradigm, which may have had an individual boiler limit or hours of operation condition for each part of a facility. Under Cap and Trade: "One covered entity = One compliance obligation." There are also no specific technology requirements such as Best Available Control Technology (BACT) determinations. The whole premise of the Regulation is to allow entities the flexibility to determine how best to comply.

Under the Regulation, the HECA Project is considered to be the following: 1) an electrical generating facility; 2) a nitrogenous fertilizer manufacturer; and 3) a CO_2 supplier. Although the Regulation identifies each of these operations separately, HECA's compliance obligation is the sum total of its operating emissions. Additionally, CO_2 suppliers can reduce their compliance obligation by geologically sequestering their emissions in a manner consistent with a Board-approved accounting methodology. This accounting scheme is known in the Regulation as a Quantification Methodology, or QM.

As mentioned previously, a covered entity can receive free allowances from CARB. Any emissions obligation over and above the CARB free allocation must be secured prior to the compliance dates listed in the Regulation. On the HECA Project, currently only the nitrogenous fertilizer portion of the operations will receive free allowances. Therefore, HECA will be responsible for securing compliance instruments in excess of what is provided by the Board.

This amount will be determined by CARB after HECA submits its annually required, independently verified emissions report. The amount of required compliance instruments that would need to be submitted by the facility will depend on whether or not the CARB Board has approved a Carbon Capture and Sequestration QM. In either case, with or without an approved QM, HECA will obtain sufficient compliance instruments to assure that it will satisfy the Regulation.

Offsets can be secured at any time prior to the date they need to be surrendered. Once the first allowance auction occurs, allowances can be obtained from third parties at any time. CARB will also conduct quarterly auctions starting in 2013, and HECA can purchase allowances directly at these auctions. As with every other covered entity, it will be up to HECA to determine the most cost-effective manner in which to secure compliance instruments to ensure compliance with the Regulation. It should be noted that there is a quantitative limit to the amount of offsets that can be used—that limit is currently 8 percent of the compliance obligation.

The surrendering of compliance instruments, and therefore the time at which compliance with the emissions portions of the Regulation occurs, is laid out in detail in the Regulation. Starting in the second compliance period (2015-2017), 30 percent of a covered entities compliance obligation for the preceding year needs to be surrendered for the preceding year. The remaining obligation must be surrendered in the year after the compliance period ends. The Regulation establishes November 1 as the annual compliance surrender date.

Additionally, the Regulation has specific provisions for covered entities that initially exceed the Regulation's applicability threshold during a compliance period. These details are provided in Section 95853(d). HECA may fall within this provision of the Regulation, because their initial operation may not coincide with the beginning of a compliance period. Depending on when the applicability thresholds are exceeded, the compliance obligation is determined accordingly, with the intent of allowing newly regulated entities extra time to comply.

Assuming HECA starts operation in 2017 (and exceeds the applicability threshold of 25,000 metric tons), the first compliance obligation surrender date for the facility will be in 2019, when 30 percent of the HECA facility's 2018 obligations are due. The 2017 emission obligations for the HECA facility will be added to the third compliance period (2018-2020) obligations, and will be due November 1, 2021.

The HECA Project is considered one Covered Entity under the CARB Cap and Trade Regulation; as such, it only has a single compliance requirement—submission of compliance instruments (any combination of allowances and/or offsets) equal to the emissions of the facility for each compliance period.

DATA REQUEST

A21. Please describe all of the separate entities that would be covered under ARB's Mandatory Reporting Regulation (electric generation, CO_2 supplier, nitric acid plant, etc.) and the compliance steps for each, including noting which would require third party emissions verification.

RESPONSE

ARB's Mandatory Reporting Regulation (MRR) was revised January 2012, to harmonize with the USEPA Final Rule on Mandatory Reporting of Greenhouse Gases, by including those additional source categories in 40 CFR Part 98 that exist in California. A facility that falls under any of the source categories provided in 40 CFR 98.2(a) must submit an annual emissions report to CARB. For ARB reporting, HECA falls under the source categories of Electricity Generation, Stationary Fuel Combustion, Nitric Acid Production, and CO_2 Supplier, but will file as one single entity. For USEPA reporting, HECA also falls under the source categories of Ammonia Manufacturing and Electrical Transmission, but is exempt from these categories for Assembly Bill 32 (AB32). A discussion of the requirements for each ARB applicable category is provided below.

Emissions from the emergency generator and fire water pump are exempt from reporting requirements. Sources may be reported as *de minimis* emissions (95103[i]) if emissions are less than 3 percent of the facility's total carbon dioxide equivalent (CO_2e) emissions, not to exceed 20,000 metric tons of CO_2e. Emissions from the flares, urea absorber vents and fugitives fall into this category. Emissions can be calculated using alternative methods of the operator's choosing, subject to the concurrence of the verification body that the methods used are reasonable. HECA does not fall into the hydrogen production source category, because it does not sell hydrogen gas to other entities.

The annual emissions report will cover all applicable source categories present at the facility. It will be organized according to the applicable subparts in 40 CFR Part 98, and contain data relevant for each source category. The annual report will contain the necessary information outlined in Section 95104, Emissions Data Report Contents and Mechanism, and will be submitted via the CARB Greenhouse Gas Reporting Tool, or any other tool approved by the Executive Officer.

Records required to be maintained by 40 CFR 98.3(g) will be maintained for 10 years from the date of certification, as required by §95105(a).

A written GHG Monitoring Plan will be prepared, meeting the requirements of 40 CFR 98.3(g)(5), as well as the elements listed in §95105(c).

Annual emissions reports for the previous calendar year must be submitted to CARB by April 10 of each calendar year (§95103[e]). Verification reports prepared by a third party must be submitted to CARB by September 1 of each year (§95103[f]). All equipment will be calibrated and maintained to meet the requirements of §95103(k).

The following source categories exist at HECA and are subject to existing GHG reporting requirements:

1. Electricity Generation and Cogeneration Units;
2. Stationary Fuel Combustion Sources;
3. Nitric Acid Production;

4. Suppliers of Carbon Dioxide.

Compliance obligations specific to each of the source categories listed above are discussed below.

§95112 – Electricity Generation and Cogeneration Units

Because HECA meets the definition of "Electricity generating facility" in §95102(a)(119), the Project must comply with §95112; and because it is subject to USEPA acid rain reporting requirements, it is also subject to Subpart D of 40 CFR Part 98 (§98.30 to §98.48) as incorporated. The emissions from the turbine will be quantified and reported under these requirements.

Compliance Steps:

- To comply with Subpart D of 40 CFR Part 98, annual emissions of CO_2, nitrous oxide (N_2O), and methane (CH_4) must be reported for each electricity generating unit subject to the Acid Rain Program and 40 CFR Part 75.

- Monitoring, QA/QC, records retention, and data reporting requirements are all in line with those of 40 CFR Part 75.

- Submit annual report containing information required in paragraphs (a) and (b) of §95112, regarding the facility and electricity generating units (e.g., facility details such as capacity in MW, disposition of generated electricity, disposition of thermal energy (million British thermal units [MMBtu]) produced in a cogeneration unit, fuel consumption by type, etc.).

- Submit annual report containing data on emissions from fuel combustion required in paragraph (c) of Section 95112, which describes acceptable methods of calculating emissions from fuel combustion.

- Must meet requirements for monitoring, missing data procedures, data reporting, and records retention specified in 40 CFR §98.34 to §98.37, except as modified in paragraph (h) of Section 95112.

§95115 – Stationary Fuel Combustion Sources

This section applies to Stationary Fuel Combustion sources. This section requires operators to comply with Subpart C of 40 CFR Part 98 (§98.30 to §98.38). Emissions from the auxiliary boiler, tail gas thermal oxidizer, and ammonia synthesis plant startup heater will be reported under the requirements of this Section.

Compliance Steps:

- These sources are smaller than 250 million British thermal units per hour (MMBtu/hr); therefore, emissions can be calculated using Tier 1 or Tier 2 methods, which are based on the amount of fuel burned.

- Missing data must be handled according to the requirements in §95129.

Data reporting requirements (40 CFR 98.36):

- For units using one of the Tiers to calculate emissions, report information such as type of unit, type of fuel combusted, which Tier was used, emissions of CO_2, N_2O, and CH_4.
- Similar units may be aggregated (§98.36[c][1]).

Records required to be maintained to verify data are outlined in 98.36(e); basic information such as amount of fuel combusted, calibration records for flow meters, data on carbon content analysis, etc.

§95118 – Nitric Acid Production

This section applies to emissions associated with nitric acid production. Operators must also comply with Subpart V of 40 CFR Part 98 (§98.220 to §98.228).

Compliance Steps:

- N_2O emissions from the nitric acid production train must be reported (40 CFR 98.222[a]).
- Annual production of nitric acid (HNO_3) must be reported (§95118[d]).
- CO_2, CH_4 and N_2O emissions from stationary combustion units associated with the nitric acid production must be reported under Stationary Fuel Combustion sources (40 CFR 98.222[b]); thus, the auxiliary boiler emissions are reported.
- An annual N_2O performance test must be conducted to determine a site-specific emission factor (40 CFR 98.223[b]).

§95123 – Suppliers of Carbon Dioxide

This section applies to suppliers of CO_2, who must also comply with 40 CFR Part 98 (§98.420 to §98.428).

Compliance Steps:

- HECA will need to report the mass of CO_2 produced and exported. The difference of these emissions will be the amount of CO_2 used in urea production and released from the CO_2 vent.
- Using either a mass or volumetric flow meter, the CO_2 stream must be sampled quarterly to determine its composition.
- For measurements using a *volumetric* flow meter on the CO_2 stream, quarterly measurements of the density of the stream must be made in order to calculate the mass of CO_2.
- All flow meters must be operated and calibrated according to standard procedures outlined in §98.424(a)(4).
- Must maintain quarterly records of captured CO_2 streams and composition.

BACKGROUND: AIR QUALITY PERMIT APPLICATION PROCESS

A Determination of Compliance (DOC) analysis from the San Joaquin Valley Air Pollution Control District (SJVAPCD) will be needed for staff's analysis. Staff will need to coordinate with the applicant and SJVAPCD to keep apprised of any air quality issues determined by the district during their permit review.

DATA REQUEST

A22. Please provide copies of any official submittals and correspondence to or from the SJVAPCD within 5 days of their submittal to or their receipt from the SJVAPCD, and any previously submitted documents of relevance to obtaining air quality permits.

RESPONSE

The Applicant has provided the CEC with copies of official SJVAPCD submittals and correspondence to date; namely, the *Authority to Construct Permit Application* submitted in May 2012. The Applicant will continue to provide official correspondence to the CEC as it is exchanged with SJVAPCD.

BACKGROUND: PREVENTION OF SERIOUS DETERIORATION (PSD) PERMIT PROGRESS

Currently U.S. EPA is in the processes of "localizing" Prevention of Significant Deterioration (PSD) permitting authority with the SJVAPCD. We understand that the U.S. EPA published on June 1, 2012 in the Federal Register their intent to accept a State Implementation Plan update that would transfer PSD authority from U.S. EPA to the SJVAPCD. However, the exact timing of the final transfer of this authority is unknown, so there is some uncertainty regarding which of these agencies will complete the permit for this facility. Additionally, staff is aware that the applicant is providing PSD permit application materials to both agencies as is prudent in this circumstance. Therefore, for staff to keep current on the PSD permitting for this proposed project, we need the applicant to provide updates on the PSD permit application status and we need to be copied on substantive communication with U.S. EPA.

DATA REQUEST

A23. Please provide copies of any official air quality/GHG related submittals and correspondence to or from the U.S. EPA within 5 days of their submittal to or their receipt from the U.S. EPA, and any previously submitted documents of relevance to obtaining this PSD permit.

RESPONSE

The Applicant has provided the CEC with copies of official USEPA submittals and correspondence to date; namely, the *Supplemental Information for the Prevention of Significant Deterioration (PSD) Permit Application* submitted in May 2012. The Applicant will continue to provide official correspondence to the CEC as it is exchanged with the USEPA.

DATA REQUEST

A24. Please provide the Federal Lands Manager's (FLM) official acceptance of the PSD Class 1 air quality impacts analysis.

RESPONSE

On April 18, 2012, the U.S. Forest Service confirmed that a revised AQRV analysis would not be required for the HECA Project; therefore, no Class I Area AQRV analysis was conducted. Attachment A24-1 presents the correspondence with the U.S. Forest Service stating they do not require a Class I AQRV analyses to be conducted.

ATTACHMENT A24-1
CORRESPONDENCE WITH THE U.S. FOREST SERVICE

Garlock, Jennifer

From: Nick, Andrea -FS <anick@fs.fed.us>
Sent: Wednesday, April 18, 2012 3:54 PM
To: Mitchell, Julie
Cc: Delgado, Arturo -FS; Worn, Katherine -FS; Whitfield, James W -FS; Grant, Sharon -FS; Procter, Trent -FS; McCorison, Mike -FS
Subject: Hydrogen Energy Project

Hello Julie,

Thank you for sending us the updated Hydrogen Energy California, LLC modeling protocol and the Q/D calculation values. Based upon the emission rates and distance from the USFS Class I areas, the USDA Forest Service feels that no adverse impacts to air quality related values (AQRV) at these Forest Service areas will occur. Therefore, we are not requesting that a Class I AQRV analyses to be conducted. Should the emissions or nature of the project change significantly, please contact us so that we may re-evaluate the project.

Please note that we are only addressing the need for an AQRV analysis and this does not apply to Class I increment requirements, as the Q/D analysis does not waive increment requirements. In addition, the state and/or EPA may require a Class I increment analysis.

Thank you for keeping us informed and have a great day.

****

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BACKGROUND: GENERAL CONFORMITY

The project will require approval from the U.S. Department of Energy (DOE), which would trigger General Conformity regulations. Staff needs additional information regarding the applicant's proposal to show a positive General Conformity finding.

DATA REQUEST

A25. Please provide a proposed methodology for the General Conformity determination (offsets, etc.) for the pollutants found to exceed the General Conformity applicability thresholds for construction and operation.

RESPONSE

Operational emissions from plant stationary sources will conform with the Clean Air Act and State Implementation Plan because they are subject to PSD/New Source Review (NSR) requirements and permitting (40 CFR 93.153[d][1]; 40 CFR 51.853[d][1]). The response to Data Request No. A18 shows that during operations, indirect, mobile source emissions only exceed the General Conformity *de minimis* levels for NO_X in SJVAPCD. During construction, emissions of NO_X and VOC exceed the General Conformity *de minimis* thresholds in SJVAPCD. A General Conformity Determination analysis is currently being prepared by HECA for submission to SJVAPCD and DOE. This analysis will also be docketed with the CEC.

DATA REQUESTS FOR THE ENHANCED OIL RECOVERY (EOR) AND CARBON CAPTURE AND SEQUESTRATION (CCS) PROJECT

BACKGROUND: EMISSIONS CALCULATIONS

The emission calculations in Appendix A appear to have several errors, particularly errors in the off-road equipment emissions factors. Specifically, it can be seen by review of the emissions factors that the Carbon Dioxide (CO_2) and Sulfur Dioxide (SO_2) emissions factors, which should be very similar on a gram per horsepower basis for all of the diesel fueled equipment, varies by over three orders of magnitude and those errors translate into the other pollutant emissions estimates. Additionally, not all of the assumptions associated with the emissions calculation are clear. Staff needs information to understand all of the emissions calculation assumptions, and needs the apparent errors in the emissions estimates to be corrected.

DATA REQUEST

A26. Please correct the off-road equipment emissions factors and associated emissions estimates for project construction.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, Occidental of Elk Hills, Inc. (OEHI) is requesting additional time to address this Data Request.

DATA REQUEST

A27. Please explain proposed emissions controls or mitigation measures, if any, for the construction off-road and on-road equipment.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A28. Please explain proposed emissions controls or mitigation measures, if any, for the operation off-road and on-road equipment.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A29. Please confirm that all of the on-site roads that will be used during project construction and operation are paved, and please identify if any street sweeping activities are proposed.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A30. Please provide the source or assumption used for the emergency engine emissions factors.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A31. Please explain the basis, or provide the source(s), for the differing Nitrogen Oxide (NO_X), Volatile Organic Compounds (VOC's) and Carbon Monoxide (CO) emissions factors for the various boilers and heaters.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A32. Please confirm that the natural gas proposed for use in the boilers and heaters will be pipeline quality natural gas from the local natural gas utility or from the Elk Hills Gas Plant and not unrefined produced gas, and please provide the specifications, range and average, of the Elk Hills Gas Plant pipeline quality natural gas; including heat content, carbon content, and sulfur content. If unrefined produced gas is proposed to be used, please provide the gas specifications for that proposed fuel.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A33. Please provide the following information regarding the proposed flare.

a. Please provide the sources or explain the sources or explain the basis for the hours per year of emergency flaring events used in the emissions calculations.

b. The pilot gas and purge gas for the flare have the same assumed heat content. Please clarify the basis of this assumption.

c. The flared gas is shown to have an assumed heat content of 250 Btu/SCF. Please provide references for this assumption and references for the assumed carbon and sulfur contents.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A34. Please confirm that there would be no potential for venting of CO_2, either recycled CO_2 or HECA delivered CO_2 at the enhanced oil recovery/carbon capture and sequestration (EOR/CCS) project site, and list the controls and measures that will be used to ensure that in the case of electrical failure or other mechanical failures of the compressors that there would be adequate backup capacity to reinject all of the recycled and HECA delivered CO_2.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A35. Please explain why all of the piping component counts on Page 21 of 26 in the GHG emissions appendix to Appendix A are zero even though the emissions estimate summary on Page 12 of 26 shows positive CO_2 and VOC emissions values.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

BACKGROUND: PEAK CO_2 INJECTION RATE AND ANNUAL EMISSIONS

It is unclear if the emissions calculations provided in Appendix A of the Amended AFC show peak daily and annual emissions for EOR/CCS operation. Specifically, staff needs to understand the assumptions on maximum CO_2 recycle and combined injection rates and the associated maximum criteria and GHG pollutant emissions.

DATA REQUEST

A36. Please describe the anticipated maximum CO_2 recycle rate from CO_2 recovered during oil extraction associated with the EOR/CCS process, and the maximum CO_2 injection rate that includes the recycled CO_2 and the CO_2 being piped from the HECA project.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A37. As part of the description of the maximum CO_2 recycle rate please identify how long the paired injection/production well site locations will be used before moving to new a location.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A38. Please provide the maximum daily and annual criteria pollutant and GHG emissions rates associated with the maximum CO_2 injection rate, including the secondary GHG emissions from electricity consumption.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

BACKGROUND: OIL AND GAS PRODUCTION

In order for staff to understand, evaluate, and describe the overall project energy efficiency of the HECA and Oxy EOR/CCS projects we need to understand the amount of oil and gas produced due to the EOR/CCS project.

DATA REQUEST

A39. Please provide a current best estimate for the anticipated oil and gas recovery rates for the EOR/CCS project, and the baseline "business as usual" production without this EOR/CCS project.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

BACKGROUND: EMISSIONS OFFSET ASSUMPTIONS

In order for staff to understand and describe the emissions offsets issue for the EOR/CCS project, staff needs additional explanation of the exempt emission sources, the CO offset assumptions, and the assumptions for the sources of the emissions reduction credits.

DATA REQUEST

A40. Please describe the rationale for the offset exempt status for the stationary emissions sources for which exemption is claimed.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A41. Please describe the current NSR baseline for all pollutants requiring emissions offsets.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A42. Please explain why CO emissions are assumed to be offset, rather than be found to be exempt from offset requirements after the completion of an emissions modeling analysis (SJVAPCD Rule 2201, 4.6.1).

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A43. Please describe whether Occidental Petroleum currently owns any emissions reduction credits created from oil field emissions reductions in the general area, or if they currently own enough emission reduction credits to meet the "ERCs Required" values shown in Table 4.3-11, or if they will have to purchase some or all of the ERCs needed for the EOR/CCS project.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

Technical Area: Biological Resources
Author: Amy Golden

FIELD SURVEYS

BACKGROUND

In the Amended AFC, the applicant indicated in Table 5.2-2, Biological Resources Field Surveys, the dates, locations, and resources that surveys were performed for; however, it is not clear whether the linear routes surveyed were "old" or "new." For example, it is not clear whether the April, July, August, September, December 2010 and March 2011 surveys covered the previously proposed or currently proposed natural gas and transmission line routes. The applicant also indicated in the Amended AFC that preconstruction surveys would be a mechanism for avoiding impacts to special-status plant and wildlife resources during construction. The specific locations of sensitive resources (e.g., kit fox dens, burrowing owl burrows, rare plants, etc.) must be identified before construction begins in order to perform an analysis of the project's impacts on those resources.

In addition, the Amended AFC proposes improvements at four intersections to alleviate traffic and transportation impacts (Amended AFC, pp. 5.10-19-20). The four intersection improvements include: signalization at State Route (SR) 43 (Enos Lane)-Stockdale Highway; signalization at SR 119-Tupman Road; addition of turn lanes at Dairy Road-Stockdale Highway; and intersection reconstruction at Dairy Road-Adohr Road. These improvements represent impact areas and should be included in field surveys and impact calculations.

DATA REQUEST

A44. Please provide a summary table of surveys performed on the most recently proposed linear routes and the results of those surveys i.e., natural gas pipeline, carbon dioxide, transmission line, potable water pipeline, and railroad spur. Include specific dates, area surveyed including buffers, specific plant or wildlife species surveyed for, and which special-status species were observed, if any. For plant species, include dates and locations that reference populations were checked.

If focused surveys for San Joaquin kit fox dens, blunt-nosed leopard lizard, burrowing owl, and special-status plant species were not performed on the current linear facility routes, please perform them and provide the results including a graphic showing the Global Positioning System (GPS) locations of any identified special-status plant or wildlife species.

RESPONSE

Table A44-1 summarizes the survey dates and locations of wildlife and plant surveys that were conducted in 2012 on each of the proposed linear routes and the Project Site. Site numbers referenced in Table A44-1 refer to the locations identified on Figure 5.2-6. Table A44-2 summarizes the results of the 2012 survey efforts. Additional surveys will be conducted for juvenile blunt-nosed leopard lizards in late August and early September 2012. Results of these surveys will be provided to the CEC in a separate transmittal, including the global positioning system (GPS) locations of any identified special-status species observations.

Table A44-1
Summary Table of 2012 Surveys Conducted, Including Dates and Locations

Study Area	Blunt-Nosed Leopard Lizard[1]	Swainson's Hawk[2]	Burrowing Owl	San Joaquin Kit Fox Dens/Sign	Nelson's Antelope Squirrel	Rare Plants[4]
Process Water	No habitat present	Full Protocol Survey	Driving survey[3]	Driving survey[3]	Driving survey[3]	No habitat present
Natural Gas	Site 1 through Site 5	Full Protocol Survey	Site 1 through Site 5	Site 1 through Site 5	Site 1 through Site 5	Site 1 through Site 5
Rail Road	Site 2 through Site 5	Full Protocol Survey	Site 2 through Site 5	Site 2 through Site 5	Site 2 through Site 5	Site 2 through Site 5
Transmission Line	No habitat present	Full Protocol Survey	Surveyed in 2011	Surveyed in 2011	Surveyed in 2011	Surveyed in 2011
Potable Water	No habitat present	Full Protocol Survey	Surveyed in 2011	Surveyed in 2011	Surveyed in 2011	Surveyed in 2011
CO_2	Oxy	Full Protocol Survey[5]	Oxy	Oxy	Oxy	Oxy
Project Site	No habitat present	Full Protocol Survey	Driving survey[3]	Driving survey[3]	Driving survey[3]	No habitat present

Notes:
1 Blunt-nosed leopard lizard surveys were conducted for adults between May 1 and July 12, 2012.
2 Swainson's hawk surveys were conducted according to California Department of Fish and Game protocol between February 23 and July 6, 2012.
3 Observations of burrowing owl, San Joaquin kit fox, and Nelson's antelope squirrel in the Biological Study Area that were incidental to other biological surveys.
4 Rare plant surveys were conducted in two parts. Early-season surveys were conducted on March 27 through 30, 2012, in conjunction with wetland delineation surveys and covered Site 4 and portions of Sites 1, 2, and 3; late-season surveys were conducted at all Sites (1 through 5) (survey sites are identified on Figure 5.2-6) between May 1 and July 12, 2012.
5 Potential nesting habitat for Swainson's hawks is limited to the area north of the California Aqueduct. No surveys were conducted on lands owned by Occidental Petroleum, Inc.

Table A44-2
Summary Table of 2012 Survey Results

Study Area	Blunt-Nosed Leopard Lizard[1]	Swainson's Hawk	Burrowing Owl	San Joaquin Kit Fox Dens/Sign	Nelson's Antelope Squirrel	Rare Plants
Process Water		Near Alignment	None detected	None detected	None detected	
Natural Gas	None detected	Near Alignment	Near Alignment	None detected	None detected	None detected
Rail Road	None detected	Near Alignment	None detected	None detected	None detected	None detected
Transmission Line		Near Alignment				
Potable Water		Near Alignment				
CO_2		None detected				
Project Site		Near Project Site[2]	Near Project Site[3]	None detected	None detected	

Notes:
1 Juvenile blunt-nosed leopard lizard surveys to be conducted in August/September 2012.
2 Swainson's Hawk nest site observation approximately 3/4 mile east of Project Site.
3 Burrowing owl observed approximately 50 feet north of northern Project Site boundary; territorial, but could not confirm paired or breeding.

Additional details regarding the survey methods, dates, area surveyed, and results are provided below. In addition to the text and tables provided with this response, revised figures are provided in the response to Data Request No. A45-1 (Revised Figure 5.2-6, Revised Figure 5.2-7, and Revised Figure 5.2-9) that identify specific study area locations and the 2012 observations for Swainson's hawks and burrowing owls. Plant species survey methods, including dates, personnel conducting the surveys, and the survey locations and results are also summarized below.

San Joaquin Kit Fox

San Joaquin kit fox survey methods and results are described below.

Methods

San Joaquin kit fox den surveys were completed in conjunction with the 2012 wetland delineation surveys, rare plant surveys, Swainson's hawk surveys, and blunt-nosed leopard lizard surveys. Areas along the natural gas, rail line, Kern River Flood Control Channel, and around the Project Site have been checked for active or potential San Joaquin kit fox dens and other signs. Surveys were completed over several visits starting in March and ending on July 13, 2012, with the completion of adult blunt-nosed leopard lizard surveys. Surveys were conducted by URS biologists Chris Julian, David Kisner, Kate Eldridge, Jamie Deutsch, Kelly Kephart, Johanna Kisner, Melissa Newman, Mike Carbiener, Mike Dempsey, Jan Novak, and Jane Donaldson.

Results

No signs, active dens, or road kill have been detected during surveys this year. Because of the timing of the extensive nature of the surveys, detection of dens used by this species was likely.

Previously vacated dens were observed at Site 1 near Magnolia Road. These dens have not been recently used by San Joaquin kit fox, and are now used by small mammals, lizards, and burrowing owls.

Adult Blunt-Nosed Leopard Lizard

Adult blunt-nosed leopard lizard survey methods and results are described below.

Methods

The 2012 adult blunt-nosed leopard lizard survey efforts followed the protocols described in the California Department of Fish and Game (CDFG) Approved Survey Methodology for the adult blunt-nosed leopard lizard (May 2004). Figure A45-1 (Revised Figure 5.2-6) Blunt-Nosed Leopard Lizard Occurrences Near the Project Area, shows five sites along the natural gas and/or rail line that were determined to have potential habitat for blunt-nosed leopard lizards. No other habitat suitable for this species is present along the linears that will be constructed by HECA. OEHI assumes that potential habitat within the CO_2 pipeline study area is occupied by blunt-nosed leopard lizards, and does not propose to conduct additional focused surveys specifically for this project.

HECA's adult blunt-nosed leopard surveys were conducted by URS Level 2 biologists[1] Chris Julian, David Kisner, and Kate Eldridge; and Level 1 URS biologists Jamie Deutsch, Kelly

[1] Level 2 biologist per CDFG survey protocol (CDFG, 2004).

Kephart, Johanna Kisner, Melissa Newman, Mike Carbiener, Mike Dempsey, and Jane Donaldson. Site 1 had to be surveyed two additional times due to excessive cloud cover and extreme temperatures.

Juvenile surveys will be conducted according to protocol in August or September of 2012.

Results

No blunt-nosed leopard lizards were detected during the 2012 adult surveys conducted on the five sites identified on Figure A45-1 (Revised Figure 5.2-6). Table A44-3 details the results of surveys conducted in 2012.

Burrowing Owl

Burrowing owl survey methods and results are described below.

Methods

The 2012 burrowing owl assessment was completed in conjunction with wetland delineation surveys, rare plant surveys, Swainson's Hawk surveys, and blunt-nosed leopard lizard surveys. Areas along the natural gas, rail line, Kern River Flood Control Channel, and around the Project Site have been checked for burrowing owl presence; see Figure A45-3 (Revised Figure 5.2-9) Burrowing Owl Occurrences Near the Project Area. Surveys were completed over several visits, starting in March and ending on July 13, 2012. Surveys were conducted by URS biologists Chris Julian, David Kisner, Kate Eldridge, Jamie Deutsch, Kelly Kephart, Johanna Kisner, Melissa Newman, Mike Carbiener, Mike Dempsey, Jan Novak, and Jane Donaldson.

Results

Multiple individuals, burrows, and burrow sites have been identified, as shown on Figure A45-3 (Revised Figure 5.2-9). These occurrences are described below.

Natural Gas Line. At Site 1, two individuals were found during blunt-nosed leopard lizard surveys. The individuals were seen during the period of May 2 until June 8, 2012. In addition, multiple burrows, and possible nesting sites, were located during previous surveys. Burrowing owl sign was found during blunt-nosed leopard lizard surveys at both Site 2 and Site 3. Although outside of the survey area, URS biologists have documented successful breeding at the Buttonwillow Ecological Reserve; the burrow, adults, and young were visible from Brandt Road approximately a half-mile from the proposed Natural Gas Linear.

Project Site and Vicinity. A single adult was observed on the side of Adhor Road, 50 feet north of the Project Site. The owl was seen sitting on top of a concrete culvert. The culvert had been filled in on the southern side, and could potentially provide a suitable site for nesting burrowing owls. The owl was first observed on July 2, 2012, but was also present over the next 2 weeks; there was no indication of the owl being paired, but the contents of the culvert were not examined.

During Swainson's hawk surveys on July 2, 2012, at least six burrowing owls were seen in the Tule Elk Preserve east of the Project Site. At least four of the owls appear to be a part of a burrowing owl family group. Access to this area was limited, and observations were made from a great distance using a 20- to 45-power spotting scope.

Table A44-3
Blunt-Nosed Leopard Lizard Survey Results for 2012

		Site 1				Site 2				Site 3				Site 4				Site 5			
Survey #	Dates	*WT*	SB	*BNLL*	Other	*WT*	SB	*BNLL*	Other	*WT*	SB	*BNLL*	Other	*WT*	SB	*BNLL*	Other	*WT*	SB	*BNLL*	Other
1a	1-May-12	-	-	-	-	0	2	0	BtJa	8	8	0	-	16	10	0	-	4	2	0	CrVi
1b	2-May-12	31	31	0	LeNi, BuOw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a	17-May-12	2	7	0	2 BuOw	4	1	0	BtJa	0	4	0	-	5	6	0	-	0	2	0	-
3	23-May-12	6	14	0	BuOw	8	9	0	BtJa	4	12	0	-	1	2	0	-	0	1	0	-
4	24-May-12	10	19	0	CrVi	4	12	0	BtJa	2	2	0	-	2	2	0	-	4	2	0	-
5	6-Jun-12	3	11	0	2 BuOw, 2 LeNi	3	3	0	BtJa	1	5	0	-	2	3	0	2 SwHa	0	1	0	-
6	7-Jun-12	4	18	0	2 BuOw	1	10	0	BtJa	0	6	0	MaFl	2	4	0	-	1	2	0	-
7	8-Jun-12	10	20	0	2 BuOw	4	10	0	SwHa, BtJa	1	6	0	-	0	3	0	-	1	0	0	-
8	19-Jun-12	6	16	0	CrVi	2	4	0	BuOw pellet, BtJat	1	17	0	LeNi, BuOw pellets	0	15	0	-	0	6	0	-
9	20-Jun-12	0	24	0	-	0	9	0	BtJa	0	5	0	-	4	10	0	-	1	2	0	-
10	21-Jun-12	6	29	0	-	0	7	0	BtJa	1	16	0	-	2	12	0	-	0	6	0	-
11	22-Jun-12	5	22	0		4	17	0	BtJa	3	27	0	LeNi, WFIb	1	12	0	-	0	6	0	-
12a	10-Jul-12					3	13	0	BtJa	2	31	0	SwHa, 2 MaFl	2	7	0	GrRo, BtJa,	0	1	0	BtJa
12b	11-Jul-12	5	40	0	CrVi-	-	-	-	BtJa	-	-	-	-	-	-	-	-	-	-	-	-
2b	12-Jul-12	1	33	0	-	-	-	-	BtJa	-	-	-	-	-	-	-	-	-	-	-	-
2c	13-Jul-12	2	21	0	-	-	-	-	BtJa	-	-	-	-	-	-	-	-	-	-	-	-

Note:

Species abbreviations:

BNLL – blunt-nosed leopard lizard
BtJa – black-tailed jackrabbit (*Lepus californicus*)
BuOw – burrowing owl (*Athene cunicularia*)
CrVi – western rattlesnake (*Crotalus viridis*)
GrRo – greater roadrunner (*Geococcyx californianus*)
LeNi – lesser nighthawk (*Chordeiles acutipennis*)
MaFl – coachwhip (*Masticophis flagellum*)
SwHa – Swainson's hawk (*Buteo swainsoni*)
WFIb – white-faced ibis (*Plegadis chihi*)

Swainson's Hawk

Swainson's hawk survey methods and results are described below.

Methods

Surveys efforts followed the protocols described in Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley by the Swainson's Hawk Technical Advisory Committee (May 31, 2000). Figure A45-2 (Revised Figure 5.2-7) Swainson's Hawk Observations Near the Project Area, illustrates the area surveyed for potential nesting Swainson's hawks, which includes a 5-mile buffer around the Project Site, and a 1-mile buffer around the linears, but excludes most of the Elk Hills area due to a lack of habitat. Surveys were conducted by URS biologists David Kisner, Jamie Deutsch, Kelly Kephart, and Jane Donaldson.

Results

Seventeen active nests were identified in the Swainson's hawk survey area (Figure A45-2, Revised Figure 5.2-7). Six Swainson's hawk nests were identified; four were confirmed to have fledged at least one young, and were classified as "successful." Details for the Swainson's hawk nests during the five survey periods are detailed below. The other eleven nests belonged to common raven, great horned owl, red-tailed hawk or red-shouldered hawk.

Survey Period 1 (January to March 20). The survey for Period 1 was conducted on February 23, 2012. Data gathered on nesting raptors from 2010 and 2011 were used to help focus this survey for 2012. Nest structures were observed at locations 2, 5, 6, 11, 14, and 15.

Survey Period 2 (March 20 to April 5). Surveys for Period 2 were conducted April 3, 4, and 5, 2012. Swainson's hawks were observed on or near five traditional nest locations (5, 6, 19, 21, and 22). A female dark morph Swainson's hawk was observed sitting on nest structure 19 during the survey conducted on April 4, 2012. Potentially territorial Swainson's hawks or "floaters" were observed at various locations around traditional nest locations in the project area.

Survey Period 3 (April 5 to April 20). Surveys for Period 3 were conducted on April 17, 18, and 19, 2012. Pairs were observed at nest structures 5, 19, and 21. Individual hawks were spotted at nest structures 6 and 22. A dark morph Swainson's hawk was observed sitting on nest structure 6 on April 18 and 19, 2012.

Survey Period 4 (April 21 to June 10). On May 1, 2012, biologists were surveying for blunt-nosed leopard lizards when a Swainson's hawk was observed circling overhead. The bird landed on a nearby eucalyptus tree on a frontage road leading south from Highway 58, where a new nest structure was then observed. On May 2, 2012, the bird was seen sitting on the nest structure. Due to the proximity of the nest structure to the lizard survey area, this nest was observed on a regular basis.

Survey Period 5 (June 10 to July 30). Surveys for Period 5 were conducted on July 2, 3, 5, and 6, 2012. During this period, biologists monitored known nest sites 5, 6, 19, 21, 22, and 29. Out of the six Swainson's hawk nest structures observed in the Project Area, four were observed to be successful (structures 5, 6, 22, and 29).

One immature dark morph Swainson's hawk was observed on a snag near presumed nest structure 22 and another immature intermediate morph was observed sitting on a tree with

presumed nest structure 22. Three pairs of baby Swainson's hawks were observed on nest structures 5, 6, and 29. Biologists did not observe young at structures 19 and 21; these nests may have fledged prior to early July and/or were unsuccessful.

Nelson's Antelope Squirrel

Nelson's antelope squirrel survey methods and results are described below.

Methods

Passive Nelson's antelope squirrel surveys have been completed in conjunction with the 2012 wetland delineation surveys, rare plant surveys, Swainson's hawk surveys, and blunt-nosed leopard lizard surveys. Areas along the natural gas, rail line, Kern River Flood Control Channel, and around the Project Site have been checked for their presence. Surveys were completed over several visits starting in March and ending on July 13, 2012, with the completion of adult blunt-nosed leopard lizard surveys. Surveys were conducted by URS biologists Chris Julian, David Kisner, Kate Eldridge, Jamie Deutsch, Kelly Kephart, Johanna Kisner, Melissa Newman, Mike Carbiener, Mike Dempsey, Jan Novak, and Jane Donaldson.

Results

No adults, juveniles, road kill, or Nelson's antelope squirrel have been detected during surveys this year. Because of the timing of the surveys, detection of the species was likely if they were present in these areas.

Rare Plant Surveys

Rare plant surveys and methods are described below. Additional discussion of a previously observed occurrence of bobtail barley (*Hordeum intercedens*) is provided in the response to Data Request No. A46.

Methods

Focused rare plant surveys were conducted on March 27 through 30, 2012, on portions of the biological study area that are not actively cultivated or disturbed, and had not been previously surveyed. The 2012 surveys were conducted according to the methods described in the AFC. The rail line and portions of Site 4 within 1,000 feet of the proposed natural gas pipeline were surveyed in 2012 (survey sites are identified on Revised Figure 5.2-6). Additional parcels, including the majority of Site 1, Site 2, Site 3, and Site 5, were not surveyed in 2012 due to access restrictions, or because these areas had been previously surveyed for the Project.

Surveys were conducted by URS biologists Jan Novak, Kelly Kephart, and Jane Donaldson. Additional rare plant surveys were conducted in conjunction with blunt-nosed leopard lizard surveys from May 1 until July 13, 2012. These surveys were completed by URS biologists Chris Julian, David Kisner, Kate Eldridge, Jamie Deutsch, Kelly Kephart, Johanna Kisner, Melissa Newman, Mike Carbiener, Mike Dempsey, and Jane Donaldson.

Results

No rare plants were detected during the surveys conducted in 2012; however, rainfall in the 2011/2012 season was below average, and many spring annuals either did not germinate or failed to flower. Detection of rare plants would not have been likely during the 2012 blooming

season. Based on rainfall observations and on informal discussions with regional biologists, it was determined that rare plant reference sites were not available in 2012.

Reference

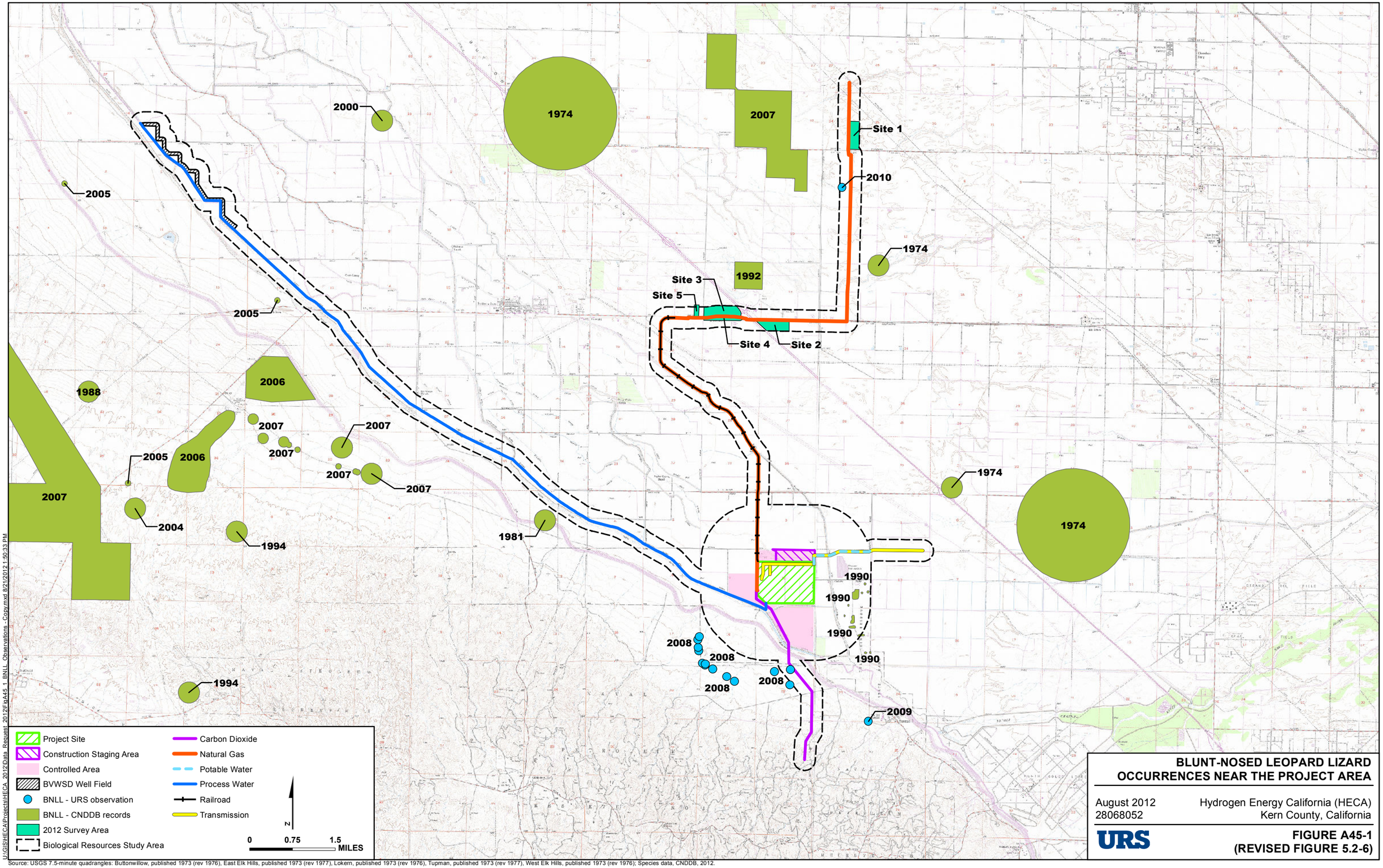
CDFG (California Department of Fish and Game), 2004. Approved survey methodology for the blunt-nosed leopard lizard. California Department of Fish and Game Memorandum. May.

DATA REQUEST

A45. Similar to Figure 5.2-6 in the Amended AFC, please provide three separate graphics showing all collected "URS-observation" GPS data, to date, for: 1) special-status plant species 2) burrowing owl and sign and 3) San Joaquin kit fox and sign. Also, please update Figure 5.2-6 with current blunt-nosed leopard lizard survey findings.

RESPONSE

Updated figures for blunt-nosed leopard lizard (revised Figure 5.2-6), Swainson's hawk (revised Figure 5.2-7), and burrowing owl (revised Figure 5.2-9) are provided with this response, as Figures A45-1, A45-2, and A45-3, respectively. There are no new observations of blunt-nosed leopard lizard, but Figure 5.2-6 was updated to identify the 2012 study area sites. New observations of Swainson's hawk nest sites and burrowing owl observations are included as requested. There is no updated figure for San Joaquin kit fox, because there are no new observations in the biological resources study area.



U:\GIS\HECA\Projects\HECA_2012\Data_Request_2012\FigA45_1_BNLL_Observations_Copy.mxd 8/21/2012 1:50:33 PM

Source: USGS 7.5-minute quadrangles: Buttonwillow, published 1973 (rev 1976), East Elk Hills, published 1973 (rev 1977), Lokern, published 1973 (rev 1976), Tupman, published 1973 (rev 1977), West Elk Hills, published 1973 (rev 1976); Species data, CNDDB, 2012.

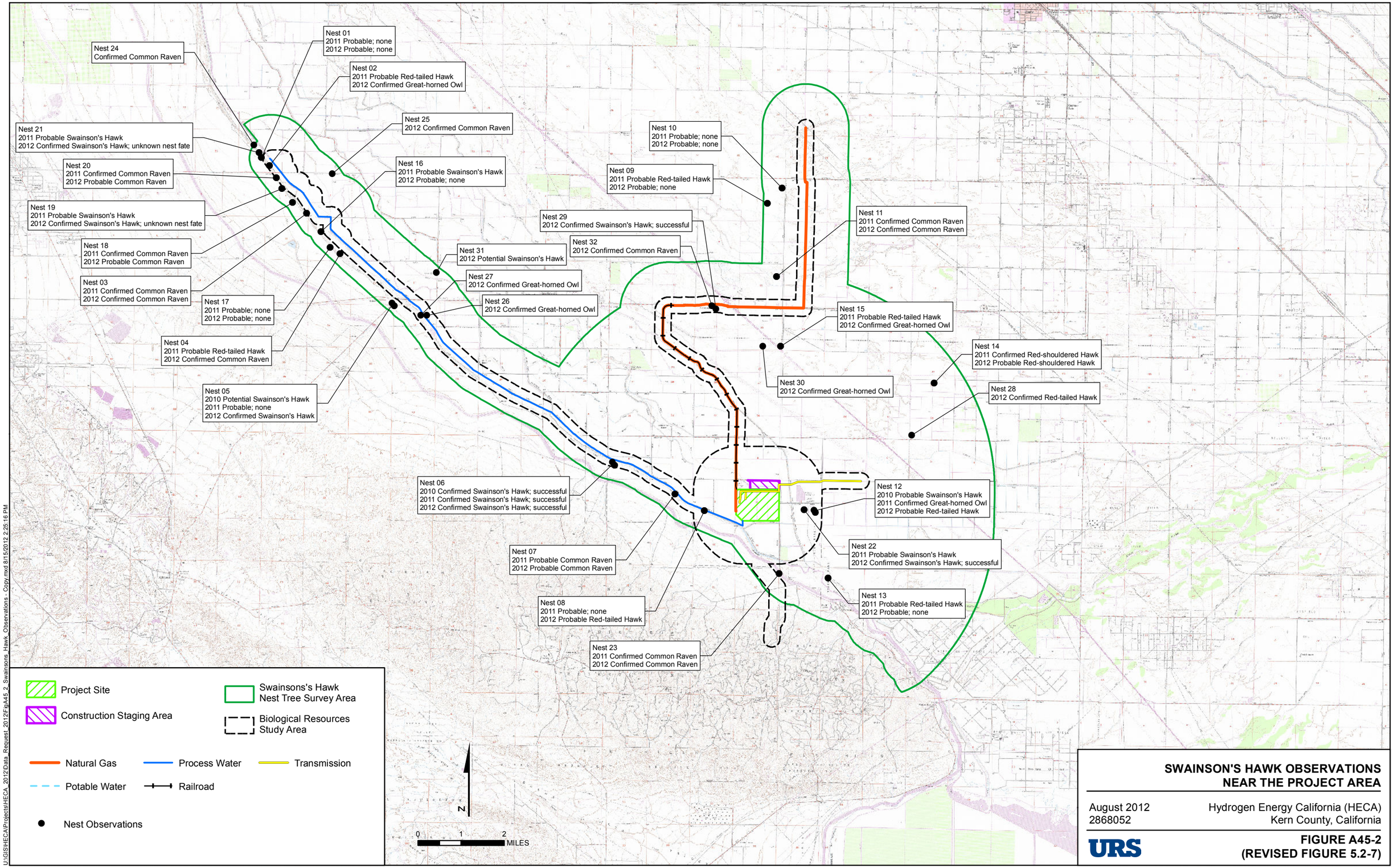
BLUNT-NOSED LEOPARD LIZARD OCCURRENCES NEAR THE PROJECT AREA

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A45-1
(REVISED FIGURE 5.2-6)



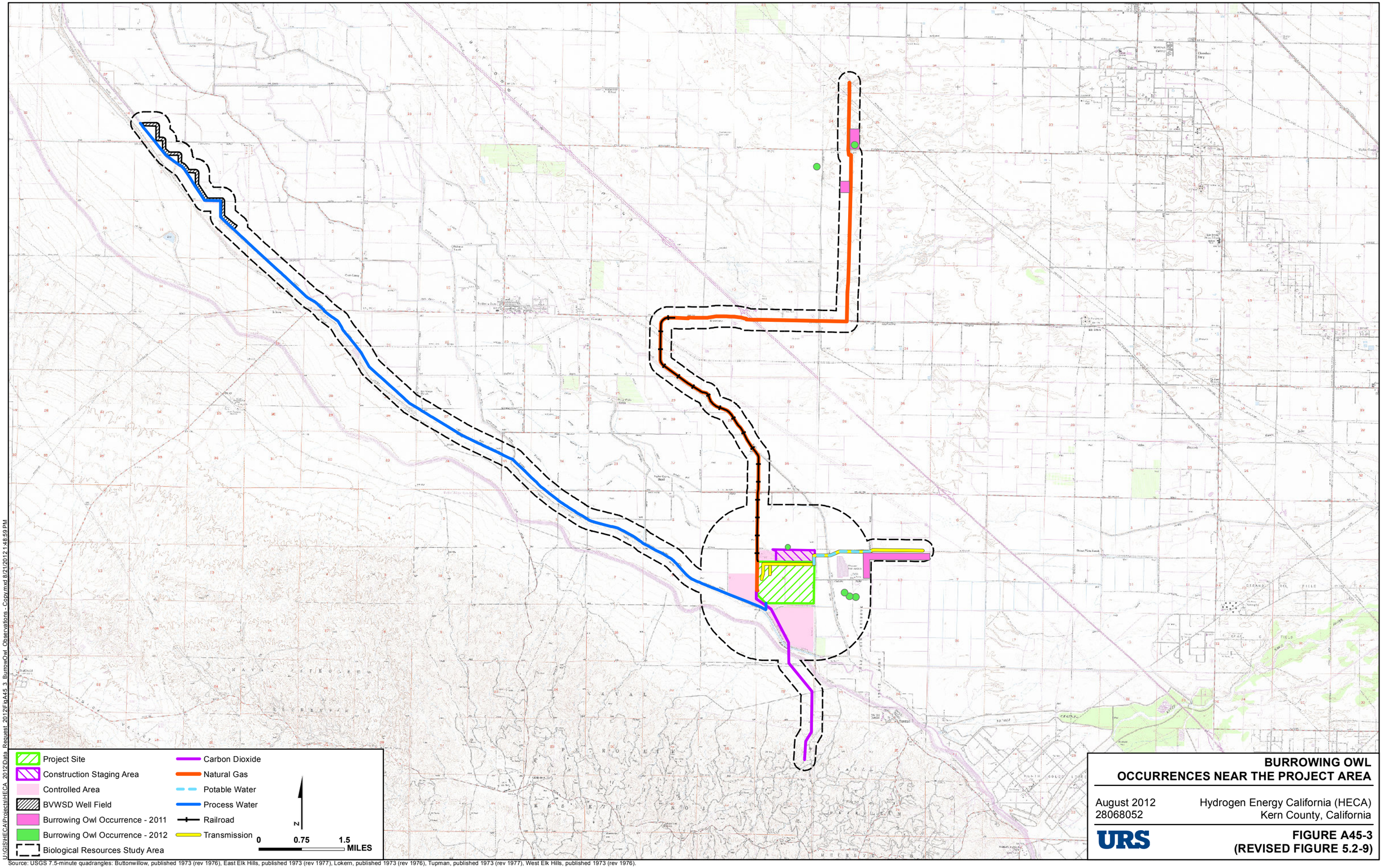
SWAINSON'S HAWK OBSERVATIONS NEAR THE PROJECT AREA

August 2012
2868052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A45-2
(REVISED FIGURE 5.2-7)



BURROWING OWL OCCURRENCES NEAR THE PROJECT AREA

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A45-3
(REVISED FIGURE 5.2-9)

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Source: USGS 7.5-minute quadrangles: Buttonwillow, published 1973 (rev 1976), East Elk Hills, published 1973 (rev 1977), Lokern, published 1973 (rev 1976), Tupman, published 1973 (rev 1977), West Elk Hills, published 1973 (rev 1976).

DATA REQUEST

A46. Bobtail barley and San Joaquin bluecurls are not addressed in the text but are listed in Table 5.2-3 as an observed plant species. Please provide the survey dates, locations, and approximate number of plants observed for these two plant species.

RESPONSE

San Joaquin bluecurls (*Trichostema ovatum*) were found by biologists Kelly Kephart and David Kisner in spring of 2010 outside of the current biological resources study area. The occurrence was located along an old road adjacent to the California Aqueduct, south of the town of Tupman, and 4 miles south of the Project Site. This population is no longer located in the Project Area or vicinity, and would not be affected by the Project. Therefore, this species should be excluded from Table 5.2-3.

An occurrence of bobtail barley (*Hordeum intercedens*) was documented by Johanna Kisner, Chris Julian, Kelly Kephart, and David Kisner during wetland delineation surveys on March 16, 2011. Bobtail barley is included in the California Native Plant Society's Inventory of Rare and Endangered Plants as a Rank 3.2 species (identified for further review). The occurrence is located at the northern end of the natural gas linear at Site 1 (see Figure A45-1, Revised Figure 5.2-6 for the location of Site 1). Within the western 200 feet of the low-lying areas sampled for the jurisdictional delineation at Site 1, this species represented 40 percent of the absolute total cover. An approximate number of individuals for this site was not estimated, but it is expected that this species is abundant in similar low-lying alkali flat habitats in the Project vicinity. This occurrence is located in the biological resources study area, but direct or indirect impacts to this species would be avoided or minimized, because the pipeline will be constructed in the existing county road rights-of-way at this location.

DATA REQUEST

A47. Please provide the Geographical Information System (GIS) shapefiles for the currently proposed linear routes (carbon dioxide, transmission line, potable water, processed water, natural gas, and railroad spur).

RESPONSE

Geographic Information System (GIS) shapefiles for the proposed linear routes (CO_2, natural gas, potable water, process water, transmission, and railroad) presented in the 2012 Amended AFC are provided separately on CD to the CEC.

DATA REQUEST

A48. Please clarify whether the four-intersection improvement areas were included in plant and wildlife field surveys. Please state whether focused botanical surveys, San Joaquin kit fox den surveys, blunt-nosed leopard lizard surveys, and burrowing owl surveys were performed in these areas. If they were not, please perform these surveys and provide the results.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

FEDERAL WATERS OF THE U.S.

BACKGROUND

On page 5.2-6 of the Amended AFC, the applicant identifies dates that delineation surveys were performed and that the California Aqueduct, Kern River Flood Control Channel, all drainage ditches that connect to these features, and two areas of seasonally ponded claypan depressions are potentially jurisdictional waters of the U.S. and that the West Side Canal, East Side Canal, all interconnected drainages, and several retention basins are non-jurisdictional features; however, staff believes the delineation has not been verified by the U.S. Army Corps of Engineers (Corps) to date. Staff has reviewed Appendix F-2, Waters of the U.S. in the 'Railroad and Natural Gas Linears' confidential submittal provided by the applicant.

DATA REQUEST

A49. Please provide an update on the jurisdictional determination for the HECA project including the date the formal wetland delineation was submitted to the Corps for verification and any correspondence with the Corps office.

RESPONSE

A jurisdictional delineation report is currently being prepared for the HECA Project, and will be submitted to the U.S. Army Corps of Engineers (USACE) for verification in late August or September 2012. A copy will be submitted to the CEC at the same time. HECA will request a preliminary jurisdictional determination by the USACE.

DATA REQUEST

A50. On page 5.2-32, the text indicates that less than 0.20-acre of permanent impacts to potential waters of the U.S. would occur; however, Table 5.2-9 only indicates that temporary impacts would occur to potential waters of the U.S. Please revise Table 5.2-9 to include this permanent impact and explain where the permanent impact will occur and how it was calculated.

RESPONSE

Impacts to potential waters of the U.S. would be associated with construction of the natural gas pipeline, which will be an underground facility. The seasonally ponded depressions affected by construction of the natural gas pipeline would be reestablished within one season following completion of construction. Therefore, the Project would not permanently impact potential waters of the U.S. The statement on page 5.2-32 of the 2012 Amended AFC was intended to explain why the Project is likely to qualify for authorization under Nationwide Permit 12; it was not intended to imply that there are any permanent impacts to jurisdictional waters.

DATA REQUEST

A51. Please provide a summary table showing total acreages of features that were delineated as non-jurisdictional, waters of the U.S., and wetland.

RESPONSE

A summary table of the total acreages of features that were delineated as nonjurisdictional, potential waters of the U.S., and wetland waters of the U.S. is provided in Table A51-1. This table identifies the area of each feature in the delineation study area shown on Figure A53-1 (Revised Figure 5.2-2) Waters of the U.S., provided with the response to Data Request No. A53.

Table A51-1
Area of Features Delineated as Wetlands or Other Waters in the HECA Project Delineation Study Area

Feature ID	Area (ft^2)	Area (Acres)	Jurisdiction
Potential Waters of the U.S. (Wetlands)			
WL 1	303	0.01	WL
Total Wetland Area	**303**	**0.01**	
Potential Waters of the U.S. (Other Waters of the U.S.)			
WUS 1	2,854	0.07	OWUS
WUS 2	3,645	0.08	OWUS
WUS 3	2,221	0.05	OWUS
WUS 4	2,221	0.05	OWUS
WUS 5	892	0.02	OWUS
WUS 6	2,412	0.06	OWUS
WUS 7	1,636	0.04	OWUS
WUS 8	2,115	0.05	OWUS
WUS 9	2,595	0.06	OWUS
WUS 11	1,726	0.04	OWUS
WUS 12	3,404	0.08	OWUS
WUS 13	384	0.01	OWUS
WUS 14	3,050	0.07	OWUS
WUS 15	6,552	0.15	OWUS
WUS 17	10,330	0.24	OWUS
WUS 18a	1,882	0.04	OWUS
WUS 18b	465	0.01	OWUS
WUS 18c	376	0.01	OWUS
WUS 19	744	0.02	OWUS
WUS 20	5,137	0.12	OWUS
WUS 21	1,501	0.03	OWUS
WUS 22	1,905	0.04	OWUS
WUS 23	3,353	0.08	OWUS

Table A51-1
Area of Features Delineated as Wetlands or Other Waters in the HECA Project Delineation Study Area
(Continued)

Feature ID	Area (ft^2)	Area (Acres)	Jurisdiction
WUS 24	1,096	0.03	OWUS
WUS 25	5,530	0.13	OWUS
WUS 26	842	0.02	OWUS
WUS 27	373	0.01	OWUS
WUS 28	648	0.01	OWUS
WUS 29	4,521	0.10	OWUS
WUS 30	743	0.02	OWUS
WUS 31	4,552	0.10	OWUS
WUS 32	2,619	0.06	OWUS
WUS 33	4,407	0.10	OWUS
WUS 34	291	0.01	OWUS
WUS 35	9,956	0.23	OWUS
WUS 36	6,165	0.14	OWUS
WUS 37	2,015	0.05	OWUS
WUS 38	13,445	0.31	OWUS
WUS 39	3,270	0.08	OWUS
WUS 40	1,608	0.04	OWUS
WUS 41	660	0.02	OWUS
WUS 42	910	0.02	OWUS
WUS 43	713	0.02	OWUS
WUS 44	1,607	0.04	OWUS
WUS 45	1,735	0.04	OWUS
WUS 46	1,148	0.03	OWUS
WUS 47	634	0.01	OWUS
WUS 48	1,362	0.03	OWUS
WUS 49	159	0.00	OWUS
WUS 50	311	0.01	OWUS
WUS 53 (California Aqueduct)	74,104	1.70	OWUS
WUS 54 (Kern River Flood Control Channel)	281,556	6.46	OWUS
WUS 54 (Kern River Flood Control Channel)	2,436,448	55.93	OWUS
WUS 54 (Kern River Flood Control Channel)	932,383	21.40	OWUS
WUS 62	53	0.00	OWUS
WUS 63	171	0.00	OWUS
WUS 64	132	0.00	OWUS
Total Other Waters of the U.S. Area	**3,857,568**	**88.57**	

Table A51-1
Area of Features Delineated as Wetlands or Other Waters in the HECA Project Delineation Study Area
(Continued)

Feature ID	Area (ft^2)	Area (Acres)	Jurisdiction
Nonjurisdictional Waters			
NJ 1 (West Side Canal)	2,308,064	52.99	NJW
NJ 2	7,975	0.18	NJW
NJ 3	9,133	0.21	NJW
NJ 4	25,690	0.59	NJW
NJ 5	16,736	0.38	NJW
NJ 6	4,034	0.09	NJW
NJ 7	16,046	0.37	NJW
NJ 8	3,743	0.09	NJW
NJ 9	3,088	0.07	NJW
NJ 10	478,939	10.99	NJW
NJ 11 (East Side Canal)	16,676	0.38	NJW
NJ 12	15,363	0.35	NJW
NJ 13	923	0.02	NJW
NJ 14	60,200	1.38	NJW
NJ 15	88,461	2.03	NJW
NJ 16	28,217	0.65	NJW
NJ 17	42,604	0.98	NJW
NJ 18	11,854	0.27	NJW
NJ 19	119,728	2.75	NJW
NJ 20	61,703	1.42	NJW
NJ 21	3,942	0.09	NJW
NJ 22	3,706	0.09	NJW
NJ 23	4,988	0.11	NJW
NJ 24	2,586	0.06	NJW
NJ 25	6,192	0.14	NJW
NJ 26	3,213	0.07	NJW
NJ 27	3,331	0.08	NJW
NJ 28	1,393	0.03	NJW
NJ 29	719	0.02	NJW
NJ 30	47,707	1.10	NJW
NJ 31	1,832	0.04	NJW
NJ 32	10,881	0.25	NJW
NJ 33	6,708	0.15	NJW
NJ 34	13,897	0.32	NJW
NJ 35	5,312	0.12	NJW
NJ 36	122,468	2.81	NJW

Table A51-1
Area of Features Delineated as Wetlands or Other Waters in the HECA Project Delineation Study Area
(Continued)

Feature ID	Area (ft^2)	Area (Acres)	Jurisdiction
NJ 37	13,731	0.32	NJW
NJ 38	10,032	0.23	NJW
NJ 39	14,014	0.32	NJW
NJ 40	3,487	0.08	NJW
NJ 41	1,359	0.03	NJW
NJ 42	13,601	0.31	NJW
NJ 43	4,753	0.11	NJW
NJ 44	5,872	0.13	NJW
NJ 45	2,931	0.07	NJW
NJ 46	1,934	0.04	NJW
NJ 47	2,354	0.05	NJW
NJ 48	1,660	0.04	NJW
NJ 49	4,476	0.10	NJW
NJ 50	17,123	0.39	NJW
NJ 51	9,052	0.21	NJW
NJ 52	15,157	0.35	NJW
NJ 53	6,529	0.15	NJW
NJ 54	551	0.01	NJW
NJ 55	2,948	0.07	NJW
NJ 56	2,358	0.05	NJW
NJ 57	5,047	0.12	NJW
NJ 58	2,142	0.05	NJW
NJ 59	1,592	0.04	NJW
NJ 60	30,523	0.70	NJW
NJ 61	26,727	0.61	NJW
NJ 64	19,055	0.44	NJW
NJ 65	11,654	0.27	NJW
NJ 66	8,297	0.19	NJW
NJ 67	4,595	0.11	NJW
NJ 68	3,500	0.08	NJW
Total NJ Waters of the U.S. Area	**3,805,107**	**87.35**	
TOTAL AREA OF ALL FEATURES	**7,662,978**	**175.93**	

Notes:
ft^2 = square feet
NJW = Nonjurisdictional Waters
OWUS = Other Waters of the U.S.
WL = Wetland

DATA REQUEST

A52. For the two depressional claypan areas, the text indicates that representative soil test pits and data were collected regarding vegetation, soil types, and hydrology. Please provide the wetland data sheets and a map showing the location of the soil test pits in relation to the two depressional areas. Also, please indicate why the WL-1 feature was classified differently than other depressional waters of the U.S. features.

RESPONSE

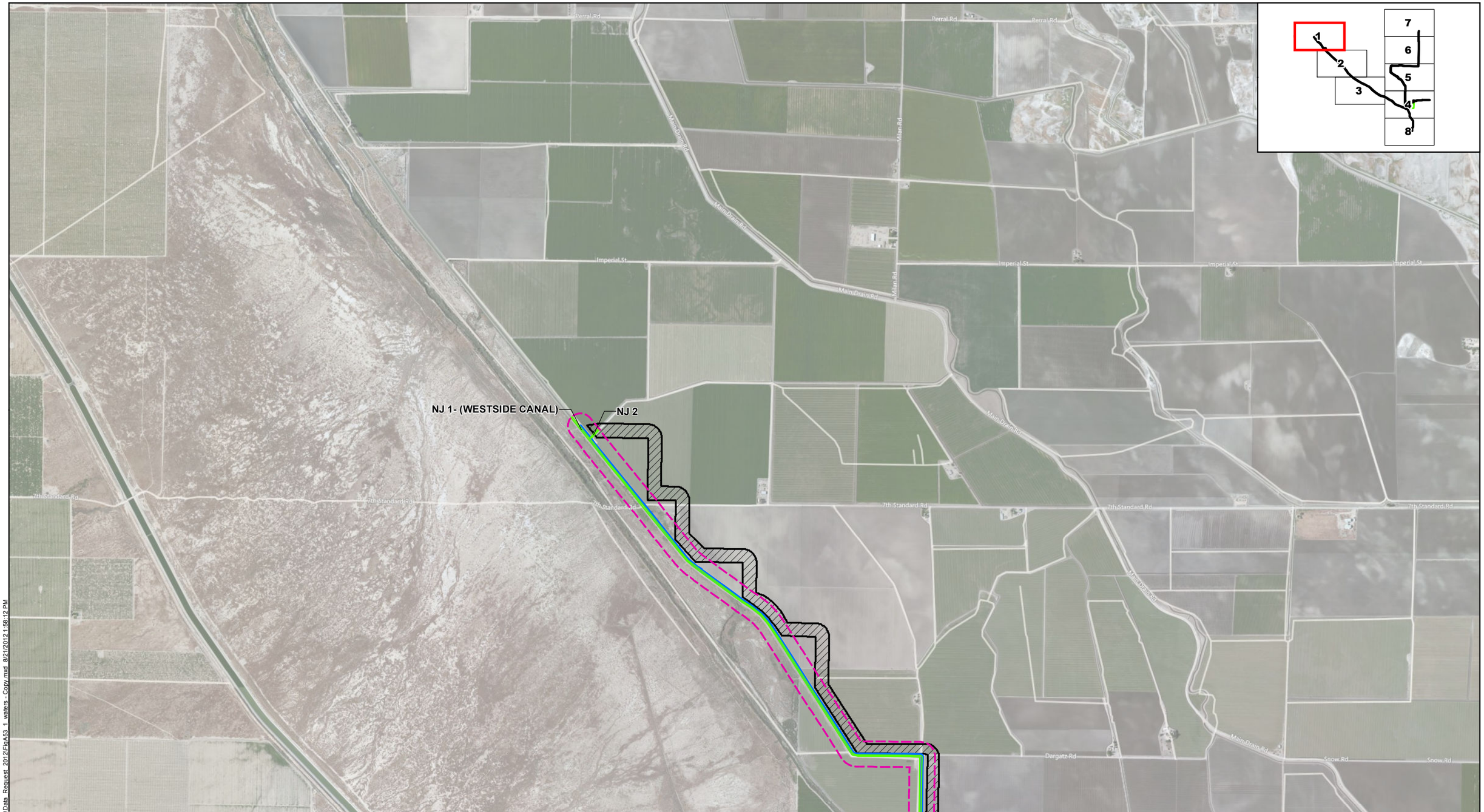
The requested data sheets and figures will be included in the jurisdictional delineation report that is currently in preparation. A copy of this report will be provided to the CEC when it is submitted to the USACE. WL-1 was classified differently than the other depressional waters of the U.S. because WL-1 met all three wetland parameters (vegetation, soils, hydrology); the other depressional waters of the U.S. were classified as nonwetland waters because they are unvegetated.

DATA REQUEST

A53. Please identify which non-jurisdictional features represent the East Side Canal.

RESPONSE

Figure A53-1 (Revised Figure 5.2-2) Waters of the U.S., identifies the location of the East Side Canal (see Sheets 4 and 5).



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
250-foot Buffer from Disturbance Area
HDD Entry/Exit Pits

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Waters
Non-jurisdictional Waters of the U.S. (NJ)
Other Waters of the U.S. (WUS)
Wetland (WL)

N

0 2,000 4,000 FEET

WATERS OF THE U.S.

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A53-1 (1)
(REVISED FIGURE 5.2-2)

Source: Aerial Imagery, Bing Maps, 2009.

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Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
250-foot Buffer from Disturbance Area
HDD Entry/Exit Pits

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Waters
Non-jurisdictional Waters of the U.S. (NJ)
Other Waters of the U.S. (WUS)
Wetland (WL)

N

0 2,000 4,000 FEET

WATERS OF THE U.S.

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A53-1 (2)
(REVISED FIGURE 5.2-2)

Source: Aerial Imagery, Bing Maps, 2009.

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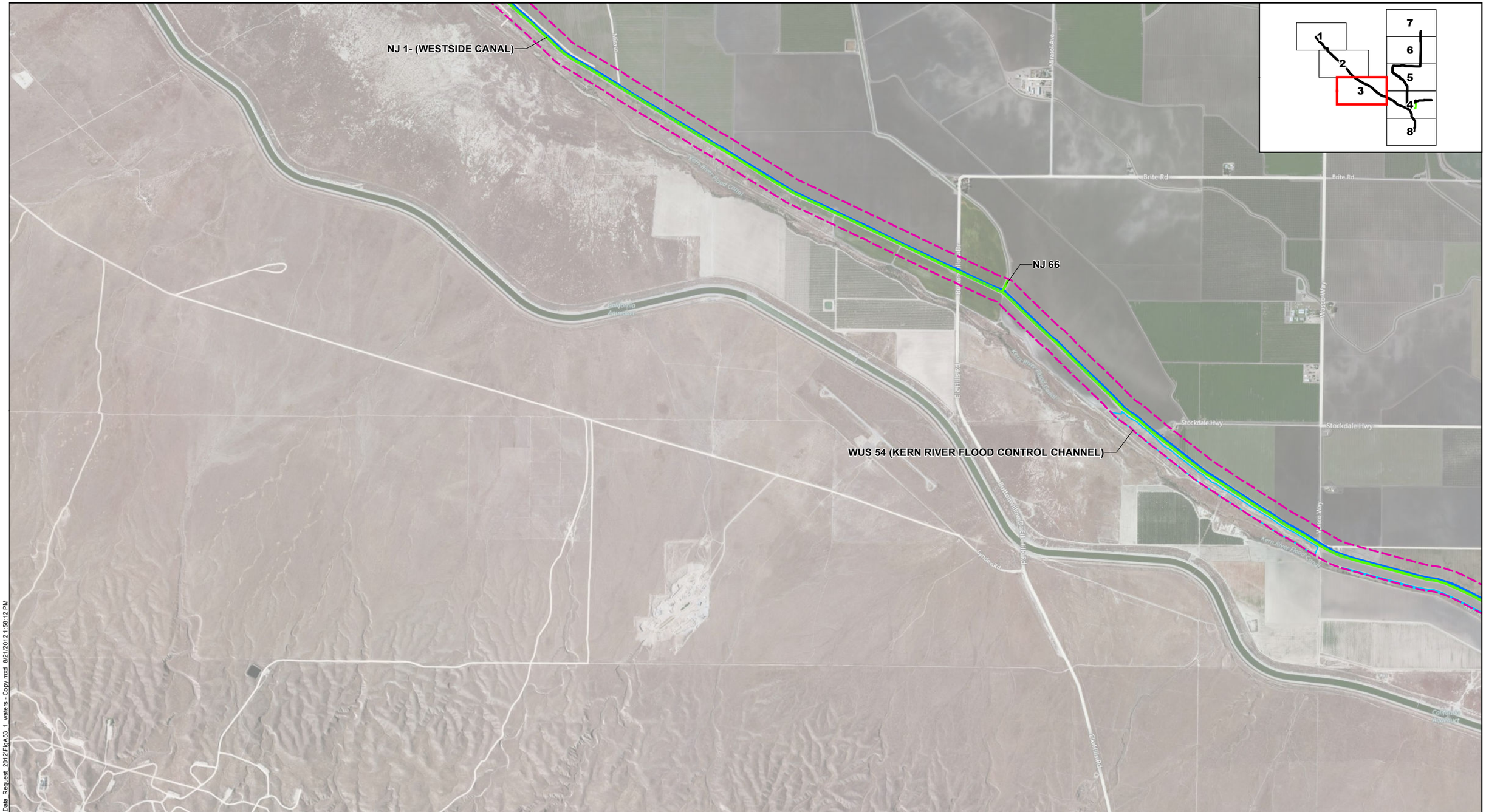

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
250-foot Buffer from Disturbance Area
HDD Entry/Exit Pits

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Waters
Non-jurisdictional Waters of the U.S. (NJ)
Other Waters of the U.S. (WUS)
Wetland (WL)

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

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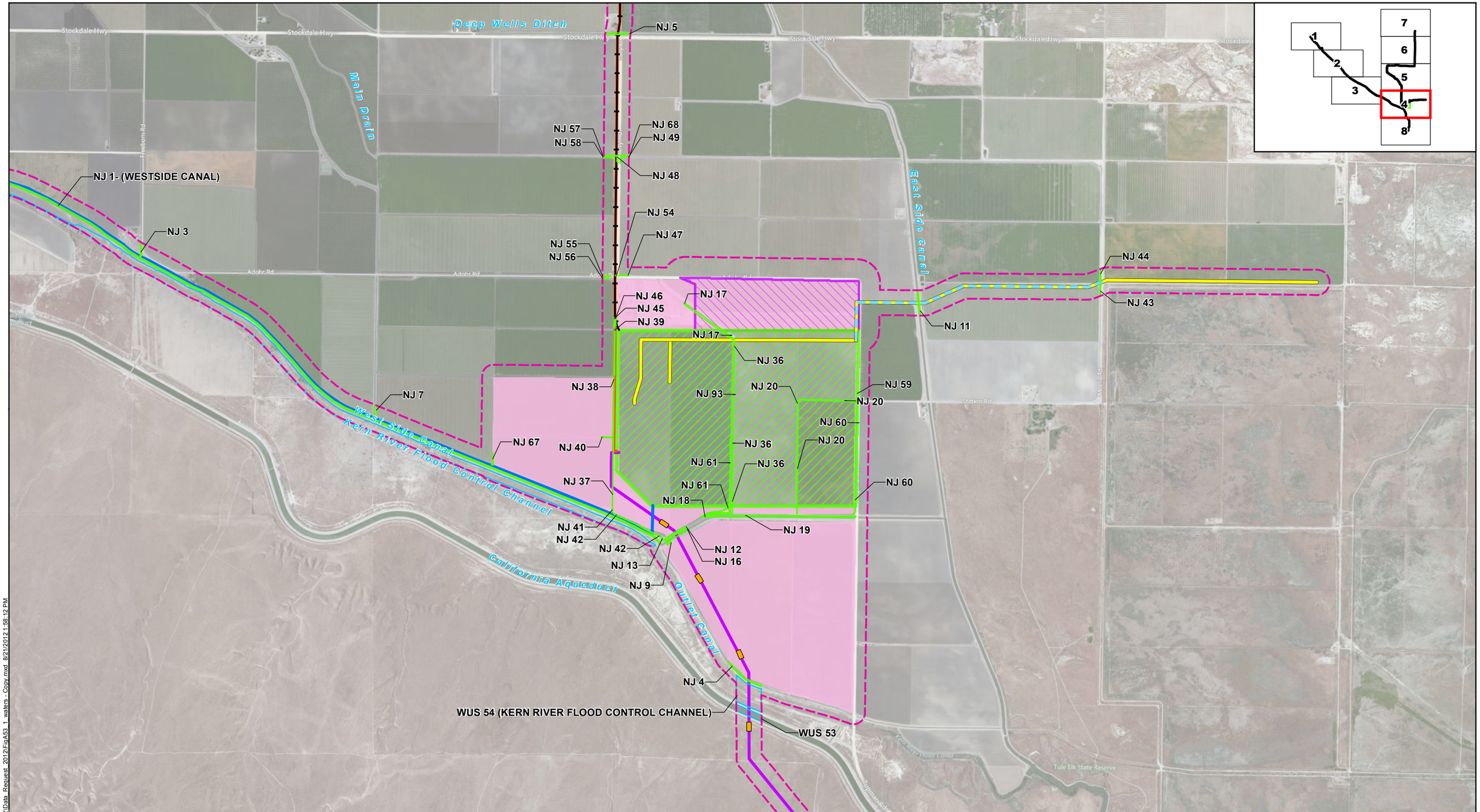
WATERS OF THE U.S.

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A53-1 (3)
(REVISED FIGURE 5.2-2)



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
250-foot Buffer from Disturbance Area
HDD Entry/Exit Pits

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Waters
Non-jurisdictional Waters of the U.S. (NJ)
Other Waters of the U.S. (WUS)
Wetland (WL)

N

0 2,000 4,000 FEET

Source: Aerial Imagery, Bing Maps, 2009.

WATERS OF THE U.S.

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A53-1 (4)
(REVISED FIGURE 5.2-2)

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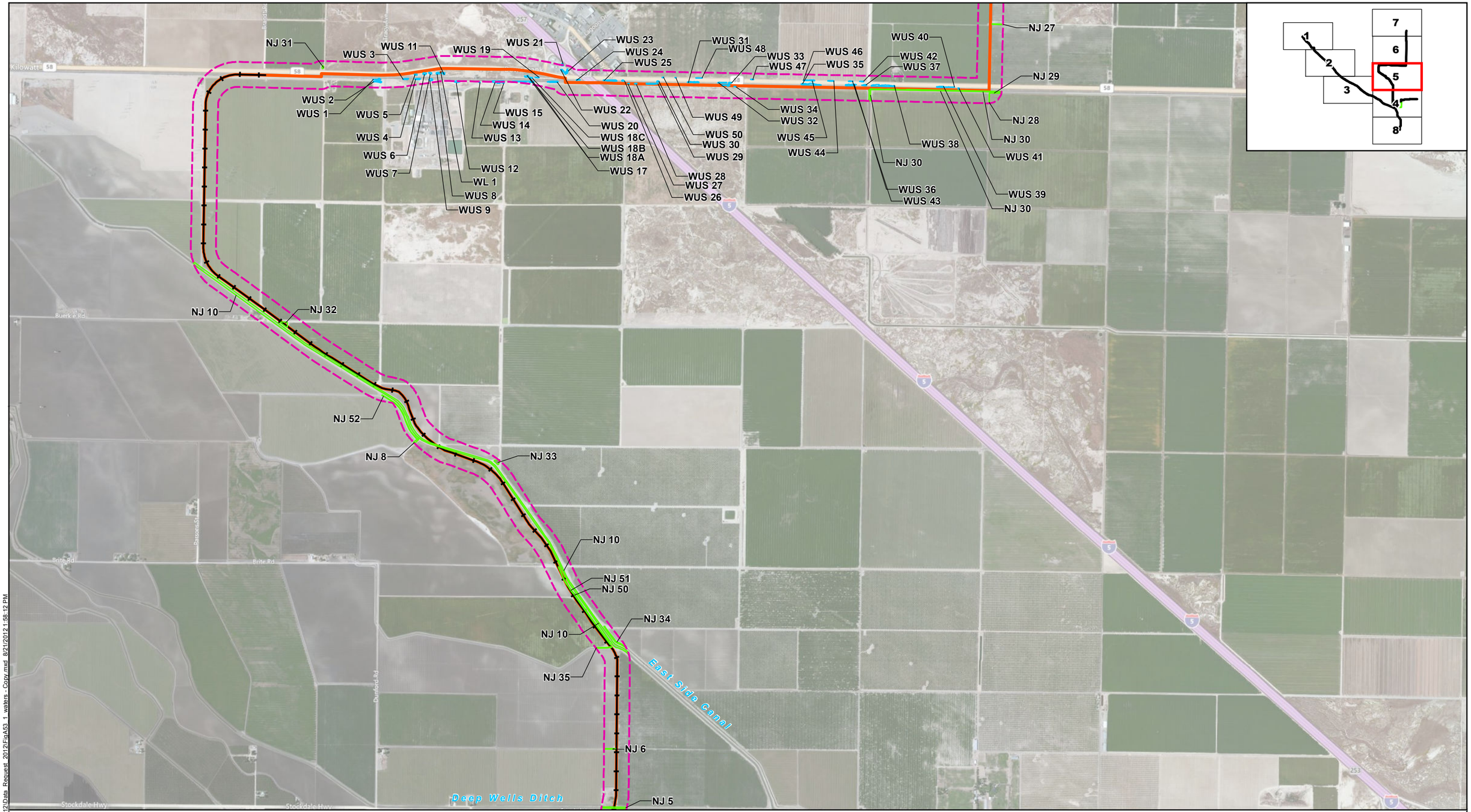

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
250-foot Buffer from Disturbance Area
HDD Entry/Exit Pits

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Waters
Non-jurisdictional Waters of the U.S. (NJ)
Other Waters of the U.S. (WUS)
Wetland (WL)

N

0 2,000 4,000 FEET

WATERS OF THE U.S.

August 2012
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Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A53-1 (5)
(REVISED FIGURE 5.2-2)

Source: Aerial Imagery, Bing Maps, 2009.

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Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
250-foot Buffer from Disturbance Area
HDD Entry/Exit Pits

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Waters
Non-jurisdictional Waters of the U.S. (NJ)
Other Waters of the U.S. (WUS)
Wetland (WL)

N

0 2,000 4,000 FEET

WATERS OF THE U.S.

August 2012
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Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A53-1 (6)
(REVISED FIGURE 5.2-2)

Source: Aerial Imagery, Bing Maps, 2009.

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Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
250-foot Buffer from Disturbance Area
HDD Entry/Exit Pits

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Waters
Non-jurisdictional Waters of the U.S. (NJ)
Other Waters of the U.S. (WUS)
Wetland (WL)

N

0 2,000 4,000 FEET

WATERS OF THE U.S.

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A53-1 (7)
(REVISED FIGURE 5.2-2)

Source: Aerial Imagery, Bing Maps, 2009.

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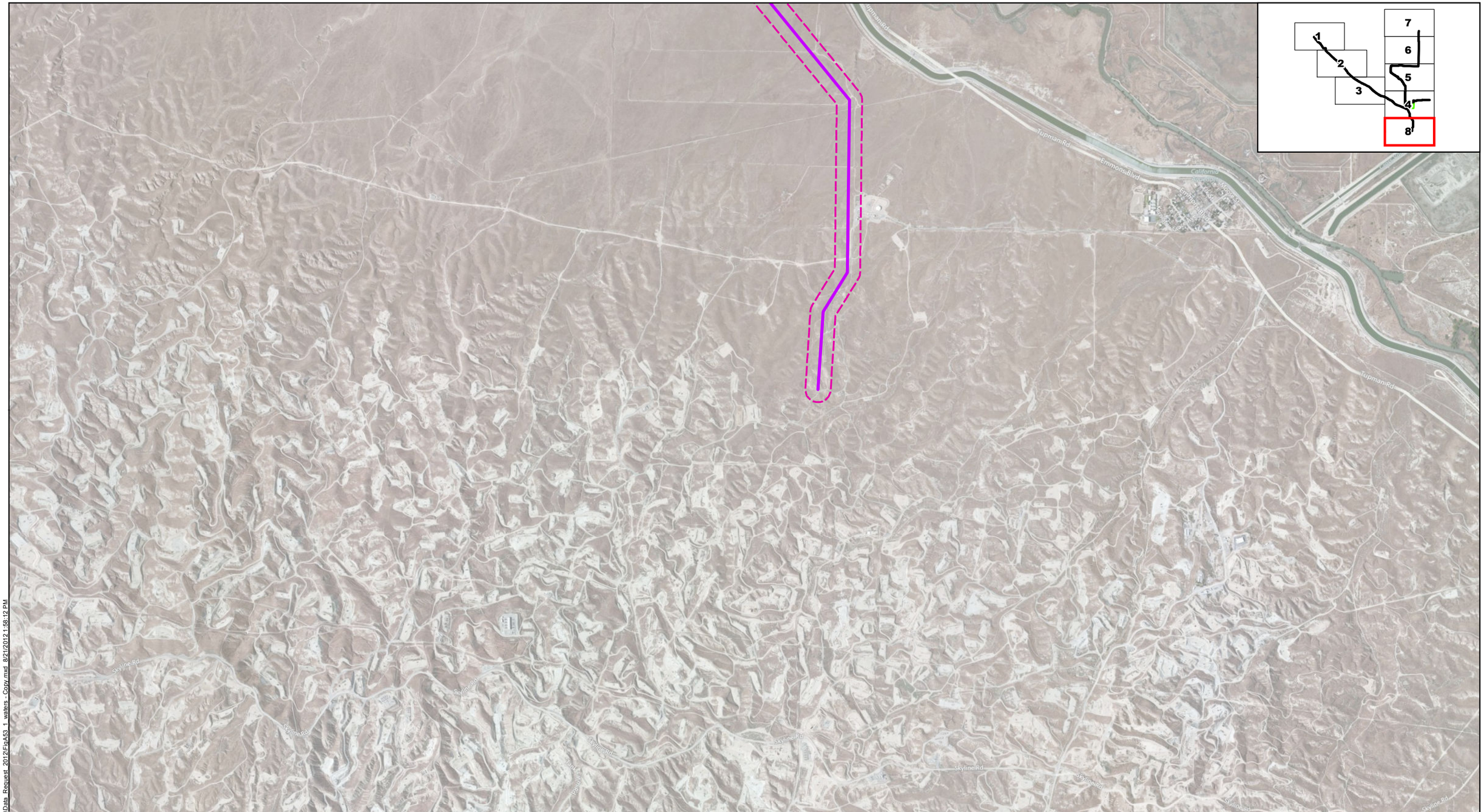

Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field
250-foot Buffer from Disturbance Area
HDD Entry/Exit Pits

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Waters
Non-jurisdictional Waters of the U.S. (NJ)
Other Waters of the U.S. (WUS)
Wetland (WL)

N

0 2,000 4,000 FEET

WATERS OF THE U.S.

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A53-1 (8)
(REVISED FIGURE 5.2-2)

Source: Aerial Imagery, Bing Maps, 2009.

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STATE WATERS

BACKGROUND

The California Department of Fish and Game (CDFG) regulates activities that would substantially change, divert, obstruct, or use any material from the bed, channel, or bank of, any river, stream, or lake under Section 1600 of the California Fish and Game Codes. The applicant has indicated that the identified waters may be regulated by the Central Valley Regional Water Quality Control Board (CVRWQCB) but has not provided any data regarding the occurrence of state waters potentially regulated under California Fish and Game Code 1600. CDFG has indicated to staff previously that horizontal directional drilling (HDD) activities beneath canals would require a Lake or Streambed Alteration Agreement and a frac-out Plan. Because the Energy Commission is the lead state permitting authority over the project's impacts to state waters, staff needs additional information on the occurrence of state waters in the project area.

DATA REQUEST

A54. Please provide a map showing the location of delineated state waters. Please also provide the estimated acreage of state jurisdictional waters, project description, estimated impacts, measures to protect fish and wildlife resources for activities occurring in state waters and any other information that would normally be included in a Notification of a Lake or Streambed Alteration to CDFG.

RESPONSE

All of the delineated features shown on Figure A53-1 (Revised Figure 5.2-2), including the features identified as "NJ" (nonjurisdictional) for USACE, would be potentially subject to regulation as waters of the state. These features are also documented in Table A51-1.

Many of the federally nonjurisdictional features identified in Table A51-1 are potentially jurisdictional under state laws and regulations; however, the extent of state jurisdictional waters has not been verified by CDFG. The features identified as NJ in Table A51-1 are typically engineered, water-conveyance facilities that have minimal habitat functions. The potential impacts to these features will be estimated and provided to the CEC.

Section 5.2.4 of the 2012 Amended AFC describes measures to be implemented during construction that would protect fish and wildlife resources associated with potential waters of the state. In addition, pipelines constructed under large aquatic features—such as the Outlet Canal, Kern River Flood Control Channel, and the California Aqueduct—will avoid direct impacts using horizontal directional drilling. Impacts to most of the potentially jurisdictional state waters in the Project area will be temporary in nature.

GOLDEN EAGLE

BACKGROUND

Due to changes in the U.S. Fish and Wildlife Service's (FWS) survey protocols and management of golden eagle nests (Pagel et al 2010), staff needs additional information on the occurrence of golden eagle nests within the project area. Resource agencies have indicated previously that golden eagles have been observed in the Lokern area and Dustin Acres area. Page 5.2-16 of the Amended AFC indicates that no golden eagles were observed during field surveys and no nests are documented within 40 miles of the site but does not include a reference for this conclusion. Golden eagle nests are rarely reported in the CNDDB due to the sensitivity of nest locations; therefore, relying solely on the lack of CNDDB records is not enough information to conclude eagle nests do not occur in the project area. Staff will be consulting with the FWS Migratory Bird Office on impacts to golden eagles and other migratory birds in preparation of the staff assessment.

DATA REQUEST

A55. Please review and provide all existing recent and historical data available on golden eagles within 4 to 10 miles (according to the FWS golden eagle survey protocols noted above in Background information) from the project area including nesting habitat, winter roosts, natal dispersal, migration corridors, and foraging habitat. Please also check local bird inventory and raptor groups (like HawkWatch, California Condor Recovery Team of Ventura Fish and Wildlife Office, or local Audubon Chapter) for golden eagle observations and nest territories in the project area.

RESPONSE

Based on a literature review, the average area of a golden eagle home range in California ranges from 36 to 48 square miles, or 6 to 8 miles from the nest, as citied by Smith and Murphy (1973), and Dixon (1937) in CDFG's Life History Account for golden eagle. There are no known golden eagle nesting locations documented in the California Natural Diversity Database (CNDDB) within a 30-mile radius of the Project location. The closest nesting sites to the Project recorded in the CNDDB are 45 miles east, 50 miles southeast, and 40 miles north of the Project Site.

There have been no sightings of golden eagles by URS biologists in the Project vicinity during hundreds of hours of biological resource surveys conducted for the HECA Project between 2008 and 2012. Interviews with local wildlife experts who are familiar with western Kern County suggest that the Project Site is unsuitable habitat for nesting eagles, and nesting golden eagles have not been observed in the southwestern San Joaquin Valley area. Transitory eagles are likely to pass through the Project Area; however, observations of these eagles appear to be rare.

Table A55-1 summarizes the individuals and organizations that were consulted to respond to this request.

Table A55-1
Names and Organizations Contacted
Regarding Golden Eagle Observations in the Project Vicinity

Name	Organization	Summary of Information
Cheryl Harding	Kern Waterbank Authority	At least five golden eagle strikes on wells in valley floor on the edge of Elk hills 5 years ago while working with PG&E.
Jim Jones	South Valley Biology	Golden eagles rarely seen near Elk Hills and Cole's levee; maybe one per season spotted flying through.
Ted Murphy	Kern Audubon Society	Golden eagles are not uncommon in eastern Kern County. He is not very familiar with western Kern County.
Dale Moffet	Tule Elk Reserve	Picked up female golden eagle hit by truck in October of 2010 on the western side of the park at the bottom of the Grapevine.
Allison	Weldon Audubon Branch	Conducts Christmas bird counts in eastern and western Kern County for the past few years in December. They were unable to access western Kern County this season (2010). She saw golden eagles on all counts in eastern Kern County.
Pam Williams	Kern National Wildlife Refugee	Adult golden eagle was seen hunting American coots (12/15/11) about 15 miles north of KNWR up in the Alpaugh area; however, no nesting has been observed in vicinity.
Joseph	California Condor Recovery Team	Left voicemail for Joseph on August 6, 2012 regarding inventory and surveys in the Bakersfield/ Buttonwillow area, he is the recovery team's principal biologist.
—	Hawkwatch	Left voicemail on August 6, 2012; have not received a call back.

References

Dixon, James B., 1937. The golden eagle in San Diego County, California. The Condor. 39:49-56.

Smith, D.E. and J.R. Murphy, 1973. Breeding ecology of raptors in the eastern Great Basin of Utah. Brigham Young Univ. Sci. Bull. Biol. Series 18:1-76.

HABITAT IMPACTS

BACKGROUND

Staff needs to accurately calculate habitat impacts in order to determine species habitat loss and appropriate mitigation acreage. Since the applicant has indicated that the majority of the project's impacts would be temporary and subject to revegetation activities, staff must understand how impact acreages were determined. As mentioned previously, the directional drilling associated with the CO_2 pipeline under the levee, two water canals (West Side Outlet Canal, California Aqueduct), four intersection improvement areas that are impact areas associated with the project and must be included in impact calculations.

DATA REQUEST

A56. Please explain how permanent and temporary impacts were calculated in Table 5.2-6 and whether calculations in this table represent existing acreage or impacted acreage. If this table provides impact calculations, please explain why these calculations differ from the calculations in Table 2-1, Project Description.

RESPONSE

Table 5.2-6 from the 2012 Amended AFC has been updated to be consistent with Table 2-1, and also includes the values for the OEHI components. This updated table is included herein as Table A56-1, Area of Habitats and Existing Land Use Types within the Project Area.

References

Stantec (Stantec Corporation), 2012a. Supplemental Environmental Information, Occidental of Elk Hills, Inc., CO_2 Enhanced Oil Recovery Project. Prepared for Occidental of Elk Hills, Inc. April.

Stantec (Stantec Corporation), 2012b. Modified CO_2 Supply Line Alignment Data Gap Analysis. Prepared for Occidental of Elk Hills, Inc. April.

Table A56-1
Area of Habitats and Existing Land Use Types within the Project Area
(Revised Table 5.2-6)

Habitat/ Land Use Types[1]	Project Site		Construction Staging Area		Railroad Spur		Railroad Spur Laydown Yard		Natural Gas Pipeline		Process Water Supply Pipeline		Trans-mission Line		OEHI CO_2 Pipeline[2]		OEHI EOR Facilities[3]		Total	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Alfalfa	–	118.0	59.8	–	7	5.3	1.9	–	3.4	–	4.2	–	9.7	0.07	–	–	–	–	85.7	123.37
Other Row Crop	–	317.3	20.0	–	21.4	17.6	–	–	12.1	2.2	1.7	–	0.1	–	–	–	–	–	55.3	337.3
Orchards	–	–	–	–	1.6	4.5	5.6	–	0.6	–	2	–	–	0.01	–	–	–	–	9.8	4.51
Natural/Vegetation	–	–	–	–	–	–	–	–	3.6	–	–	–	–	–	28.89	0.11	1,447.0	261.6	1,479.49	261.71
Developed/Disturbed	–	17.7	11.2	–	15.7	12.4	0.7	–	30.1	–	79.5	–	12.9	0.07	–	–	–	–	150.4	29.97
Total	**–**	**453**	**91**	**–**	**45.7**	**39.8**	**8.2**	**–**	**49.8**	**2.2**	**87.4**	**–**	**22.7**	**0.15**	**28.89**	**0.11**	**1,447.0**	**261.6**	**1,775.99**	**750.36**

Notes:

1 Areas not designated as crop land or Natural/Vegetated land have been classified as Developed/Disturbed.
2 Source: Modified CO_2 Supply Line Alignment Data Gap Analysis (Stantec, 2012b).
3 Source: Supplemental Environmental Information for CO_2 Enhanced Oil Recovery Project (Stantec, 2012a).

DATA REQUEST

A57. Please confirm whether the three HDD pits in the Controlled Area were factored into the construction staging area impact in Table 5.2-6. If they were not, please revise this table.

RESPONSE

The disturbance area associated with the three HDD pits that will be located in the Controlled Area was included with the disturbance area associated with the OEHI CO_2 Pipeline construction. See Table A56-1 (Revised Table 5.2-6) Area of Habitats and Existing Land Use Types within the Project Area, in the response to Data Request No. A56.

DATA REQUEST

A58. Please provide a description of the construction activities to be performed at the intersection improvement areas including type of work, equipment, and approximate work area dimensions. Please clarify whether the work areas were included in habitat impact calculations. If they were not, please revise Table 5.2-6 to include this impact under a separate column.

RESPONSE

Construction work areas for intersection improvements were not included in habitat impact calculations presented in the 2012 Amended AFC Table 5.2-6. Given that the mitigation measures are only proposed at this time, and it is not yet known what final mitigation measures may be imposed by the CEC in consultation with the County, it is premature to undertake the analysis at this time. Applicant suggests that this issue be addressed through a Condition of Certification requiring additional analysis in these affected areas prior to ground disturbing activities, but after certification of the Project and finalization of the required mitigation measures.

CARBON DIOXIDE PIPELINE ROUTE AND OEHI PROJECT

BACKGROUND

Staff will need to assess the impacts to species and sensitive habitat associated with the Occidental of Elk Hills, Inc. (OEHI) project on Elk Hills since it is a connected action with the HECA project. Appendix A, OEHI Environmental Documents, identifies 13 satellites as broad Enhanced Oil Recovery (EOR) development areas; however, Appendix A does not address specific impacts of the carbon dioxide route or results from 2010 or 2011 botanical surveys, as the Amended AFC indicates. Staff needs to be able to determine the project's impacts to special-status plants and wildlife that occur on Elk Hills in the region of the carbon dioxide route and all EOR activities.

DATA REQUEST

A59. Table 5.2-6 of the applicant's Amended AFC does not include habitat impact acreages for the carbon dioxide pipeline route and refers the reader to Appendix A; however, Appendix A also does not include an impact acreage for this linear facility. Please provide the habitat impact acreage for the currently proposed carbon dioxide route and explain how it was calculated.

Please confirm that the portion of the carbon dioxide (CO_2) pipeline that occurs on the Elk Hills Oil Field (EHOF) is not proposed for lands that are covered under an existing conservation easement or proposed for conservation under the draft Occidental of Elk Hills Habitat Conservation Plan.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A60. Please provide an aerial exhibit(s) at an appropriate scale (e.g., 1 inch: 7,000 feet) showing plant and wildlife species GPS data collected during previous monitoring years. On the exhibit, please also show a conceptual drawing overlay (such as AutoCAD) of the 13 satellites shown in Appendix A.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A61. Page 5.2-13 indicates that cottony buckwheat, Hoover's eriastrum, and oil nest straw were observed in areas surveyed for the previously proposed carbon dioxide route but not the current pipeline route and details are addressed in Appendix A. Appendix A gives a general overview of occurrences of these plant species on the Elk Hills Oil Field by referring to the Draft Habitat Conservation Plan for the Elk Hills Oil Field but does not include survey results specifically for the currently proposed carbon dioxide route. Please provide the results of the botanical surveys performed on the carbon dioxide pipeline study area. Provide a figure showing the location of these plant populations in relation to the current carbon dioxide pipeline route, approximate number of plants found during surveys, and dates that surveys were performed. Please also describe the potential for direct and indirect impacts to this species during construction and operation.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A62. Please provide copies of (per Section 4.4 of Appendix A, Amended AFC):

a. Any available wildlife and botanical monitoring reports from Elk Hills history as NPR-1 and NPR-2;

b. Occidental of Elk Hills, Inc. (OEHI) Habitat Conservation Plan, 2006. First Public Draft. Kern County Planning Department;

c. CESA Incidental Take Permit application for draft HCP (OEHI 2009);

d. Memorandum of Understanding and CESA Take Authorization, CDFG and OEHI, 1997;

e. Memorandum of Understanding and CESA Take Authorization, CDFG and OEHI, 1999 MOU amendment;

f. Memorandum of Understanding and CESA Take Authorization, CDFG and OEHI, 2010 second amendment; and

g. USFWS 1995, Biological Opinion.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

SAN JOAQUIN KIT FOX

BACKGROUND

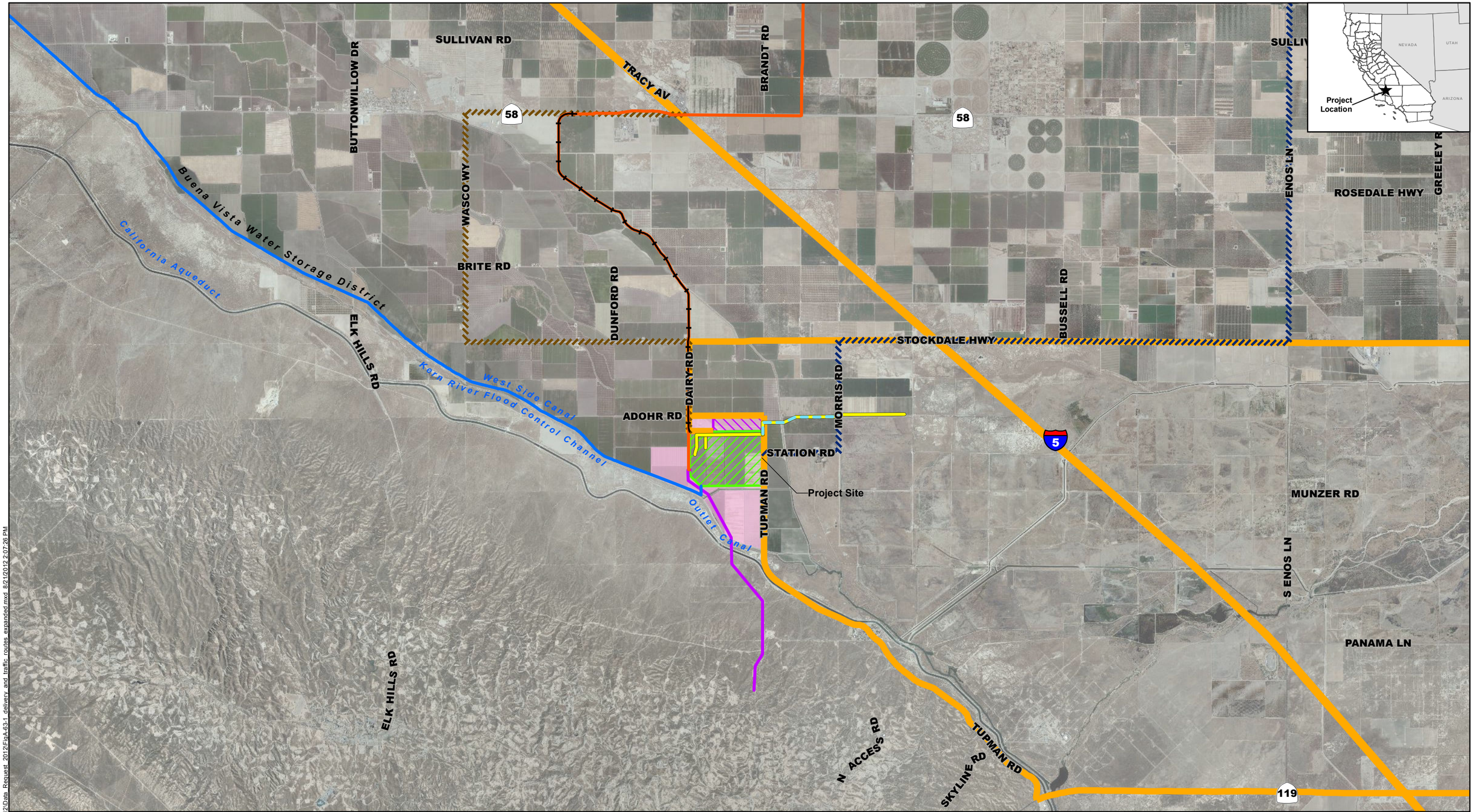
Page 5.2-22 of the Amended AFC states "… [kit fox] dens, scat, and burrows indicate that the Elk Hills area south of the California Aqueduct is the most intensively used area in the Biological Resources Survey Area." This information on Page 5.2-22 conflicts with information on page 5.2-36 stating that the carbon dioxide pipeline, in an area located south of the California Aqueduct, would disturb habitats that are already degraded by existing activities (i.e., dirt roads, active agriculture, and canals) and are not likely to provide habitat for breeding or denning kit foxes. Staff believes the project could affect San Joaquin kit fox both in terms of habitat loss and regional movement.

DATA REQUEST

A63. Please provide a figure showing the product truck delivery routes, the 27-mile truck route from the Wasco coal transloading facility to the project site, and the construction traffic routes.

RESPONSE

Figure A63-1 shows the routes for truck delivery and construction vehicles. Figure A63-2 shows the 27-mile truck route from the Wasco coal transloading facility to the Project Site.



Project Site
Construction Staging Area
Controlled Area
BVWSD Well Field

Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

Coal Truck Route
Vehicle/Truck Route
Alternate P.M. Construction Worker Route

N

0 0.5 1 MILES

DELIVERY AND TRAFFIC ROUTES

August 2012
28068052

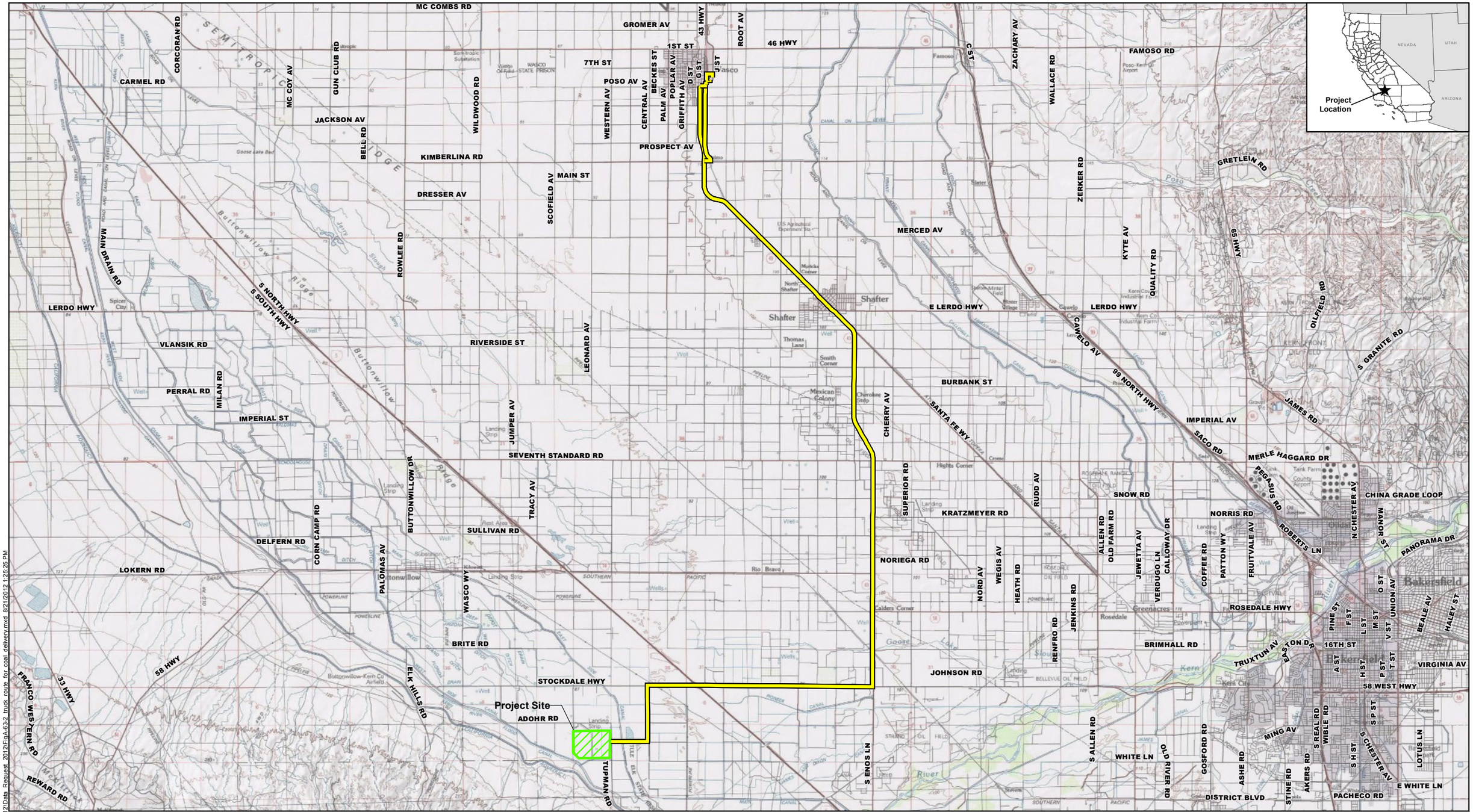
Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A63-1

Source: USGS (30'x60' quads: Taft 1982, Delano 1982). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Kern County and State of California (proposed and approved projects).

ed U:\GIS\HECA\Projects\HECA_2012\Data_Request_2012\Fig\A-63-1_delivery_and_traffic_routes_expanded.mxd 8/21/2012 2:07:26 PM



Project Site

Coal Truck Route

N

0 1.5 3 MILES

TRUCK ROUTE FOR COAL DELIVERY

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A63-2

Source: USGS (30'x60' quads: Taft 1982, Delano 1982). Created using TOPO!, ©2006 National Geographic Maps, All Rights Reserved. Kern County and State of California (proposed and approved projects).

et U:\GIS\HECA\Projects\HECA_2012\Data Request_2012\FigA-63-2 truck route for coal delivery.mxd 8/21/2012 1:26:25 PM

DATA REQUEST

A64. Page 5.2-37 states "…most project-related traffic would be on the roads during daylight hours when kit fox are less likely to be present." Please provide an estimate of project traffic that would occur during day light hours and those at night (i.e., after dusk or before dawn). Consider construction traffic (construction workers, materials, equipment) and operation traffic (product deliveries, alternative 2 for coal delivery, employees, etc.). Please identify operational traffic that could operate on a 24-hour schedule, if any.

RESPONSE

Estimates of Project construction and operation traffic are presented in 2012 Amended AFC Tables 5.10-3 through 5.10-5, including coal transportation associated with Alternative 1, Rail Transportation Option, and Alternative 2, Truck Transportation Option. Table A64-1 provides the estimated distribution of traffic that would occur during daylight and nighttime hours, in percent.

Table A64-1
Project Traffic During Day and Night

	Day Traffic (percent)	Night Traffic (percent)
Construction Traffic	85	15
Operations Traffic – Alternative 1, Rail Transportation Option	79	21
Operations Traffic – Alternative 2, Truck Transportation Option	66	34

Notes:

[1] Construction traffic considers construction worker vehicles, truck deliveries, and soil fill deliveries (see Table 5.10-3 in the 2012 Amended AFC).

[2] Operation traffic for Alternative 1, Rail Transportation Option, considers operations and maintenance trips, delivery trips for process materials and byproducts, and feedstock material delivery trips (see Table 5.10-4 in the 2012 Amended AFC).

[3] Operation traffic for Alternative 2, Truck Transportation Option, considers operations and maintenance trips, delivery trips for process materials and byproducts, feedstock material delivery trips, and coal delivery trips (see Table 5.10-5 in the 2012 Amended AFC).

DATA REQUEST

A65. In Table 5.2-12, explain how the values under 'baseline take (fox/yr/mi)' were determined from Urban Roads and the Endangered San Joaquin Kit Fox (Bjurlin et al., 2005). Also, please explain how the roadway segment lengths were selected for analysis. Explain how values under the project take (fox/year) column were determined.

RESPONSE

The "baseline take (fox/yr/mi)" values in Table 5.2-12 were determined from *Urban Roads and the Endangered San Joaquin Kit Fox (*Bjurlin *et al.,* 2005) by back-calculating the number of fox found dead on specific roads (or road types), then dividing that number by the number of years that area was examined, and by the length of the road segment. The details for each road segment are shown below.

Stockdale: Calculated using Figure 9 (p. 16) from Bjurlin *et al.*, 2005.

- From 1998 to 2004 (6 years)
- 1 kill per year, 6 overall
- 1 fox/year/5.09 miles = 0.20 fox/yr/mi

Interstate 5 (I-5): Estimated by quantifying data from Figure 9 (p. 16) from Bjurlin *et al.*, 2005, and the HECA document.

- 1 kill overall (6 Years)
- 0.16 fox/yr/14.00 mi = 0.01 fox/yr/mi
- 0.16 fox/yr/5.65 mi = 0.03 fox/yr/mi

SR 119: Calculated using Figure 9 (p. 16) from Bjurlin *et al.*, 2005.

- 0.3 kill per year, 2 overall (6 Years)
- 0.3 fox/yr/4.28 mi = 0.07 fox/yr/mi

Highway 46: Estimated by attaining a home range estimate from page 72 of the Humboldt document (link below), comparing it to the urban kit fox range and creating a fraction.

http://humboldt-space.calstate.edu/xmlui/bitstream/handle/2148/36/Frost.pdf?sequence=1

Tupman Road: These numbers were calculated using a traffic volumes chart, and comparing it to traffic volumes from known streets, and mortality rates.

0.75 kill per year, 0.75 fox/yr/5.41 mi =0.14 Mortality #/yr/mi

The lengths of the roadway segments used in calculating the kit fox mortality in the model are the overlap between the roadways described in Section 5.10, Traffic and Transportation, of the 2012 Amended AFC, and the San Joaquin Kit Fox Recovery Area (Figure 5.2-11). For instance, I-5 crosses through 14 miles of the Antelope Plain/Semitropic/Kern Satellite area in the north; and 5.65 miles of the Western Kern County core area in the south.

"Project take" was calculated by multiplying the "Baseline annual take" by the "Project vehicles (% increase)." "Cumulative take" was calculated as the sum of the "Baseline annual take" and the "Project take."

Technical Area: Cultural Resources
Authors: Melissa Mourkas, Elizabeth A. Bagwell, Gabriel Roark

INTRODUCTION

All responses to these Data Requests containing references to specific archaeological site location or information should be submitted under a request for confidentiality.

BACKGROUND

The California Environmental Quality Act (CEQA) and State CEQA Guidelines direct lead agencies to identify historical resources and unique archaeological resources that may be affected by proposed projects, and assess their impacts on those resources (Public Resources Code [PRC] 21083.2[a]; 14 California Code of Regulations (CCR) 15064.5[b] and [c]). Lead agencies (in this case, the Energy Commission) "shall determine whether a significant effect on the environment based on substantial evidence in light of the whole record" (PRC 21082.2), as defined at 14 CCR 15384. CEQA practice recognizes the value of incorporating historic records in efforts to identify historical and unique archaeological resources (see Governor's Office of Planning and Research 1999, p. 360).

The Amended AFC (pp. 5.3-56–57) and *Confidential Archaeological Reconnaissance, Hydrogen Energy California Study Area, Kern County, California* list the historic maps and aerial photographs examined by Hydrogen Energy California's (HECA's) archaeological consultant (Amended AFC App. G-3, May 2012, Tables 1 and 2). An attempt was made in the Amended AFC and Appendix G-3 to provide the requisite level of information needed by staff to evaluate project impacts on historical and unique archaeological resources. The presentation of the consultant's review of historic maps and aerial photographs, however, is inadequate for staff's analysis for three reasons:

First, the archaeological consultant (URS) did not consult historic maps dating to the 1870s, 1880s, 1900s, or 1920s (Amended AFC, pp. 5.3-56–57; Amended AFC App. G- 3, pp. 26–27). Historic maps are a critical source of information for the identification of historic archaeological and historic built environment resources. For example, maps spanning the date ranges stated earlier in this paragraph could narrow down the date of construction of the historic residence at HECA-2010-2, which the applicant's consultant states "was in place prior to World War II, likely being constructed during the 1920s or 1930s" (Amended AFC App. G-3, p. 41). The age of building and structural remnants on historic archaeological resources inform on the likelihood of encountering refuse pits or artifact-filled privy pits (outhouse pits). Features such as refuse and privy pits frequently contain sufficient archaeological information to qualify archaeological resources for listing on the California Register of Historical Resources (CRHR). The number and range of archaeological and historic built environment resources is likely to be underrepresented in cultural resource studies that do not include a comprehensive review of available historic maps. In turn, the quality of cultural resources impact assessments may suffer.

Second, the archaeological consultant (URS) does not discuss where they conducted the historic map research nor does the consultant provide full bibliographic citations for the historic maps and aerial photographs listed in Tables 1 and 2 (Amended AFC, p. 5.3-19–20; Amended AFC App. G-3, pp. 25–27). Without information concerning the repositories visited to obtain historic maps and aerial photographs and full bibliographic data on the examined documents, it is impractical for staff to determine whether the consultant made an adequate review of these data sources. For instance, if the requested data were already presented in Amended AFC Appendix G-3, staff would be able to determine whether maps and historic photographs dating

to the 1870s, 1880s, 1900s, and 1920s are simply unavailable or the consultant conducted insufficient research in this matter.

Third, the archaeological consultant's (URS) report (Amended AFC App. G-3) does not state whether, and in what manner, their review of historic maps and aerial photographs informed their archaeological field methods, especially with respect to the identification of historic archaeological resources (Amended AFC App. G-3, pp. 33, 37–38). The archaeological consultant (URS) did, however, use the sources consulted to infer the age of historic archaeological site HECA-2010-2 (Amended AFC, p. 5.3-29; Amended AFC App. G-3, p. 41).

DATA REQUEST

A66. The applicant's historic built environment consultant, JRP Historical Consulting (JRP), cites historic maps and aerial photographs from the 1870s, 1880s, and 1900s (Amended AFC, App. G-4, p. 36). In conducting the archaeological inventory, the archaeological consultant (URS) did not consult these maps and aerial photographs (Amended AFC, pp. 5.3-56–57; Amended AFC App. G-3, pp. 26–27). Please provide copies of these maps.

RESPONSE

Copies of historic maps from the 1870s, 1880s, and 1900s cited by JRP Historical Consulting (2012 Amended AFC, Appendix G-4, p. 36) are provided separately on CD to the CEC.

DATA REQUEST

A67. Please review historic maps or aerial photographs of the HECA project area that date to the 1920s and provide documentation of any evidence of historic features in the project area, especially in the vicinity of HECA-2010-2. Please identify:

a. The dates when historic map and aerial photograph research was conducted.

b. The sources consulted at each repository.

c. Whether and in what way(s) the historic map review informed efforts to identify historical and unique archaeological resources.

d. Whether the archaeological consultant's review of maps described in paragraphs 1 and 2 above resulted in the identification of historic features in the project area, whether any such features have been recorded, and whether they are still extant in the project area.

e. Full bibliographic citations for the maps and aerial photographs examined. Bibliographic information for maps and aerial photographs should include the dates that aerial photographs were actually taken (the year is sufficient), the dates that culture features were mapped onto U.S. Geological Survey topographic quadrangles, including the dates of field verification (if applicable), and the dates of survey for General Land Office survey plats.

RESPONSE

a. Historic maps and aerial photographs for the HECA Project area were consulted over various dates over various years as the Project developed. Applicant's response to Data Request No. A83 Part A includes a table indicating when various components of the current project footprint were subjected to archaeological inventory. Historic maps and aerial photographs—as presented in the 2012 Amended AFC and archaeological technical report—were consulted, along with new record searches and consultations, prior to these field efforts.

The 1921 and 1929 1:125,000 Buena Vista Lake topographic maps, which depict the portion of the Project area where HECA-2010-2 is located, were reviewed after our field efforts for the proposed railroad corridor/revised natural gas line in an attempt to date the former structure (i.e., HECA 2010-2). No evidence of the site was observed on either of these maps.

b. Historic maps and aerial photographs were obtained from a number of sources during the course of the investigation. Historic topographic quadrangles and aerial photographs were copied from the Environmental Data Resources, Inc. (EDR) Report prepared for the HECA Project. Government Land Office (GLO) plat maps were collected from the on-line GLO database provided by the Bureau of Land Management (http://www.glorecords.blm.gov/). Historic topographic quadrangles and other historic maps were copied and/or consulted from a number of sources over the life of the Project, including the California State Archives in Sacramento, the Earth Sciences and Map Library at UC Berkeley, the Shields Library at UC Davis, historic maps on file at the Southern San Joaquin Valley Information Center, the on-line Atlas and Map Collection of Humboldt State University (http://library.humboldt.edu/infoservices/atmapcoll.htm), the on-line California Historic Topographic Map Collection at Chico State University (http://cricket.csuchico.edu/maps/topo_search.html), and the U.S. Geological Survey

(USGS) Government Historic Topographic Map Collection Archives (http://cida.usgs.gov/hqsp/apex/f?p=262:1:4100044668676310).

c. When a potential historic resource (e.g., site of a former structure) was indicated during the completion of the pre-field research, the location and the dates (e.g., 1926 to 1948) of the potential resource were noted. When the location of the potential historic resource was reached, transect intervals were reduced, increasing the visual coverage of the area. Particular attention was given to identifying artifacts of the corresponding age of the potential historic resource (to act as confirmation of the identification of the potential resource). No subsurface survey efforts were employed, however, because such techniques were not in the access agreements.

This survey strategy was used for both potential historic archaeological resources, as well as prehistoric archaeological resources. For this latter class of potential resource, it should be noted that it is common to see "Indian Burial Mound" on early USGS topographic quadrangles of the San Joaquin Valley.

d. All prehistoric and historic archaeological sites encountered in the field were recorded. As currently defined, only a single historic archaeological resource occurs within the survey area. As explained within the 2012 Amended AFC and confidential technical report, this site (HECA-2010-2) appears to have been graded away since original recordation. It should be noted that when fieldwork for the HECA Project was first initiated, the structure at the corner of Adohr and Dairy Roads was still standing, and therefore was not treated as an archaeological resource. In 2010, when the survey for a revised natural gas line was undertaken, the structure had been recently demolished and the remaining foundation was subsequently recorded by URS archaeologists as HECA-2010-2. In 2012, when the Applicant added the railroad spur, and the natural gas line route was again revised, all surface evidence of the demolished house (i.e., HECA 2010-2) had been graded away by projects unrelated to the HECA Project.

e. The bibliographic list of reviewed historic maps and aerial photographs is provided below. The citation for these aerial photographs is presented as "Environmental Data Resources 2010," because the collection of photographs examined were from a report produced by EDR. Within both the 2012 Amended AFC and confidential technical report (presented as Table 5.3-2 and Table 2, respectively), the year in which the actual aerial photograph was taken is provided.

Aubury, Lewis E. *Map of Kern County, California*. San Francisco: State Mining Bureau, 1904.

Buffington, M.W. *Official Map of Kern County, California*. San Francisco: Britton & Rey, 1912.

California Department of Engineering. *Detail Irrigation Map: Southern San Joaquin Valley, California*. Sacramento: California State Engineering Department; William Hammond Hall, State Engineer, 1885.

Congdon, Charles H. *Official Map of Kern County, California*. San Francisco: W.B. Walkup, 1898.

Environmental Data Resources, Inc. Environmental Data Resource *HECA Dairy/Adohr Rd Tupman, CA 93276*. *EDR Aerial Photo Decade Package,* 2010. On file with URS San Francisco.

Government Land Office, Mount Diablo Base Meridian, *Township 29 South/Range 22 East*. San Francisco Office, California, 1856 and 1868.

Government Land Office, Mount Diablo Base Meridian, *Township 29 South/Range 23 East*. San Francisco Office, California, 1856 and 1868.

Government Land Office, Mount Diablo Base Meridian, *Township 29 South/Range 24 East*. San Francisco Office, California, 1856 and 1868.

Government Land Office, Mount Diablo Base Meridian, *Township 30 South/Range 24 East*. San Francisco Office, California, 1856, 1868, and 1894.

Government Land Office, Mount Diablo Base Meridian, *Township 30 South/Range 25 East*. San Francisco Office, California, 1855.

Government Land Office, Mount Diablo Base Meridian, *Township 31 South/Range 25 East*. San Francisco Office, California, 1855 and 1868.

Leicht, Ferdinand von. *Official Map of Kern County, California*. San Francisco: Britton, Rey and Co., 1875.

Punnett Brothers. *Weber's Map of Kern County, California*. San Francisco: C.F. Weber and Company, 1914.

Stegman, A.E. *Map of 1918 Kern County, California*. Bakersfield, California: County Surveyor, 1918.

Southern Pacific Railroad Company. "Southern Pacific Railroad Bakersfield to Olig." August 1913.

United States. Agricultural Adjustment Administration. *Aerial Photographs of Kern County, California*. Salt Lake City, Utah: The Administration, 1942.

USACE. *Buttonwillow Quadrangle.* USACE: Washington, D.C., 1932, 1942, 1954, 1954; photorevised 1973.

USGS. *Buena Vista Quadrangle*. USGS: Washington, D.C., 1912, reprinted 1921 and 1929.

USGS. *East Elk Hills Quadrangle.* USGS: Washington, D.C., 1932, 1954, 1954; photorevised 1973.

USGS. *Tupman Quadrangle.* USGS: Washington, D.C., 1954, 1954; photorevised 1968 and 1973.

As described previously in the various components that comprise the response for Data Request No. A67 Parts A through D, as well as the response to Data Request No. A83 Part A, prefield research—including a review of historic maps and aerial photographs—and field surveys were conducted at numerous times over a number of years as a result of refinement in the HECA Project. Also as described previously, all archaeological sites encountered during the surveys were recorded. Of the archaeological sites identified, only one within the current Project area is from the historic-era (i.e., HECA 2010-2).

BACKGROUND

The Amended AFC and Appendix G-3 identify HECA-2010-2[2] as the foundation and remnant of a "recently demolished farmhouse." The resource is situated within the archaeological resources study area for the proposed railroad spur and natural gas pipeline. HECA-2010-2 consists of a house foundation, clay and cast-iron drainage pipes, polyvinylchloride (PVC) plumbing, and a debris scatter. The archaeological consultant states that the building appears to have been altered more than once during its period of occupancy. To support this statement, the Amended AFC and Appendix G-3 cite the presence of cinderblocks and the clay, cast-iron, and PVC piping at the site. The Amended AFC and Appendix G-3 state that the clay and cast-iron drainage pipes are part of the original construction of the house. They further state that since "the structure had internal plumbing, as evidenced by sewer pipes (likely connected to a leach field), it is unlikely that an undiscovered 'privy pit' occurs buried in the [archaeological resources study area]." The debris scatter consisted of "sanitary cans, milk cans, ceramic and glass fragments, and various structural debris associated with the building's demolition." (Amended AFC, p. 5.3-29–30, Appendix G-3, pp. 41–42.) Appendix G-4 (Department of Parks and Recreation [DPR] 523 form for MR 5) describes a Quonset hut on the same property as HECA-2010-2 and surmises that this structure was built as a miscellaneous farm structure by the residents of HECA-2010-2. Between the time of HECA-2010-2's recordation on July 29, 2010 and a site update on February 29, 2012, the property on which HECA-2010-2 is situated was graded, resulting in the removal of all surface evidence of the site (Amended AFC, pp. 5.3-30, App. G-3, DPR 523 forms for HECA-2010-2). The Quonset hut was not demolished.

The information provided in the Amended AFC and its appendices concerning HECA-2010-2 does not provide an adequate basis for staff to assess the significance of HECA-2010-2 or potential impacts to the site. As a former rural residence built in the first third of the twentieth century, there is potential for HECA-2010-2 to contain privy and/or refuse pits. Such features, especially a privy pit, would likely be located along the east side of the property so that the prevailing westerly and northwesterly winds would blow unwanted odors away from the residence. Therefore, the proposed natural gas pipeline has the potential to intersect any privy pits that might be present. As stated in the Background to Data Requests 1–2 above, privy and refuse pits frequently contain archaeological materials that qualify archaeological resources for listing in the CRHR. Assessing whether HECA-2010-2 had an associated outhouse requires knowledge of the property's occupational history as well as physical evidence of the sanitation system used at the site. The chronological evidence of occupation must be compared carefully with any technological clues as to sanitation at the site since different sanitation technologies may have been used at different times during occupation of the residence. The documentation of HECA-2010-2 is inadequate for the following reasons:

- Additional documentation of HECA-2010-2 is required to determine whether undiscovered privy and/or refuse pits are located on site in the Project area.
- Cursory field methods were used during recordation of HECA-2010-2 relative to the site's potential to contain buried historic archaeological materials.

The Amended AFC and DPR 523 forms contained in Appendix G-3 appear to support the notion that the residence was always on a septic system. However, none of the documentation

[2] The historic architecture technical report for the proposed project identifies a historic-era structure related to HECA-2010-2 on the property (Amended AFC, App. G-4). This document references the resource as Map Reference No. 5, or MR 5. Throughout this data request document, Energy Commission staff treats HECA-2010-2 and MR 5 as a single resource because of their historical relationship.

provided to staff demonstrates that the clay and iron pipes represent the residence's sanitation system and were part of the home's original construction. The documentation does not indicate whether the clay and iron pipes were anchored to the concrete foundation at HECA-2010-2 or were fragments scattered on the site surface. Additionally, the DPR 523 forms for HECA-2010-2 do not include a sketch map (DPR 523K) depicting the location of the clay and iron pipes, among other important features of the site. A sketch map of HECA-2010-2 is an exhibit of first importance in identifying changes to the residence over time, especially given the lack of documentary sources to substantiate the hypothesized alterations to the residence (reference the Background above for discussion of alterations).

The DPR 523 forms and site descriptions contained in the Amended AFC and Appendix G-3 do not quantify the artifacts present at HECA-2010-2, describing the artifacts' location in only the most general sense, and do not estimate the age of artifacts (other than to note the presence of recent specimens as well as historic ones) with reference to standard sources of artifact identification and dating. Such information is essential to the documentation of any historic archaeological site that is being evaluated for significance under CEQA. Chronological information on the artifacts can also supplement the map and documentary evidence of site occupation, possibly filling in the 1912–1932 gap in map coverage for the area.

Finally, the field methods employed to record HECA-2010-2 were cursory, relative to the site's potential for containing a privy pit or buried refuse pit. The archaeological consultant conducted a surface inspection (50–65 feet between surveyors) of the site and scraped back vegetation in 8-inch-by-8-inch squares where ground surface visibility was deemed poor (Amended AFC, p. 5.3-21, 5.3-22; App. G-3, p. 33). Although such methods would identify refuse or privy pits that are visible at the ground surface, such features are frequently buried—surface inspection alone would not locate such buried archaeological features. Use of a metal detector to identify concentrations of metal artifacts and a metal probe to verify the presence of metal and other artifacts are invaluable for the identification of relatively shallow buried features and are standard professional protocol on historic archaeological sites of this kind (California Department of Transportation 2008:6:24; HARD Work Camps Team 2007:86).

References

California Department of Transportation, 2008. *Environmental Handbook, Volume 2: Cultural Resources*. October. Sacramento, California. Electronic document, http://www.dot.ca.gov/ser/vol2/ch_6/Ch_6_Oct_08.pdf, accessed June 25, 2012.

Governor's Office of Planning and Research, 1999. CEQA and Archaeological Resources. Appendix 6 in Ronald E. Bass, Albert I. Herson, and Kenneth M. Bogdan, *CEQA Deskbook*. Point Arena, CA: Solano Books. Originally published April 1994 in *CEQA Technical Advice Series*, Governor's Office of Planning and Research, Sacramento, California.

HARD Work Camps Group, 2007, *Work Camps: Historic Context and Archaeological Research Design*. Draft. June. Prepared for Cultural Studies Office, Division of Environmental Analysis, California Department of Transportation, Sacramento, California. Electronic document, http://sonoma.edu/asc/publications/HARD/Work%20Camps_Research%20Design_Draft2_web.pdf, accessed June 25, 2012.

DATA REQUEST

A68. Please revise and submit the DPR 523 forms for HECA-2010-2 to include the following information:

a. The number of artifacts observed at HECA-2010-2, any specific age assignments that can be made to individual specimens or classes of artifacts, and the distribution of artifacts at the site.

b. A DPR 523k Sketch Map of HECA-2010-2 that depicts the site boundary, location of all site features, artifact concentrations, and the location of any plumbing present at the site.

c. The revised DPR 523 form should represent site conditions at the time of recordation in 2010.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A69. Please prepare a succinct research design to determine whether buried privy or refuse pits are present in that portion of HECA-2010-2 within the archaeological resources study area. Staff wishes to emphasize that the purpose of the investigation is presence/absence determination. The research design should be prepared by a historical archaeologist that meets the Secretary of the Interior's professional standards for archaeologists (see Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines, 36 Code of Federal Regulations 61). The research design must include the following:

a. A brief statement of the problem and research goals.

b. A statement of methods to achieve the research goal.

c. A statement regarding how the results will be reported (memorandum or revised archaeological reconnaissance report).

d. A figure that shows the contents of the Sketch Map on an aerial photographic base at a scale of 1 inch = 200 feet. The archaeological resources study area should be depicted on this figure.

e. The preparer's resume and the resumes of other key staff that are expected to implement the research design.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A70. Upon staff's approval of the research design described immediately above, please implement the archaeological investigation consistent with the approved research design.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A71. Following completion of the archaeological investigation, please provide a memorandum or a revised archaeological reconnaissance report that identifies the methods employed and results of the investigation. The report shall contain the following:

a. A description of the research design and the methods employed during the study.

b. A description of the study results.

c. A location map on the East Elk Hills 7.5-minute topographic quadrangle.

d. A Sketch map (see item 4d above) that depicts the sampling locations and the location of any newly identified archaeological features.

e. The revised 2010 DPR 523 forms and the 2012 update.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

BACKGROUND

The applicant's historic built environment consultant, JRP, identified two historic built environment resources, MR 7 and MR 9, in the controlled area north of the proposed project site. MR 7 consists of two buildings and a structure, all built about 1930. The buildings are a dining hall and dormitory for Adohr Farms agricultural workers. The structure is a garage. MR 9 is a single-family residence that has been considerably altered since its circa-1930 construction date. A modern shed is present on the property as well. (Amended AFC, App. G-4, DPR 523 forms.) Although identified as historic-era resources by JRP, the applicant's archaeological consultant did not report on MR 7 or MR 9 (Amended AFC, App. G-3). Given the age of MR 7 and MR 9 and their rural setting in an area currently without sewer service, both resources have the potential to contain buried historic archaeological features such as privy or refuse pits. Such features would likely be situated east of the residential and cooking buildings since the prevailing winds are westerly and northwesterly; siting privies to the east of the buildings would keep unwanted odors away from residential and cooking areas.

The resources are located in the proposed control area, which may be subjected to further ground-disturbing agricultural activities during construction and operation of the proposed project. If the applicant plans or reserves the right to conduct ground-disturbing agricultural activities within the bounds of MR 7 and MR 9, it will be necessary to determine whether buried privy or refuse pits are present at either location as part of the baseline resource identification mandated by CEQA (14 CCR 15125).

DATA REQUEST

A72. If no ground-disturbing activities would occur within the bounds of MR 7 and/or MR 9, please provide a written statement affirming the applicant's intent to avoid agricultural or other ground-disturbing activities within the bounds mapped (see p. 2 of the DPR 523 forms for MRs 7 and 9, App. G-4 of the Amended AFC for resource boundaries). In addition, please provide a map depicting the limits of the properties on which MR 7 and MR 9 are located.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123*, docketed on August 9, 2012, the Applicant confirms that no ground-disturbing activity will occur within the boundaries of MR 7 and MR 9.

DATA REQUEST

A73. If the applicant is unable to commit to avoiding ground-disturbing activities within the bounds of MR 7 and MR 9, please prepare a succinct research design to determine whether buried privy or refuse pits exist at either of these sites. Staff wishes to emphasize that the purpose of the investigation is presence/absence determination. The research design should be prepared by a historical archaeologist that meets the Secretary of the Interior's professional standards for archaeologists (see Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines, 36 Code of Federal Regulations 61) and must include the following:

a. A brief statement of the problem and research goals.

b. A statement of methods to achieve the research goal.

c. A statement regarding how the results will be reported (memorandum or revised archaeological reconnaissance report).

d. A figure that shows the contents of the sketch map on an aerial photographic base at a scale of 1 inch = 200 feet. The archaeological resources study area should be depicted on this figure.

e. The preparer's resume and the resumes of other key staff that are expected to implement the research design.

RESPONSE

As stated in Applicant's response to Data Request No. A72, there will be no ground-disturbing activity within the boundaries of MR 7 and MR 9; therefore, the study requested in this Data Request is not needed.

DATA REQUEST

A74. Upon staff's approval of the research design described immediately above, please implement the archaeological investigation consistent with the approved research design.

RESPONSE

As stated in Applicant's response to Data Request No. A72, there will be no ground-disturbing activity within the boundaries of MR 7 and MR 9; therefore, the study requested in this Data Request is not needed.

DATA REQUEST

A75. Following completion of the archaeological investigation, please provide a memorandum or a revised archaeological reconnaissance report that identifies the methods and results of the investigation. The report shall contain the following:

a. A description of the research design and the methods employed during the study.

b. A description of the study results.

c. A location map on the East Elk Hills 7.5-minute topographic quadrangle.

d. Sketch maps (see item 2d above) that depict the sampling locations and the location of any newly identified archaeological features.

e. Complete DPR 523 forms for MR 7 and MR 9.

Note that the research design, fieldwork, and reporting may be combined with the work at HECA-2010-2 described under Data Requests 69–71.

RESPONSE

As stated in Applicant's response to Data Request No. A72, there will be no ground-disturbing activity within the boundaries of MR 7 and MR 9; therefore, the study requested in this Data Request is not needed.

BACKGROUND

The Amended AFC proposes improvements at four intersections to alleviate traffic and transportation impacts (Amended AFC, pp. 5.10-19–20). The cultural resources section of the Amended AFC, however, does not include an analysis of the proposed intersection improvements (Amended AFC, Section 5.3; App. G-3). CEQA requires impact analysis of all phases of a proposed project, including mitigation measures (14 CCR 15126, 14 CCR 15126.4[a][d]).

The subject intersections are:

- State Route (SR) 43 (Enos Lane)–Stockdale Highway: signalization.
- SR 119–Tupman Road: signalization.
- Dairy Road–Stockdale Highway: addition of turn lanes.
- Dairy Road–Adohr Road: reconstruct intersection.

DATA REQUEST

Please provide the following information concerning the proposed intersection improvements outlined above.

A76. A description of the intersection improvements areas. The description shall include, if available, information concerning the types of construction activities needed to build the improvements, depth of excavation expected for ground-disturbing activities, and the approximate limits of the construction work areas.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A77. Records search results for each intersection, including an area not less than a 0.25-mile radius around the intersection improvements.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A78. Figures depicting previous survey coverage, identifying the author or study number and the date of survey. If study numbers are used instead of author's name, include a table that associates each study with its respective study number for ease of reference. Figures shall be on a 1:24,000-scale U.S. Geological Survey topographic quadrangle map. Previously recorded cultural resources shall be mapped on figures set at a 1:24,000 scale on a U.S. Geological Survey topographic quadrangle map.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A79. Copies of all technical reports whose survey coverage is wholly or partly within 0.25 mile of the intersection improvement areas.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A80. Copies of California Department of Parks and Recreation (DPR) 523 forms for all cultural resources identified in the literature search as being 45 years or older or of exceptional importance.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A81. Conduct pedestrian surveys of intersection improvements that have not been previously surveyed within the last 5 years.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A82. Prepare and submit an addendum to Appendix G-3 that describes:

a. The methods used to identify cultural resources in the intersection improvement areas.

b. The results of the records search and pedestrian survey.

c. Descriptions of previously and newly recorded cultural resources in the proposed intersection improvement areas.

d. An assessment of impacts to cultural resources in the intersection improvement areas.

e. Proposed mitigation measures for identified impacts.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant objects to this Data Request.

BACKGROUND

Staff finds that the applicant's documentation of archaeological fieldwork is incomplete. The Amended AFC and Appendix G-3 do not report the dates on which archaeological fieldwork was conducted (Amended AFC, pp. 5.3-21–22; App. G-3, pp. 33, 37–38). Also, although the Amended AFC (p. 5.3-21) reports that the archaeological survey crew cleared 8-inch-by-8-inch patches of vegetation "where nonagricultural vegetation obscured the ground surface" (see also App. G-3, p. 33), neither the Amended AFC nor Appendix G-3 reports how obscured the ground surface had to be before vegetation scrapes were conducted. Additionally, the Amended AFC and Appendix G-3 do not report where the vegetation was cleared and at what interval along survey transects. This missing information renders staff unable to assess whether adequate time was allotted to the field effort and whether appropriate field methods were used.

DATA REQUEST

A83. Please provide a memorandum or revised archaeological reconnaissance report that indicates the following:

a. The dates on which archaeological fieldwork was conducted. Break the dates down by project element, as is done on pages 37–38 of Appendix G-3 to the Amended AFC and pages 5.3-21–22 of the Amended AFC.

b. How much ground surface had to be obscured to warrant scraping vegetation from the ground surface, expressed as a percentage.

c. The interval (in feet and meters) at which surface scrapes were conducted. Please describe the reasoning behind the selected surface-scrape interval and size.

RESPONSE

a. The dates that archaeological fieldwork was conducted, by Project component, are provided in the following table:

Project Component	Fieldwork Dates
Project Site	January 7-14, 2009
Process Water Line	April 7-11, 2008, May 16-22, 2008; and June 28-30, 2008
Transmission Line/Potable Water Line	April 4 and 5, 2010; and January 18 and 19, 2011
Well Field	December 8-10, 2009
Railroad/Natural Gas Line	July 28-30, 2010; February 28 and 29, 2012; and April 3 and 4, 2012

b. In natural or fallow environments, ground-surface vegetation was scraped away when surface visibility was between 50 percent and 60 percent.

As stated in the 2012 Amended AFC and confidential technical report Appendix G-3, surface vegetation was not scraped away when said vegetation was agricultural. Agricultural vegetation was not scraped away, because field crews were instructed to

avoid damaging crops. When crops were encountered, however, there were generally furrows, irrigation ditches, rodent burrows, and similar features throughout the survey area, which allowed for the visual examination of the local soils.

Within the Project Site, scraping was employed; but it should be noted that, as stated in the 2012 Amended AFC and confidential technical report, surface visibility was greater than 80 percent due to recent plowing. Along the linear alignments, surface visibility was more variable; however, surface visibility of greater than 50 percent was encountered. It should also be noted that for the majority of the linear alignments, a large percentage of the survey area was of high visibility, owing to the fact that the alignments are to be set within or immediately adjacent to unpaved roads.

c. Given the variability in ground-surface visibility throughout all of the Project elements, there was no standard interval for the employment of surface scrapes. Surface scrapes were made at the discretion of the field archaeologists in areas of between 50 percent and 60 percent surface visibility. Generally, these consisted of clearing an area of approximately 20 centimeters by 20 centimeters at intervals of 15 to 30 meters (50 to 100 feet) across the vegetated portion of the survey area.

DATA REQUEST

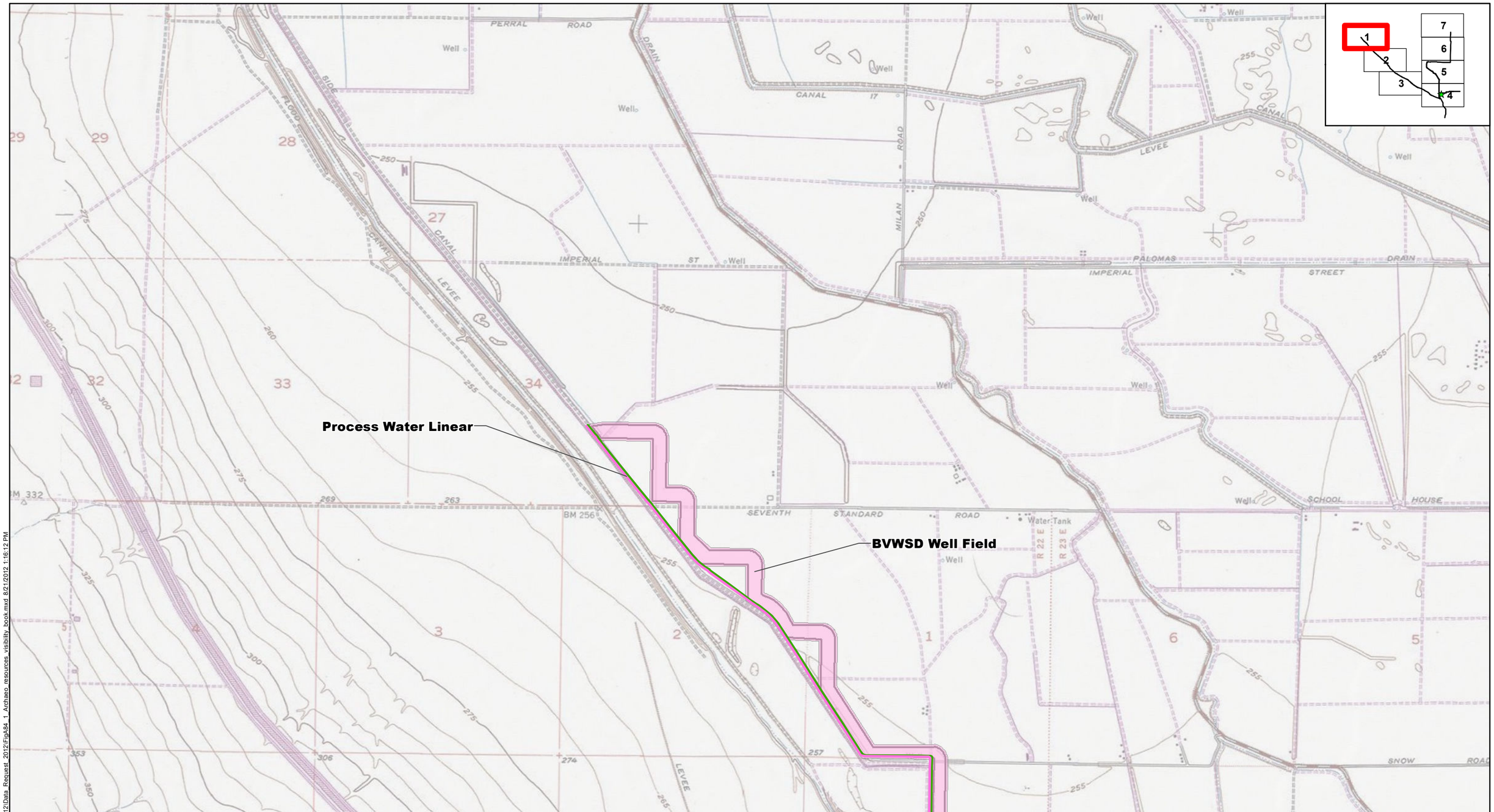
A84. Please provide figures that identify the amount of ground surface visibility in the archaeological resources study area. The figures shall conform to the following requirements:

a. The figures shall be based on 7.5-minute, U.S. Geological Survey topographic quadrangles at a scale of 1:24,000.

b. The figures shall show the project elements, archaeological resources study area boundary, any unsurveyed areas, and the ground-surface visibility throughout the archaeological resources study area.

RESPONSE

Figure A84-1 depicts all HECA Project components and the corresponding amount of surface visibility at the time archaeological surveys were conducted. Figure A84-1 is based on USGS 1:24,000 topographic quadrangles; includes the entire Archaeological Resources Study Area; and identifies areas that were not subject to pedestrian reconnaissance due to lack of access.



High Visibility (75 to 100 percent)

Moderate Visibility (50 to 75 percent)

No Survey Access

Note:
1. Cultural analysis of areas south of the California Aqueduct is included in 2012 Amendment AFC Appendix A.

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL RESOURCES STUDY AREA: VISIBILITY MAP

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A84-1 (SHEET 1)

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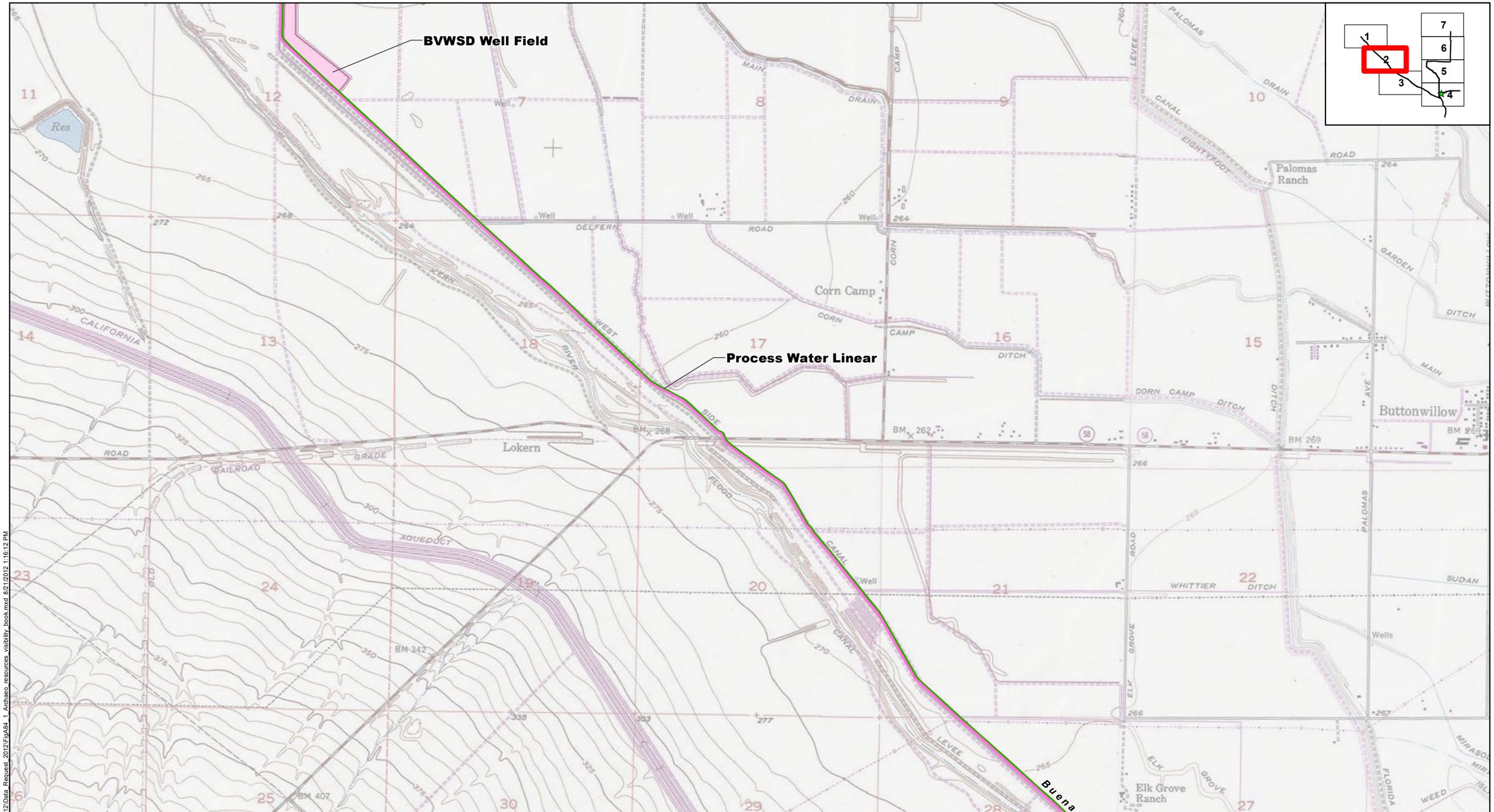
Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009



High Visibility (75 to 100 percent)

Moderate Visibility (50 to 75 percent)

No Survey Access

Note:
1. Cultural analysis of areas south of the California Aqueduct is included in 2012 Amendment AFC Appendix A.

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL RESOURCES STUDY AREA: VISIBILITY MAP

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A84-1 (SHEET 2)

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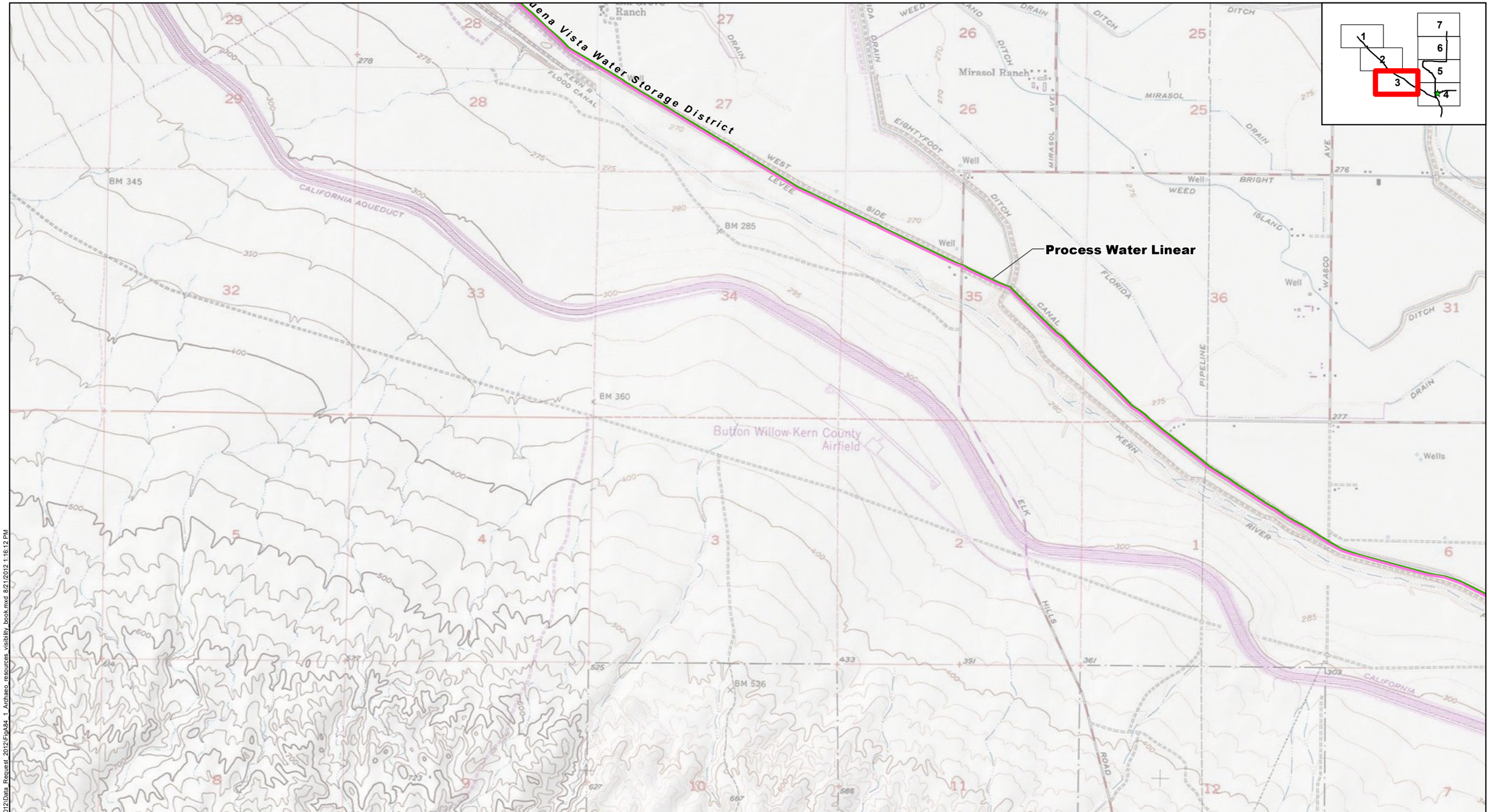
Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009



High Visibility (75 to 100 percent)

Moderate Visibility (50 to 75 percent)

No Survey Access

Note:
1. Cultural analysis of areas south of the California Aqueduct is included in 2012 Amendment AFC Appendix A.

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL RESOURCES STUDY AREA: VISIBILITY MAP

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A84-1 (SHEET 3)

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

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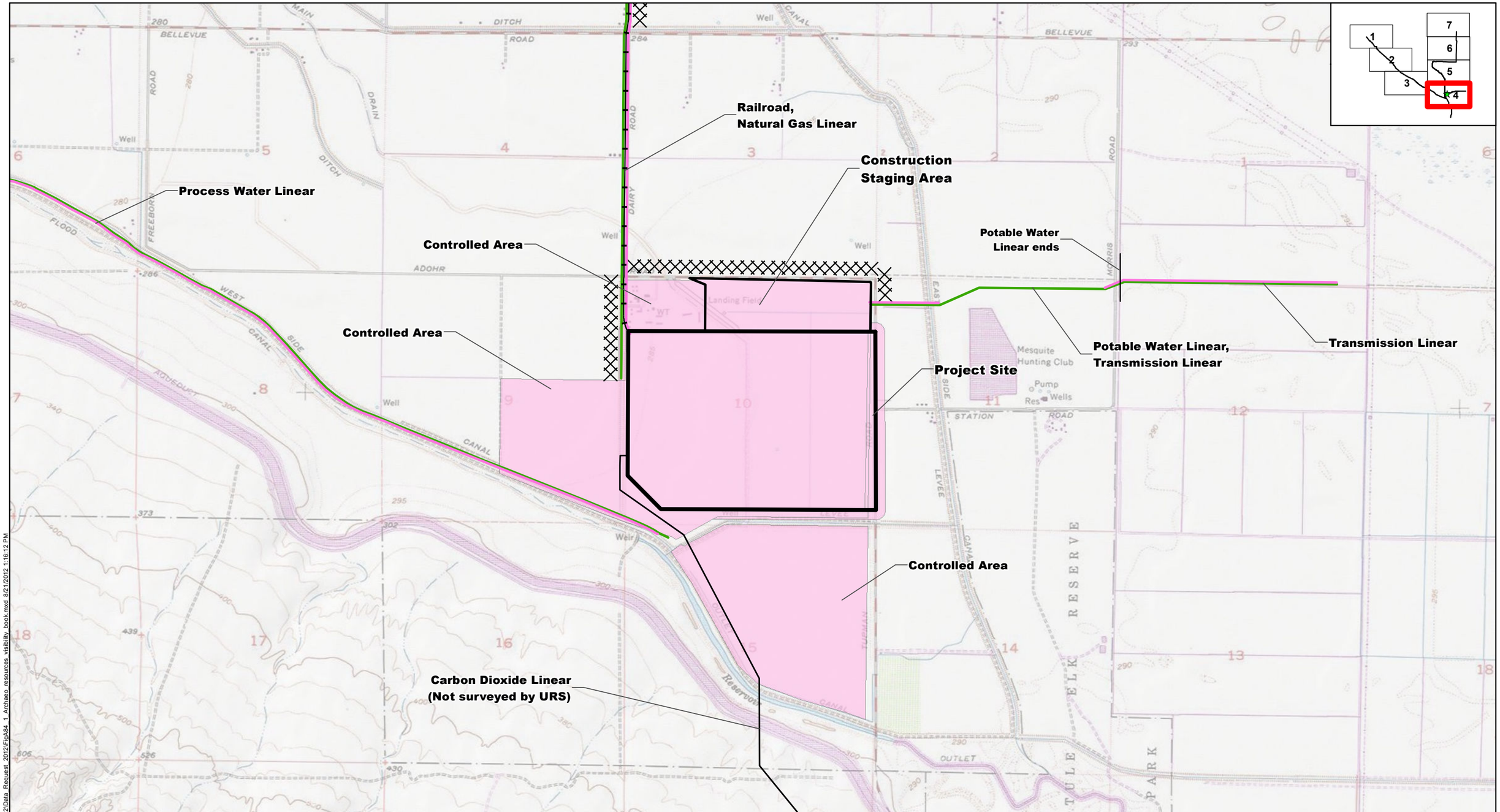

High Visibility (75 to 100 percent)

Moderate Visibility (50 to 75 percent)

No Survey Access

Note:
1. Cultural analysis of areas south of the California Aqueduct is included in 2012 Amendment AFC Appendix A.

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL RESOURCES STUDY AREA: VISIBILITY MAP

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A84-1 (SHEET 4)

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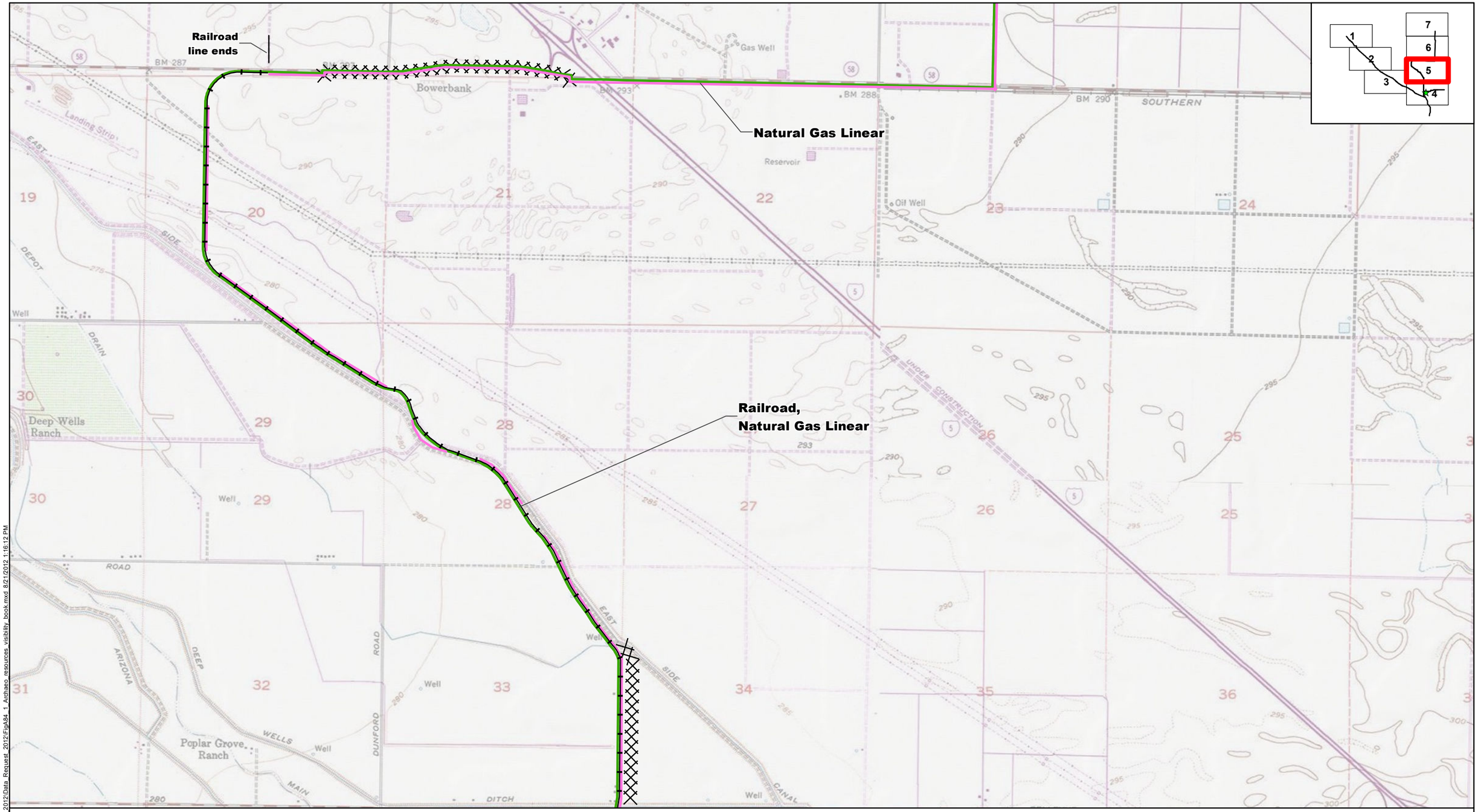
Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009



High Visibility (75 to 100 percent)

Moderate Visibility (50 to 75 percent)

No Survey Access

Note:
1. Cultural analysis of areas south of the California Aqueduct is included in 2012 Amendment AFC Appendix A.

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL RESOURCES STUDY AREA: VISIBILITY MAP

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A84-1 (SHEET 5)

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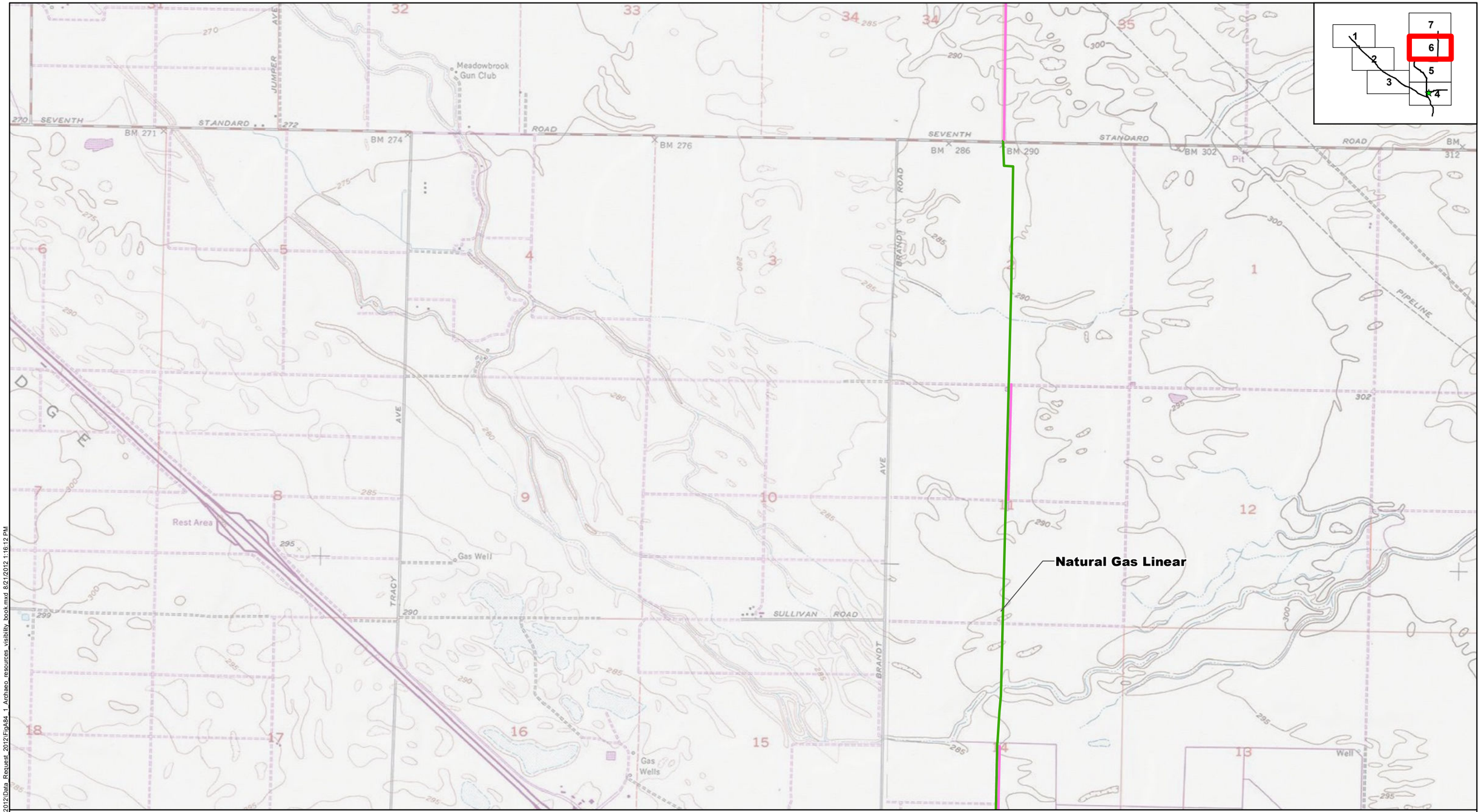
Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009



High Visibility (75 to 100 percent)

Moderate Visibility (50 to 75 percent)

No Survey Access

Note:
1. Cultural analysis of areas south of the California Aqueduct is included in 2012 Amendment AFC Appendix A.

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL RESOURCES STUDY AREA: VISIBILITY MAP

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A84-1 (SHEET 6)

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

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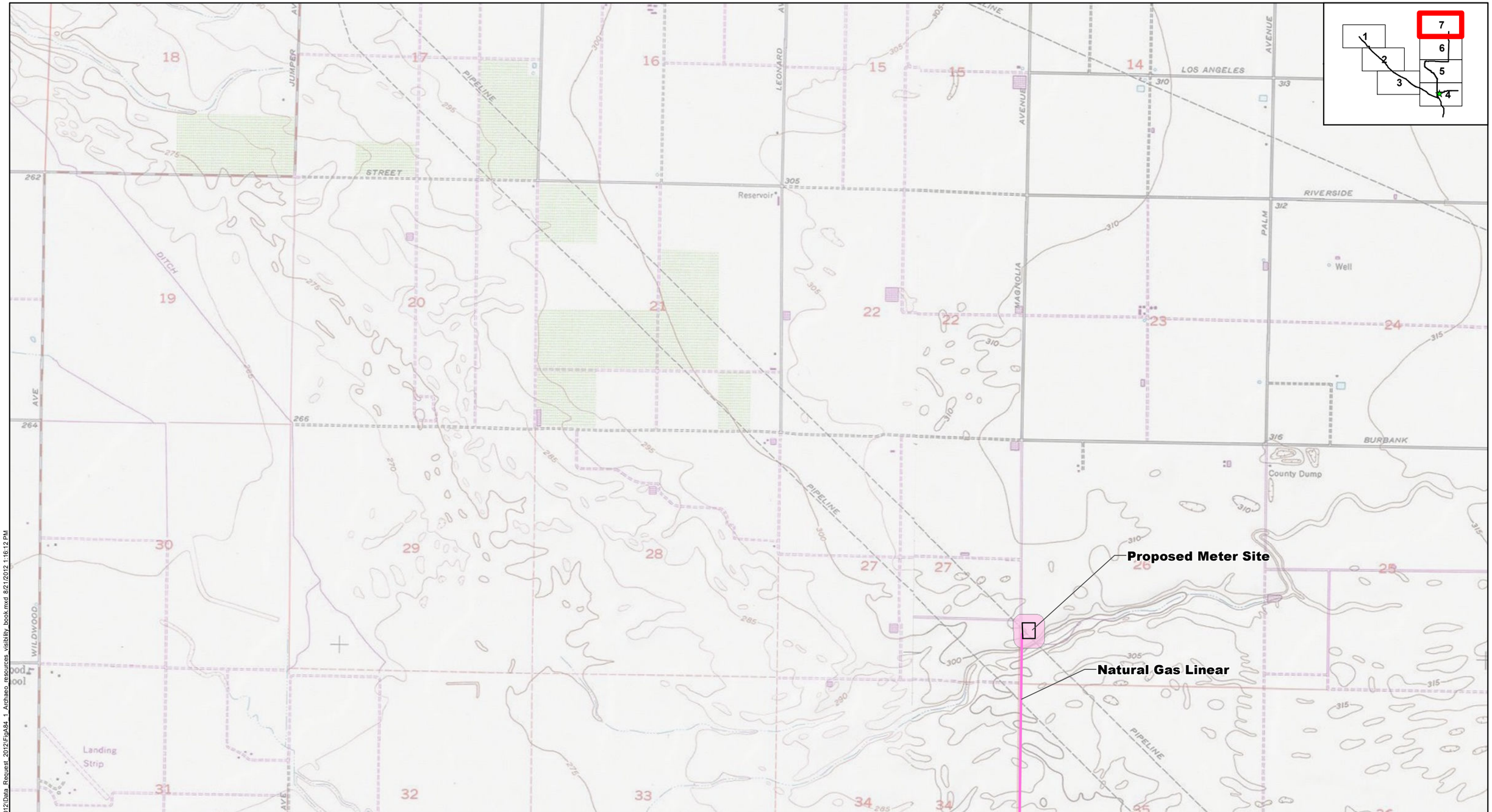

High Visibility (75 to 100 percent)

Moderate Visibility (50 to 75 percent)

No Survey Access

Note:
1. Cultural analysis of areas south of the California Aqueduct is included in 2012 Amendment AFC Appendix A.

N

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ARCHAEOLOGICAL RESOURCES STUDY AREA: VISIBILITY MAP

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A84-1 (SHEET 7)

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

lcd:\xsa U:\GIS\HECA\Projects\HECA_2012\Data_Request_2012\Fig\A84_1_Archaeo_resources_visibility_book.mxd 8/21/2012 1:16:12 PM

BACKGROUND

Based on staff's examination of the Amended AFC and the supplemental environmental information provided for the Occidental Of Elk Hills, Inc. (OEHI) project site (Amended AFC, App. A); (Pursuant to CEQA Section 15378(a)(c) "Project" defined means the whole of the action…), as such the Energy Commission staff requires additional cultural resource information regarding the CO_2 EOR Processing Facility and the associated processing satellites, 150 new wells and 652 miles of pipeline. The missing information includes but is not limited to:

- A discussion of the existing site conditions; the expected direct, indirect, and cumulative impacts due to the construction, operation, and maintenance of the project; the measures proposed to mitigate adverse environmental impacts of the project; the effectiveness of the proposed measures; and any monitoring plans proposed to verify the effectiveness of the mitigation.

- A summary of the ethnology, prehistory, and history of the region with emphasis on the area within no more than a 5-mile radius of the project location. Please note that the project location includes all access roads and linears, the 13 processing satellites, 150 new wells, and 652 miles of new pipeline identified above.

- The results of a literature search to identify cultural resources within an area not less than a 1-mile radius around the project site and not less than 0.25 mile on each side of the linear facilities.

- A report presenting the results of pedestrian surveys of the OEHI Project Site.

- Copies of all technical reports whose survey coverage is wholly or partly within 0.25 mile of the area surveyed for the project.

- Copies of DPR 523 forms for all cultural resources identified in the literature search as being 45 years or older or of exceptional importance.

- Kern County adopted environmental impact reports or related documents for the Occidental Elk Hills Oil Field identifying related cultural resources and associated/required mitigations.

DATA REQUEST

A85. Please conduct a records search and literature review of the OEHI project site. The records search and literature review shall cover an area not less than 1 mile surrounding the OEHI project site and not less than 0.25 mile on each side of linear facilities. Provide copies of all technical reports whose survey coverage is wholly or partly within 0.25 mile of the area surveyed for the project. Also consult any Kern County general or specific plan documents for the Elk Hills for cultural resources information.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A86. Please submit copies of DPR 523 forms for all cultural resources identified in the literature search as being 45 years or older or of exceptional importance.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A87. Please conduct a comprehensive cultural resources inventory (archaeological resources, historic built environment, and Native American resources) of those portions of the OEHI project site that have not been surveyed by cultural resource professionals within the last 5 years.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

DATA REQUEST

A88. Please provide the results of these surveys in a technical report conforming to the Archaeological Resource Management Report format (CA Office of Historic Preservation Feb 1990). The report should include the following information:

a. A summary of the ethnology, prehistory, and history of the region with emphasis on the area within no more than a 5-mile radius of the project location. The report shall fully discuss the findings of the various cultural resource studies conducted in and around the OEHI project site since the 1990s. In particular, the report must discuss the current management status of the Naval Petroleum Reserve-1 Rural Historic Landscape and whether it is a historical resource for the purposes of CEQA.

b. The methods used to identify cultural resources at the OEHI project site.

c. The results of the records search and pedestrian survey of the OEHI project site.

d. Descriptions of previously and newly recorded cultural resources in the proposed OEHI project site.

e. A discussion of the existing site conditions; the expected direct, indirect, and cumulative impacts due to the construction, operation, and maintenance of the project; the measures proposed to mitigate adverse environmental impacts of the project; the effectiveness of the proposed measures; and any monitoring plans proposed to verify the effectiveness of the mitigation.

f. DPR 523 forms for all cultural resources identified at the OEHI project site.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

BACKGROUND

The Amended AFC (p. 2-14) states that activities within the controlled area will be used "for agricultural purposes during construction and operations" (of the HECA facilities). Elsewhere, the Amended AFC (p. 5.9-1) states that the controlled area will be used to "control access and future land uses." The Amended AFC does not describe the types of agricultural activities that would take place in the controlled area, the sorts of agricultural activities presently underway in the controlled area, the types of "future land uses" mentioned on page 5.9-1 of the Amended AFC, or the depth and location of disturbance entailed in current and future activities within the controlled area. For instance, different agricultural practices result in various depths of ground disturbance. Further, the phrase "future land uses" could include several types of activities, which might involve deep excavation. Such excavations have the potential to damage archaeological resources that are not evident on the ground surface. Energy Commission staff needs this information to assess the proposed project's impacts on cultural resources.

DATA REQUEST

A89. Please provide the following information:

a. The types, locations, and frequencies of agricultural activities currently undertaken in the controlled area.

b. The depth of ground disturbances described in item a above.

c. The types, locations, and frequencies of agricultural activities proposed during construction and operation of the proposed project.

d. The parties responsible for implementing the activities described in item c above, insofar as they are known.

e. The depth of ground disturbances described in item c above.

f. Maps at 7.5-minute (1:24,000) scale on U.S. Geological Survey topographic maps or aerial photographs (scale of 1 inch = 200–600 feet) that depict the location of current and proposed ground-disturbing activities in the controlled area.

g. Sources of information (documents, personal communication with landowner or tenant, etc.) and the dates on which the information was acquired.

RESPONSE

a. Row crops are currently grown on the property in areas RC1, RC2, RC3 and RC4 (see Figure A89-1). The types of row crops that are grown today are cotton and alfalfa. In the past, cotton, alfalfa, wheat, sugar beets, and onions have been grown. Area ESM is used for equipment storage and maintenance. Area RH is currently residential housing.

b. Areas RC1, RC2, RC3 and RC4 are periodically "ripped" to a depth of 30 inches (every 2 to 4 years depending on the crop.) Prior to 1990, the same areas were "ripped" to 36 to 42 inches.

c. Agriculture activities proposed during construction are presented in Figure A89-2. Agricultural activities and the growing of row crops will continue in areas RC3 and RC4

during the construction phase of the Project. Equipment laydown will take place on area EL during the construction phase.

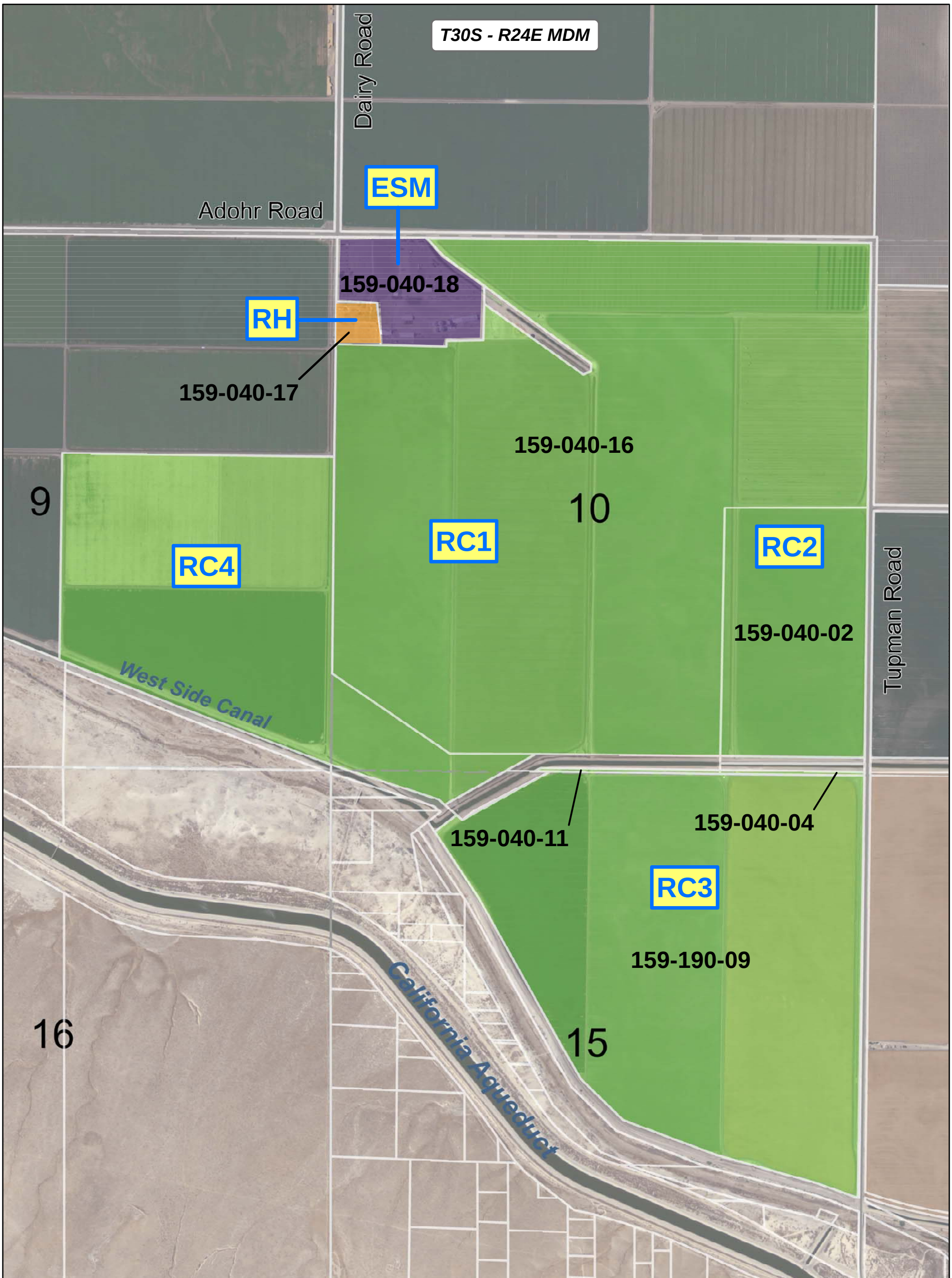
Agriculture activities proposed during operations are presented in Figure A89-3. During the operations, agricultural activities will take place on areas RC3, RC4, and RC5.

d. A local Buttonwillow farmer has a first right of refusal to lease and farm the land described in item b., above, for a period of 23 years. This lease is renewed annually. It is anticipated that this farmer will exercise this option throughout this period as they have done so for 2013.

e. Agricultural areas will continue be periodically "ripped" to a depth of 30 inches.

f. The locations of current and proposed agricultural activities in the controlled area presented on an aerial at a scale of 1 inch = 600 feet (see Figures A89-1 through A89-3).

g. The former landowner discussed the current operation with Tom Daniels on July 30, 2012, and July 31, 2012, via telephone. He has farmed the property since 1990. The farm foreman discussed the operation previous to 1990 with Mr. Daniels on July 30, 2012, via telephone. He was the farm foreman from 1982 to 1990.



Source: White Wolf Land Service, August 2012

Equipment Storage and Maintenance ESM

Residential Housing RH

Row Crops RC

0 200 400 FEET

EXISTING AGRICULTURAL ACTIVITIES

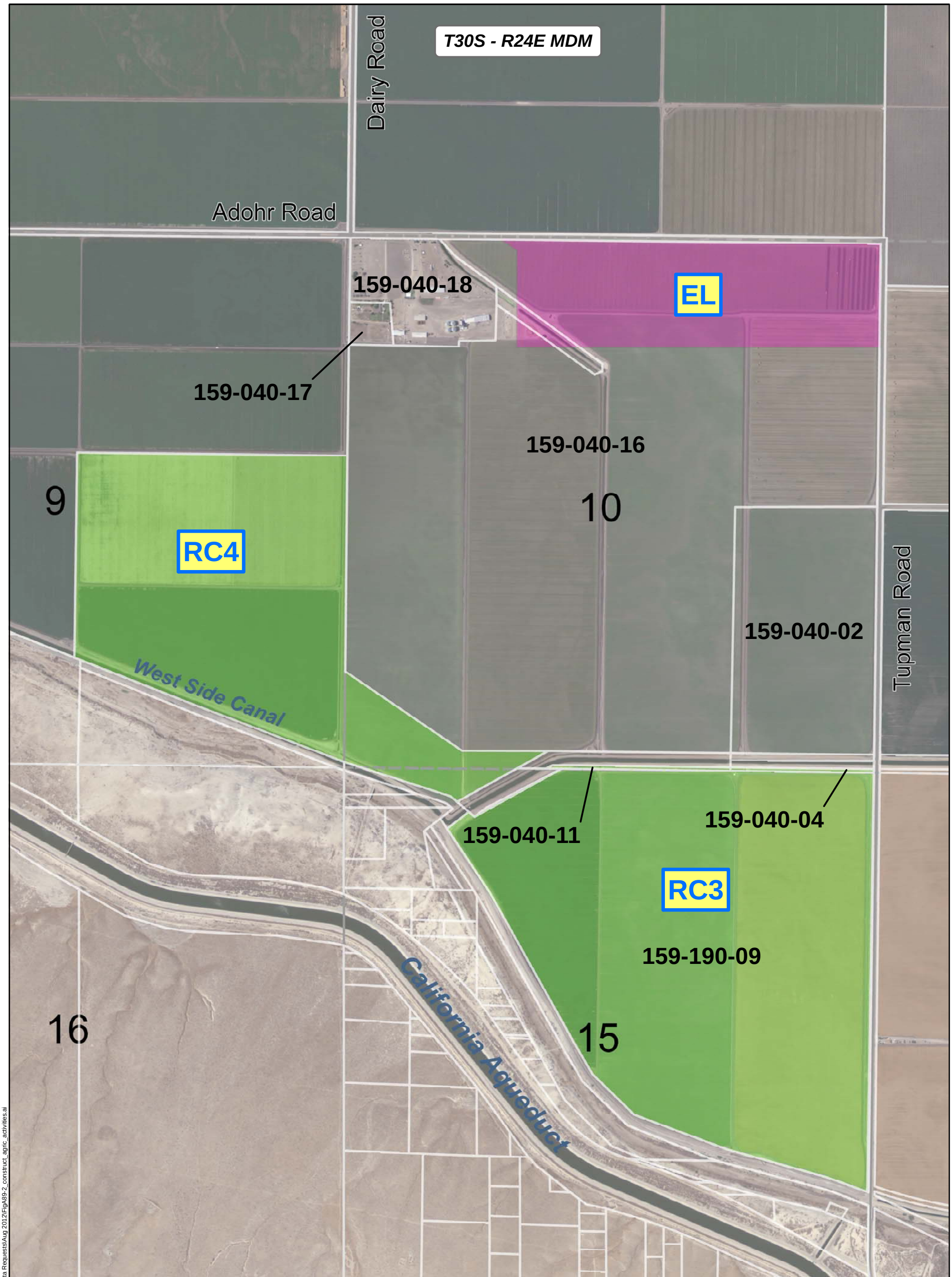
August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A89-1

8/21/12 vsa..T:\HECA-SCS 2012\Data Requests\Aug 2012\FigA89-1_exist_agric_activities.ai



Source: White Wolf Land Service, August 2012

Equipment Laydown EL

Row Crops RC

0 200 400 FEET

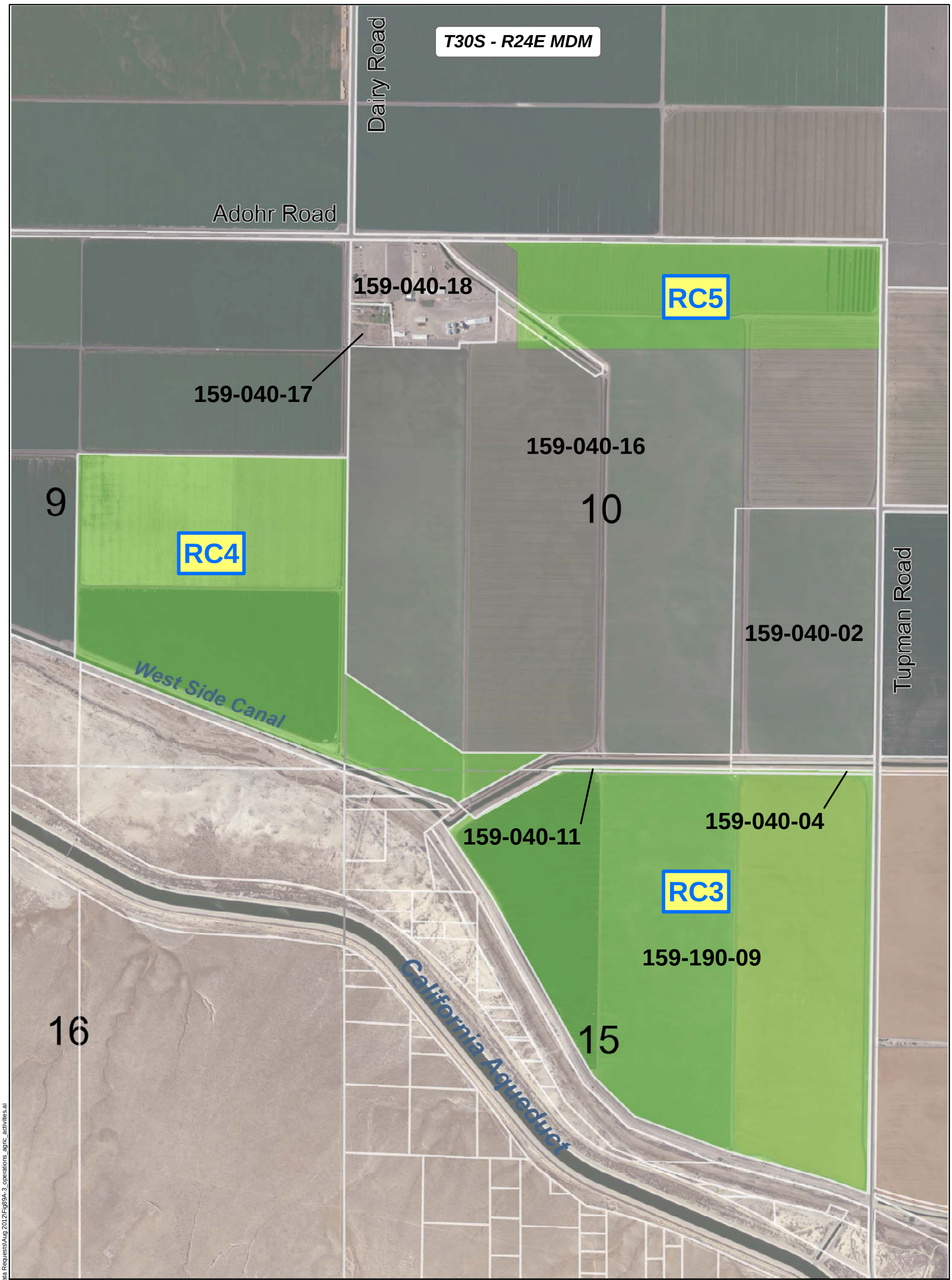
CONSTRUCTION AGRICULTURAL ACTIVITIES

August 2012 Hydrogen Energy California (HECA)
28068052 Kern County, California

URS

FIGURE A89-2

8/21/12 vsa..T:\HECA-SCS 2012\Data Requests\Aug 2012\FigA89-2_construct_agric_activities.ai



Source: White Wolf Land Service, August 2012

Row Crops RC

0 200 400 FEET

OPERATIONS AGRICULTURAL ACTIVITIES

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A89-3

8/21/12 vsa. T:\HECA-SCS 2012\Data Requests\Aug 2012\Fig89A-3_operations_agric_activities.ai

Technical Area: Power Plant Reliability
Authors: Edward Brady, Shahab Khoshmashrab

BACKGROUND

The HECA project combines the following four technologies into a first-of-its-kind industrial complex:

- Conversion of feedstock (75 percent coal and 25 percent petcoke) into syngas suitable to fuel a combustion turbine, and to waste and useful byproducts.
- Generation of electricity for the electric grid using a combined cycle power plant.
- Manufacturing of ammonia, urea and Urea Ammonium Nitrate (UAN-32), and recovery of sulfur, mercury and other coal gasification byproducts using nitrogen byproducts of the gasification.
- Recycling of Carbon Dioxide (CO_2) through the transmission to Occidental of Elk Hills Inc. (OEHI), five miles from the HECA project site, for use in the enhanced oil recovery (EOR) process and eventual sequestration.

Taken separately, these technologies are in common usage and have reached production maturation. The HECA project integrates these processes for the first time. In order to assess whether or not the HECA project can demonstrate the feasibility of the technologies proposed to be employed in the facility for the purpose of reliable operation on a sustained basis, staff needs the following information.

DATA REQUEST

A90. Provide the expected overall availability factor for the HECA project, especially that of the combined cycle power plant portion of the project, for the following modes of operation:

a. Electricity production using hydrogen-rich fuel, and

b. Electricity production using natural gas.

RESPONSE

a. HECA expects to achieve up to 91.3 percent availability producing electricity using hydrogen-rich gas.

b. Natural gas will be used for startups and shutdowns of the combined cycle power plant, and this is estimated at up to 15 hours per year. HECA has also allowed for 2 weeks (336 hours) of natural gas operation at the combined cycle power plant to meet commercial and California Independent System Operator requirements during unplanned equipment malfunctions, for a total of up to 351 hours per year.

DATA REQUEST

A91. Number of hours, annually, the plant would be operated in each of the following modes of operation:

a. Electricity production using hydrogen-rich fuel, and

b. Electricity production using natural gas.

RESPONSE

a. 8,000 hours.

b. 2 weeks per year, plus 15 hours for startups and shutdowns.

BACKGROUND

AFC Section 2.9.2 describes a scenario where natural gas would be used for up to two weeks per year as a backup fuel for the hydrogen-rich fuel while planned maintenance is designed to be performed during scheduled outages.

DATA REQUEST

A92. Please explain if the applicant anticipates the potential for hydrogen-rich fuel to be unavailable for longer than two weeks per year. If yes, please explain if the project's contract with PG&E would allow the project to draw natural gas for more than two weeks per year if hydrogen-rich fuel continues to be unavailable for longer than two weeks per year. If natural gas would not be available, please explain how the applicant would ensure fuel availability if the project is expected to be available to generate electricity for the electric grid, again, assuming that hydrogen-rich fuel would continue to be unavailable beyond this two-week period.

RESPONSE

HECA expects to achieve a high level of availability producing hydrogen rich gas during mature operations and this is expected during the third year of operations. Prior to this and during early operations, HECA anticipates that the availability may be lower and the power purchase agreement will be structured to accommodate this period of lower availability. Two weeks of natural gas use is included during all periods both in the permit and power offtake discussions to accommodate unplanned equipment outages that would affect the power plants ability to use hydrogen to produce electricity.

Technical Area: Hazardous Materials Management
Author: Dr. Alvin Greenberg

BACKGROUND

The project would store up to 3.8 million gallons of anhydrous ammonia (NH_3) in two double-walled vertical steel storage tanks. The Off-site Consequence Analysis (OCA) conducted by the applicant claims that a "worst-case" release would involve the release of the entire contents of one tank into the space between the inner and outer walls such that ammonia would be released from the Pressure Relief Valve (PRV) on the outer tank over one hour. While the analysis of this scenario is informative, it does not represent a "worst-case" release. Given the extraordinary volume of anhydrous ammonia that will be stored on site, staff believes that the catastrophic failure of the piping and/or valves through which anhydrous ammonia flows into and out of a storage tank is a much more plausible event that would result in greater impact and should be analyzed.

DATA REQUEST

A93. Please identify the piping and valves through which anhydrous ammonia will flow into and out of the storage tanks and conduct an OCA of at least two scenarios:

a. a horizontal jet release from a pipe where the contents of one tank empty in one hour, and

b. an instantaneous "egg shell" release from a pipe where the contents of the tank empty in the shortest reasonable time given the diameter of the pipe (a matter of minutes).

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND

The proposed facility consists of highly complex chemical processes that include many different types of reactor vessels, storage vessels, treatment units, piping, valves, and flanges as well as the following facilities which would, if considered separately, each constitute a highly complex stand-alone industrial plant.

- A coal/petcoke gasification plant.
- An Air Separation Unit producing cryogenic materials (a maximum of 1200 tons of liquid oxygen and 100 tons of liquid nitrogen stored at any one time).
- A syngas scrubber, sour shift, low-temperature gas cooling, sour water treatment facility.
- A mercury removal unit.
- An acid gas removal (Rectisol process) unit.
- An ammonia synthesis unit that produces and stores up to a maximum of 3.8 million gallons of anhydrous ammonia.
- A urea unit.
- A urea pastillation unit.
- A urea pastille handling and transfer unit.
- A urea ammonium nitrate complex that produces nitric acid, ammonium nitrate, and urea.
- A sulfur recovery unit that includes the storage of up to 1.4 million pounds (700 tons) of liquid sulfur at any one time at an unknown temperature.

In addition to these processes, several additional hazardous materials will be used and stored in very large volumes on the site to support various processes. These include sodium hydroxide (60,000 gallons of 5-50 percent concentration), sodium hypochlorite (7,000 gallons of unknown concentration), 2,000 gallons of diesel fuel, gasoline during construction (4,000 gallon), 300,000 gallons of methanol in a storage tank plus an additional 250,000 gallons within the process vessels, and about 6,000 pounds per year of activated carbon containing unknown amounts of mercury removed from the syngas downstream of the sour shift/low-temperature gas cooling unit and stored on-site as waste for an unknown period of time until transported off-site to a Class III hazardous waste facility.

Fugitive emissions and leak detection methods were not completely or clearly described in the Amended Application for Certification for each of the processes itemized above. Also, the potential for accidental releases of hazardous materials exists and any history of accidental releases at similar gasification facilities would be helpful to staff in its analysis. Staff needs this information in order to fully and completely assess the risk of hazardous materials use to workers and the public.

DATA REQUEST

A94. In tabular format by process, please provide a description of all leak detection methods, both stationary and portable, the chemicals that would be detected (syngas, hydrogen gas, hydrogen sulfide, ammonia, etc.), the frequency of detection unless continuous monitoring is employed, and facility response to detected leaks (e.g., automatic valve closure, manual valve closure, secondary detection, initiating the Emergency Response Plan, etc.).

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A95. In tabular format by process, please provide a description of the type, location, detection limits, and whether they are wired to an Uninterruptable Power Supply (UPS) of all permanent hard-wired hazmat sensors and the chemicals they are able to detect.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A96. Please provide any known hazardous materials accidental release history at similar facilities that utilize the same or similar chemical or engineering processes.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND

The project owner stated at the June 20, 2012 workshop that the project may ship off-site some of the 3.8 million gallons of anhydrous ammonia stored on-site in two tanks. In order to properly asses the impacts of the transfer of anhydrous ammonia to tanker trucks and/or rail cars, staff will need additional information about the transfer facility. An Off-site Consequence Analysis (OCA) conducted by the applicant is also needed.

DATA REQUEST

A97. Please provide a schematic diagram of the anhydrous ammonia transfer facility showing the piping and valves through which anhydrous ammonia will flow out of the storage tanks, secondary containment should a spill occur during transfer operations, the location, type, and detection limits of ammonia sensors, and conduct an OCA of the worst-case accidental release during transfer to tanker trucks and rail cars.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

Technical Area: Worker Safety and Fire Protection
Author: Geoff Lesh

BACKGROUND

Hydrogen Energy California (HECA) will bring a large scale industrial facility into the jurisdiction of Kern County Fire Department (KCFD). First responder and fire protection services will be required for the project and will be provided by KCFD. Construction and operation of the project will increase the assets that the fire department must protect and potentially increase call frequency for emergency first aid and medical services. Energy Commission staff must analyze the potential for the proposed project to have an adverse impact on the Fire Department's ability to provide an acceptable level of service. Staff requires assurance that after applying any proposed mitigations, the fire department's increased responsibility will not adversely affect to a significant extent its ability to continue providing service to the public.

DATA REQUEST

A98. Please provide a letter, email, or record of conversation with KCFD that confirms the absence of any expected impacts on the local fire district resulting from construction and operation of the proposed project, or identifies impacts and the needed mitigation to address such impacts to the satisfaction of the KCFD. Or, in the absence of such letter or communication, please provide a Fire and Emergency Services Risk Assessment and a Fire Protection and Emergency Services Needs Assessment for the construction and operation of the project that provides an objective estimate of both equipment and staffing shortfalls (if any) and the associated recommended mitigations (if any) that would be required by KCFD to maintain its current level of readiness to respond to the public.

RESPONSE

The Applicant is scheduling a meeting with the County, including staff from the Kern County Fire Department, to discuss how HECA can work with the County to address any Department needs as a result of the construction and operation of the Project. The Applicant will provide further details following the meeting.

DATA REQUEST

A99. The Fire and Emergency Services Risk Assessment and a Fire Protection and Emergency Services Needs Assessment should be considerate of the guidance provided by NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments and by NFPA 551: Guide for the Evaluation of Fire Risk Assessments:

a. The Risk Assessment should be used to establish the risk (chances) of significant impacts occurring. The Fire Protection and Emergency Services Needs Assessment and Risk Assessment should evaluate the following: (a) the risk of impact on the local population that could result from potential unmitigated impacts on local fire protection and emergency services (i.e., "drawdown" of emergency response resources, extended response times, etc.) and (b) recommend an amount of funding that should be provided and used to mitigate any identified impacts on local fire protection and emergency medical response services.

b. The Fire Protection and Emergency Services Needs Assessment should address emergency fire and medical response and equipment, staffing, and location needs.

RESPONSE

Please see the response to Data Request No. A98.

Technical Area: Land Use
Author: James Adams

BACKGROUND: WILLIAMSON ACT CONTRACT CANCELLATION

All page numbers, figures, and tables cited in this document refer to the 2012 HECA Amended Application for Certification (08-AFC-8A) (AFC), unless otherwise stated. Page 5.4-11 of the AFC states that the project would result in the conversion of the 453-acre project site from agricultural uses on land that is categorized as Prime Farmland. As shown in Table 5.4-5, the project site, including land potentially impacted by the project's linear facilities, is currently under Williamson Act contracts.

As described on pg. 5.4-12, on June 29, 2010, the Kern County Board of Supervisors approved the tentative cancellation of the Williamson Act Contracts (WAC) on approximately 491 acres, which included 473 acres of the former project site boundaries, and 18 acres of a former fertilizer manufacturing plant. The Williamson Act restrictions over the tentatively cancelled acreage continue to remain in place until the conditions set forth in the Certificate of Tentative Cancellation are satisfied.

However, in 2012, HECA plans to submit a new petition to Kern County to cancel the Williamson Act contract restrictions over the new 453-acre project site boundaries as shown in Figure 5.4-6. This petition would supersede the 2010 petition and tentative cancellation approval. The project footprint has changed from the 473-acre site depicted in Figure 5.4-3(5) in the Revised 2009 AFC to the current 453-acre site. Most of the northern boundary has been moved south and a new parcel has been added to the south eastern corner of the site. Williamson Act contracts covering lands along the CO_2, natural gas, process water, potable water, electric transmission linears, and the railroad spur would not be cancelled because Kern County has determined that these project components are compatible uses under the Williamson Act (AFC, pg. 5.4-12).

The applicant will also own a 653-acre controlled area adjacent to the project site to the north, west, and south to control access and future land uses in this area. Approximately 80 acres of the controlled area adjacent to the northern boundary of the project site will be temporarily used as a construction laydown area. As noted on pg. 5.4-12, Kern County and the California Department of Conservation have confirmed that the temporary use of the laydown area would not require cancellation of the Williamson Act restrictions over this parcel of land.

DATA REQUEST

A100. Please provide an estimate as to when the new petition will be submitted to Kern County to cancel the Williamson Act contract restrictions on the new project footprint.

RESPONSE

The Applicant intends to submit the petition to Kern County for cancellation of Williamson Act contract restrictions by the end of the third quarter of 2012.

DATA REQUEST

A101. Please identify how many acres of the controlled area are under Williamson Act contract restrictions and how many acres (if any) are proposed for cancellation in 2012.

RESPONSE

As discussed in 2012 Amended AFC Section 5.4.2.3, HECA will own the Controlled Area adjacent to the Project Site, and cancellation of the Williamson Act contracts covering these lands would not be required because they would continue to be used for agricultural purposes.

DATA REQUEST

A102. Please explain how the controlled area will be used and discuss in detail any planned or anticipated activities on or uses of the area that may occur during the life of the project.

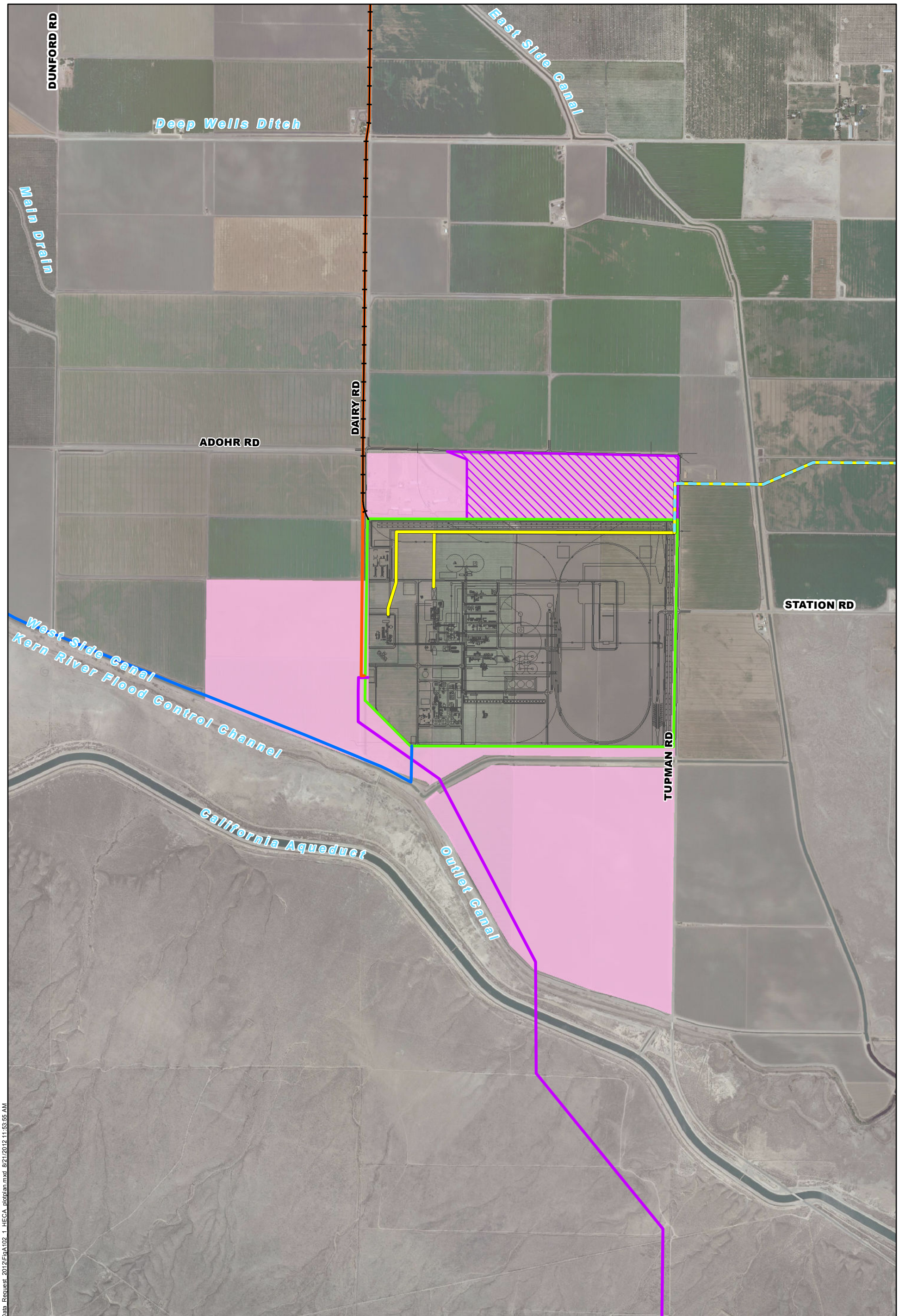
RESPONSE

As depicted on Figure A102-1 (Revised Figure 2-4) Site Plan, the Controlled Area consists of 653 acres located adjacent to the Project Site. The Applicant currently has an option to purchase this land, and will become the landowner.

During construction, the Applicant will use 91 acres of the Controlled Area along the northern boundary of the Project Site for construction staging and other construction-related purposes. After the completion of construction, this area will be restored to active agriculture use.

In addition, several of the Project linears will have permanent easements through the Controlled Area. The natural gas linear, carbon dioxide linear, process water linear, and potable water linear will run under ground, and the electric transmission line easement will run above ground through the Controlled Area.

In addition, the Applicant is exploring the ability to use the Controlled Area for protected species mitigation. If such mitigation were approved by the CDFG, we estimate that approximately 20 acres would be used for other natural purposes, such as establishment of trees and restoration of natural habitat. We will be discussing this option with CDFG in the near future.



Project Site
Construction Staging Area
Controlled Area
Carbon Dioxide
Natural Gas
Potable Water
Process Water
Railroad
Transmission

N

0 750 1,500 Feet

SITE PLAN

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A102-1
(REVISED FIGURE 2-4)

Source: Aerial Photo, Digital Globe, 2008.

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BACKGROUND: MANUFACTURING COMPLEX PRODUCTS

Kern County's June 11, 2012 letter RE: Hydrogen Energy California – Amended Application for Certification (08·AFC-8A) Response to Request for Agency Participation, states in part that in addition to the power generation facility, the AFC includes a discussion regarding uses for the site beyond those permitted in the A (Agricultural) zone. Specifically, the letter states the "Manufacturing Complex" portion of the project will produce products such as urea, urea ammonium nitrate, and anhydrous ammonia that will be used for transportation and industrial applications. Kern County staff stated that the use of urea for manufacture of any products other than fertilizer for agricultural use will require Kern County applications for a General Plan Amendment and a Zone Change for industrial land use designations. Kern County staff has requested written clarification from the applicant as to the uses proposed that would be part of the manufacturing complex, at the applicant's earliest convenience.

DATA REQUEST

A103. Please provide an estimate as to when written clarification about the products and use of products produced by the manufacturing complex will be submitted to Kern County.

RESPONSE

On July 31, 2012, the Applicant sent a letter to the County indicating that in response to the County comments, HECA plans to revise the Project to restrict its manufactured products for the purpose of "fertilizer manufacture and storage for agricultural use only." Please refer to Attachment A103-1.

ATTACHMENT A103-1
APPLICANT'S LETTER TO KERN COUNTY, JULY 31, 2012

hydrogen energy
california

30 Monument Square, Suite 235
Concord, MA 01742
(978)287-9529

VIA EMAIL and US MAIL

July 31, 2012

Jacquelyn Kitchen, Supervising Planner
Advanced Planning Division
Kern County Planning and Community Development Department
2700 M Street, Suite 100
Bakersfield, CA 93301

RE: Hydrogen Energy California – Amended Application for Certification (08-AFC-8A)

Dear Ms. Kitchen:

Thank you for your letter of June 11, 2012. The Hydrogen Energy California (HECA) project appreciates the County Staff's work in reviewing the above-referenced Amended Application for Certification.

In the June 11th letter, Staff provided comments based on their preliminary review of the Application. Please find the HECA responses to the comments below. For ease of reference, I have used the same paragraph numbering below as corresponds to those of the June 11th letter.

Comment 1

In order to clarify this issue and to allow County Staff to determine if a GPA/ZCC will be required, Staff requests written clarification of the application materials submitted to the CEC pertaining to the chemical manufacturing portion of this request and the specific land uses that will take place.

Response 1

In response to the County comments, HECA plans to revise the Project to restrict its manufactured products for the purpose of "fertilizer manufacture and storage for agricultural use only." HECA would appreciate the opportunity to meet with the County at its earliest convenience to discuss this matter in further detail.

Comment 2

To ensure effective communication with the CEC and to support County processing of the Williamson Act Contract Cancellation as described above, please provide the following:

Comment 2a

A letter from the project applicant providing the primary contact information (including name, address, phone, fax and email) for coordination issues and processing of any permits as well as instruction or copies of correspondence.

Response 2a

hydrogen energy
california

30 Monument Square, Suite 235
Concord, MA 01742
(978)287-9529

Please use the following information for contact purposes:

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Marisa Mascaro
EVP, Legal and Regulatory Affairs
SCS Energy LLC
30 Monument Square, Suite 235
Concord, MA 01742
(978) 287-9529 (phone)
(978) 287-9512 (fax)
mmascaro@scsenergyllc.com (email)

Comment 2b

A signed Agreement for Cost recovery (attached) from the Project applicant.

Response 2b

This item was previously transmitted to you via email on July 9th with a follow up hard copy sent thereafter.

Comment 2c

A completed Indemnification Agreement (attached), signed by the applicant.

Response 2c

Please find the completed and signed Indemnification Agreement attached. In addition, Hydrogen Energy International, the current landowner, will be sending the County via separate cover, an appropriate authorization letter.

hydrogen energy
california

30 Monument Square, Suite 235
Concord, MA 01742
(978)287-9529

Comment 2d

Complete and return the attached Petition for Cancellation of a Land Use Contract or Land Use Agreement.

Response 2d

HECA is finalizing the Petition materials and will submit them in the near future.

Comment 2e

Prepare and submit a non-contracted, proximate parcel analysis which utilizes a 3-mile radius.

Response 2e

HECA will prepare and submit this analysis as part of the Petition for Cancellation of a Land Use Contract or Land Use Agreement.

Comment 2f

Please submit a check made payable to the Kern County Planning and Community Department for an initial deposit of $10,990.00.

Response 2f

A check for $10,990.00 was previously sent to Craig Murphy on June 27, 2012.

Thank you also for indicating in Comment 3 some of the other requirements for compliance with County regulations. HECA will review them and follow up with the County in a separate communication.

Please feel free to contact me at (415) 874-5353 or via email at mlerdal@heca.com to discuss when HECA might meet with the County to provide additional information on restrictions associated with manufactured products.

Thank you for your assistance.

Sincerely,

Mark Lerdal

Mark Lerdal
President

attachment

DATA REQUEST

A104. Please provide a copy of the written clarification to Energy Commission staff.

RESPONSE

Please find a copy of the July 31, 2012 letter to the County as Attachment A103-1.

Technical Area: Public Health
Author: Dr. Alvin Greenberg

BACKGROUND

The Project will either use a combination of train and trucks or trucks alone to transport coal and petcoke to the facility. No matter what option is finally chosen by the applicant, Tables 5.1-19 and 5.1-30 of the Amended Application For Certification (AFC) clearly indicate a significant level of truck and train trips will be generated along a specific rail and road corridor, as many as 126,978 truck deliveries each year amounting to 348 trucks per day going past any one point along the transportation route (total going to or coming from the site) or 109 coal trains per year. These trips will result in significant emissions of diesel particulate matter (DPM) from diesel-fueled trains and trucks.

The Amended AFC contains a Health Risk Assessment addressing the impacts of DPM emissions at the Project site but not along the transportation route or routes. Given the heavy volume of truck traffic that the Project will generate along a specific route that includes the Stockdale Highway, Morris Road, and Station Road (where at least two residences exist), an assessment of impacts due to emissions of DPM is necessary in order for staff to fully understand potential public health impacts of the proposed project.

Likewise, DPM emissions from train locomotives might have impacts along a rail line and thus these impacts must also be addressed. To limit the scope of the analysis to a reasonable first-level screening effort, this assessment of impact should be a phased approach where not more than four of the residential and/or sensitive receptors (defined as schools, hospitals, day care centers, nursing homes, and any others identified by the Office of Environmental Health Hazard Assessment) most likely to experience the greatest impact along each transportation route should be initially assessed.

DATA REQUEST

A105. Please identify the maximum number of diesel truck trips (coming and going) that would pass by any residences on the transportation route between I-5 and the facility in a year and conduct a health risk assessment of the DPM emissions for not more than four of the residential and/or sensitive receptors identified as having the highest potential exposure due to either the proximity to the transportation route and/or proximity to idling trucks backed-up at any location (such as a traffic signal or when entering the site).

RESPONSE

The maximum number of annual diesel truck trips that would pass by any sensitive receptor locations (i.e., schools, daycare facilities, convalescent homes, parks, and hospitals) on the transportation route between I-5 and the facility would occur in Alternative 2 (i.e., truck transportation of coal to the Project Site). For this alternative, there are 125,160 required truck-load deliveries for annual operations that will travel along Station Road to and from the Project Site. This number includes all diesel trucks transporting feedstock and products for this alternative. Alternative 1 (i.e., rail transportation of coal to the Project Site), in comparison, would have a total of 36,080 truck-load deliveries during annual operations.

There are three residences near Station Road along the truck route. The nearest residence is about 90 feet south of Station Road. No sensitive receptors are located along the route from I-5 to Stockdale Highway to Morris Road, which is the route the diesel delivery trucks will travel

before coming to Station Road. Operations and maintenance trucks will not travel along Station Road; instead, they will continue on Stockdale Highway to Dairy Road, entering on the western side of the facility.

A health risk assessment (HRA) for diesel particulate matter (DPM) was conducted to determine the potential increase in cancer risk to the three residents on Station Road from the emissions from diesel delivery trucks in Alternatives 1 and 2. The HRA included emissions from the diesel delivery trucks, plus all diesel-fired equipment on the HECA Site, including stationary and mobile sources. Onsite diesel equipment included two emergency generators, a firewater pump, all onsite diesel trucks, and the diesel trains in Alternative 1. The onsite sources were modeled using the same emissions and techniques as outlined in the 2012 Amended AFC. The onsite delivery trucks were modeled both while moving, and while idling at weigh station scales, and idling in product-loading areas, although significant idling is not expected along Station Road. The offsite emission sources included the maximum annual quantity of feedstock and product diesel trucks that will travel along Station Road for each Alternative.

Emissions associated with delivery truck movement were calculated using heavy-heavy duty diesel truck emission factors from the CARB on-road emissions model EMFAC2007, and using the same calculation method as described in the 2012 Amended AFC. Emission factors from the model are provided in terms of grams per mile, which were converted to grams per second for the American Meteorological Society/USEPA Regulatory Model (AERMOD) dispersion model, based on the distance traveled, the number of trucks, and frequency of truck trips. Offsite trucks were modeled using volume sources with the same parameterization as the onsite truck sources. Emissions from offsite trucks were spread evenly across all volume sources.

The HRA was conducted using annual emissions for the DPM sources identified above, and all of the same model settings, including the same meteorological data used in HRA modeling in the 2012 Amended AFC. The AERMOD model was used to estimate the maximum annual PM_{10} concentration, from which the cancer risk factor was calculated. The cancer risk was estimated based on a 25-year exposure, which is the life of the project. These calculations are presented in Table A105-1.

For carcinogenic health effects, an exposure is considered significant when the predicted increase in lifetime cancer risk exceeds 10 in 1 million ($10 \times 10\text{-}^{6}$). Both Alternative 1 and Alternative 2 were modeled with the residential receptors along Station Road. Table A105-2 presents the peak PM_{10} annual concentration predicted with AERMOD and cancer risk due to Project-related DPM emissions at the maximally exposed residence during operations. As shown in this table, the cancer risk from DPM at all receptors was predicted to be below the cancer risk significance threshold. Therefore, the incremental cancer risk due to DPM emissions from the Project-related onsite and offsite sources is considered less than significant.

The modeling files are included on a CD submitted with this response to Data Requests.

Table A105-1
HRA Calculations and Results

DPM Cancer Risk Calculations	Results for Alternative 1 – Coal Transport by Rail	Results for Alternative 2 – Coal Transport by Truck
Maximum annual PM_{10} concentration at sensitive receptors on south side of Station Road	9.59E-03 µg/m^3	2.12E-02 µg/m^3
Inhalation Cancer Potency Factor for diesel particulate matter (from OEHHA)	1.10E+00 (mg/kg-day)$^{-1}$	1.10E+00 (mg/kg-day)$^{-1}$
Inhalation dose[1]	1.2907E-06 mg/kg-day	2.8479E-06 mg/kg-day
Inhalation cancer risk[2]	1.420 in a million	3.133 in a million

Notes:

[1] Inhalation dose (mg/kg-day) = Annual conc * DBR * A * EF * ED * 1E-6 / AT
where
DBR = daily breathing rate (L/kg-day), used 95th percentile (high end) = 393 L/kg-day
A = Inhalation absorption factor (fraction of chemical absorbed), default = 1
EF = Exposure frequency (days/year) = 350 days/year
ED = Exposure duration (years), Project duration = 25.0 years
AT = Averaging time period over which exposure is averaged (days), default = 25,550 days
(e.g., 25,550 days for 70-year cancer risk)

[2] Inhalation cancer risk = (Inhalation dose) * (cancer potency factor)

Table A105-2
Estimated PM_{10} Concentration and Cancer Risk from DPM
Due to Onsite Diesel Emissions and Offsite Diesel Truck Exhaust

Scenario	Maximum AERMOD PM_{10} Results (µg/m^3)	DPM Cancer Risk	Significance Threshold	Below Significance?
Alternative 1 (Rail Transportation	9.59E-03	1.42 in a million	10 in 1 million	Yes
Alternative 2 (Truck Transportation)	2.12E-02	3.13 in a million	10 in 1 million	Yes

Notes:

[1] DPM cancer risk is based on 25-year exposure.

µg/m^3 = micrograms per cubic meter
DPM = diesel particulate matter
PM_{10} = particulate matter less than 10 microns in diameter

DATA REQUEST

A106. Please identify the maximum number of diesel truck trips (coming and going) that would pass by any residences on the transportation route between the Santa Maria refineries and the facility in a year and conduct a health risk assessment of the DPM emissions for not more than four of the residential and/or sensitive receptors identified as having the highest potential exposure due to either the proximity to the transportation route and/or proximity to idling trucks backed-up at any location (such as a traffic signal or when entering the site).

RESPONSE

The maximum number of diesel truck trips was identified in the response to Data Request No. A105. The maximum number of delivery trucks passing any residence will occur along Station Road, because both feedstock and product delivery trucks will travel this route. Only feedstock trucks will travel between Santa Maria and the Project Site; therefore, the maximum number of diesel trucks passing residences between Santa Maria and the facility would be less than the number of delivery trucks that travel along Station Road. The DPM health risk analysis provided in the response to Data Request No. A105 predicted a cancer risk below the significance threshold, with a maximum DPM cancer risk of 3.13 in a million for Alternative 2. Therefore, a DPM HRA conducted for receptors along the transportation route between Santa Maria and the Project Site would result in a predicted cancer risk much lower than 3.13 in a million, which would also be lower than the cancer risk significance threshold.

DATA REQUEST

A107. Please identify the rail route that would be used to transport coal to the facility, determine in general the location of residences and sensitive receptors along the rail route that are located within the State of California, estimate the maximum number of train trips per year coming and going, and conduct a health risk assessment of the DPM emissions for not more than four of the residential and/or sensitive receptors identified as having the highest potential exposure due to either the proximity to the rail line, proximity to the rail line where engines would be at full throttle climbing a grade, and/or proximity to idling locomotives backed-up at any location (such as a rail yard, a grade crossing, or when entering the site).

RESPONSE

The maximum number of train trips per year will occur in Alternative 1, with a total of 262 product and feedstock trains coming and going from the Project Site annually. Alternative 2 was not evaluated because there are no trains under this option. Because of the extensive length of the rail route, a conservative screening HRA was performed so that not every route and sensitive receptor along the rail line needed to be identified. From a high-level examination of the rail route and setback requirements, it was determined that sensitive receptors may be as close as 100 to 200 feet from the rail line. Thus, in the screening HRA, receptors were as close as 100 feet from the rail line to represent the closest sensitive receptor.

The screening HRA for DPM was conducted using the maximum annual rail emissions from both feedstock and product trains. It was assumed that all 262 product and feedstock trains pass by the same sensitive receptors annually, both full and empty, although this is only expected to occur along the rail spur from the Project Site to the existing San Joaquin Valley Railroad Buttonwillow railroad line.

A worst-case generic rail line geometry was used in the modeling analysis to represent a location where the rail line might curve around a receptor, thus having the potential for impacts at that receptor from many wind directions. Two half-mile-long “L”-shaped train route geometries were created in AERMOD for the DPM analysis to account for a train turning in-route. Receptors were placed 100 feet from the rail line out to a quarter-mile, with 100-foot receptor spacing. This specific geometry setup assumed a worst-case cross-wind section for the train emission plume, where the maximum impact would occur at receptors near where the train was turning around a bend. In reality, a 90-degree turn is impossible, and the “L” geometry setup was a conservative approach; because in actuality, a train must curve more gently around a bend. Three separate sets of meteorological data were used for this screening analysis. The first included SJVAPCD processed Bakersfield meteorological data that were used in the 2012 Amended AFC, and the remaining two screening sets were created using MAKEMET, with either suburban or rural surface characteristics to account for varying land use along the train route. These conservative assumptions ensure the screening DPM HRA would be representative of any location in California.

The PM_{10} emission factor for line-haul locomotives from the USEPA document “Technical Highlights: Emission Factors for Locomotives” for Tier 2+ and Tier 3 engines was used to calculate the emissions. Use of this emission factor is described in the response to Data Request No. A18. Emissions from the feedstock and product trains were calculated for each notch (1 to 8) of operation. The percentage of total engine horsepower used for each notch was obtained from the “Port of Long Beach Air Emissions Inventory for 2007,” which was based on

data derived from USEPA. Idling along the train route is not expected. Total mass emissions over the modeled half-mile-long train route per engine were calculated for each notch to determine the maximum emissions that could occur in the modeled half-mile route. It was determined that the maximum emissions per engine occur during Notch 8 operation; thus, these emissions were used in the modeling analysis. Total annual emissions for all feedstock and product trains were calculated based on the maximum emission rate during Notch 8 operation. The offsite Project-related maximum annual train emissions and calculations are presented in Attachment A107-1.

The offsite trains were modeled in AERMOD using volume sources with the same parameterization as the onsite train sources in the modeling presented in the 2012 Amended AFC. Annual emissions from offsite trains were spread evenly across the volume sources in the model.

The AERMOD model was used to estimate the maximum annual PM_{10} concentration, from which the cancer risk factor was calculated. The cancer risk was estimated based on a 25-year exposure, which is the life of the Project. These calculations are presented in Attachment A107. For carcinogenic health effects, an exposure is considered significant when the predicted increase in lifetime cancer risk exceeds $10 \times 10\text{-}^{6}$. Table A107-1 presents the peak PM_{10} annual concentration predicted with AERMOD and cancer risk due to Project-related DPM emissions at the maximally exposed sensitive receptor during operations.

As shown in this table, the cancer risk from DPM at all receptors was predicted to be below the cancer risk significance threshold. This analysis shows that even with the use of many conservative inputs to the model, any sensitive receptor or residence, located as close as 100 feet to the rail line, would have a less-than-significant incremental cancer risk. Therefore, the incremental cancer risk due to DPM emissions from the Project-related trains is considered less than significant.

A digital copy of modeling files was submitted with this response.

Table A107-1
Estimated PM_{10} Concentration and Cancer Risk from DPM Due to Train Exhaust

Scenario	Maximum AERMOD PM_{10} Results ($\mu g/m^3$)	DPM Cancer Risk	Significance Threshold	Below Significance?
Alternative 1 (Rail Transportation)	1.77E-02	2.62 in a million	10 in 1 million	Yes

Notes:
[1] DPM cancer risk is based on 25-year exposure.
$\mu g/m^3$ = micrograms per cubic meter
DPM = diesel particulate matter
PM_{10} = particulate matter less than 10 microns in diameter

ATTACHMENT A107-1
TRAIN EMISSION CALCULATIONS FOR THE SCREENING HRA AND HRA CALCULATIONS AND RESULTS

DPM EMISSIONS FROM LOCOMOTIVE ENGINES FOR HEALTH RISK ASSESSMENT; WORST-CASE SCENARIO

Feedstock Trains					Product Trains				
4,400	(hp), each locomotive engine (coal train)				3,000	(hp), each locomotive engine (product train)			
0.08	(g/bhp-hr), DPM Emission Factor								
0.76	Ratio of required horsepower (empty train/full train)								
0.5	(mile), analyzed segment of route								
Feedstock Line-haul engine emissions per segment based on notch					**Product Line-haul engine emissions per segment based on notch**				
Notch	**% of Avg. Rated HP**	**Net Total HP**	**Speed (mph)**	**DPM Emissions per Segment per Engine (g)**	**Notch**	**% of Avg. Rated HP**	**Net Total HP**	**Speed (mph)**	**DPM Emissions per Segment per Engine (g)**
1	5.0%	220	5	1.76	1	5.0%	150	5	1.20
2	11.4%	502	11	1.76	2	11.4%	342	11	1.20
3	23.5%	1,034	18	2.32	3	23.5%	705	18	1.58
4	34.3%	1,509	24	2.49	4	34.3%	1,029	24	1.69
5	48.1%	2,116	31	2.76	5	48.1%	1,443	31	1.88
6	64.3%	2,829	37	3.05	6	64.3%	1,929	37	2.08
7	86.6%	3,810	44	3.50	7	86.6%	2,598	44	2.39
8	102.5%	4,510	50	3.61	8	102.5%	3,075	50	2.46

For both feedstock and product engines, the highest emissions per segment occur when operating in Notch 8.

Notes:

[1] Assumed the coal train speed increases linearly by notch.

[2] The number of locomotive engines were provided by Project engineers.

[3] DPM EF from USEPA's Technical Highlights: Emission Factors for Locomotives, 2009 (http://www.epa.gov/nonroad/locomotv/420f09025.pdf).

[4] Required horsepower ratio for empty train and full train and the other locomotive data are from HDR/Fluor locomotive model.

[5] Maximum speed information is from FRA (http://www.fra.dot.gov/downloads/PubAffairs/track_standards_fact_sheet_FINAL.pdf)

[6] % of Avg. Rated hp is from Port of Long Beach Emission Inventory 2007 for line-haul engines. Port of Long Beach Air Emissions Inventory, 2007. (http://www.polb.com/civica/filebank/blobdload.asp?BlobID=6029).

TOTAL DPM EMISSIONS FROM ALL ENGINES PER ROUTE SEGMENT

Train Type	Feedstock	Products	Total
Total locomotive engine needs to transport material per year	654	306	
Total locomotive engine needs for returning trains per year	497	232	
Total DPM emissions from all engines (g/yr)	4,151.20	1,324.30	5,475.50

TRAIN EMISSION CALCULATIONS FOR THE SCREENING HRA AND HRA CALCULATIONS AND RESULTS

DPM Cancer Risk Calculations	Results for MAKEMET screening metr Set 1	Results for MAKEMET screening metr Set 2	Results for Real metr from Bakersfield
Maximum annual PM_{10} concentration in receptors 100 to 1,320 feet (0.25 mile) from railway	0.01765 $\mu g/m^3$	0.01768 $\mu g/m^3$	0.01363 $\mu g/m^3$
Inhalation Cancer Potency Factor for diesel particulate matter (from OEHHA)	1.10E+00 $(mg/kg\text{-}day)^{-1}$	1.10E+00 $(mg/kg\text{-}day)^{-1}$	1.10E+00 $(mg/kg\text{-}day)^{-1}$
Inhalation dose (mg/kg-day)[1]	2.3755E-06 mg/kg-day	2.37953E-06 mg/kg-day	1.83445E-06 mg/kg-day
Inhalation cancer risk[2]	2.613 in a million	2.617 in a million	2.018 in a million

Notes:

[1] Inhalation dose (mg/kg-day) = (Annual conc) * DBR * A * EF * ED * 1E-6 / AT
where
DBR = daily breathing rate (L/kg-day), used 95th percentile (high end) = 393 L/kg-day
A = Inhalation absorption factor (fraction of chemical absorbed), default = 1
EF = Exposure frequency (days/year) = 350 days/year
ED = Exposure duration (years), Project duration = 25.0 years
AT = Averaging time period over which exposure is averaged (days), default (e.g., 25,550 days for 70-year cancer risk) = 25,550 days

[2] Inhalation cancer risk = (Inhalation dose) * (cancer potency factor)

Technical Area: Soil and Water Resources
Author: Marylou Taylor

BACKGROUND

The Hydrogen Energy California (HECA) project proposes to collect potentially contaminated storm water from the process plant area and drain it into lined retention basins and sumps. Storm water that comes in contact with exposed surfaces and/or materials can potentially result in contaminated runoff. Potential pollutants in the runoff could come from the feedstock and solid waste material from the gasifier process, oil, thinners, chemical reagents, solvents, and other contaminants. The applicant proposes that after runoff ponds and solids have settled, the collected water would be tested then transferred to either the water treatment plant for reuse or the wastewater treatment plant for disposal via the Zero Liquid Discharge system.

Although the retention basins and sumps are not intended to function as final disposal locations, the potentially contaminated water may be considered "designated waste" as defined by California Water Code Section 13173. Discharges of waste to land include those areas of the project where sumps collect wastewater or fluids and pads that store solid waste that could be subject to runoff carrying soluble constituents of concern. Of particular concern:

- Temporary storage of glassy vitrified gasification solids in on-site bins or containers located on a 'gas solids pad';
- The solids handling water collection facility;
- Collection sumps, for the gasification solids and the feedstock storage area; and,
- Lined retention basins, for the potentially contaminated runoff.

Waters of the State include both surface and groundwater. If applicable, storage of designated waste may require regulation via Waste Discharge Requirements (WDRs). If WDRs are required they would be prepared by the Regional Water Quality Control Board and incorporated in the Energy Commission's permit. The WDRs would be administered in accordance with the Energy Commission's in-lieu authority.

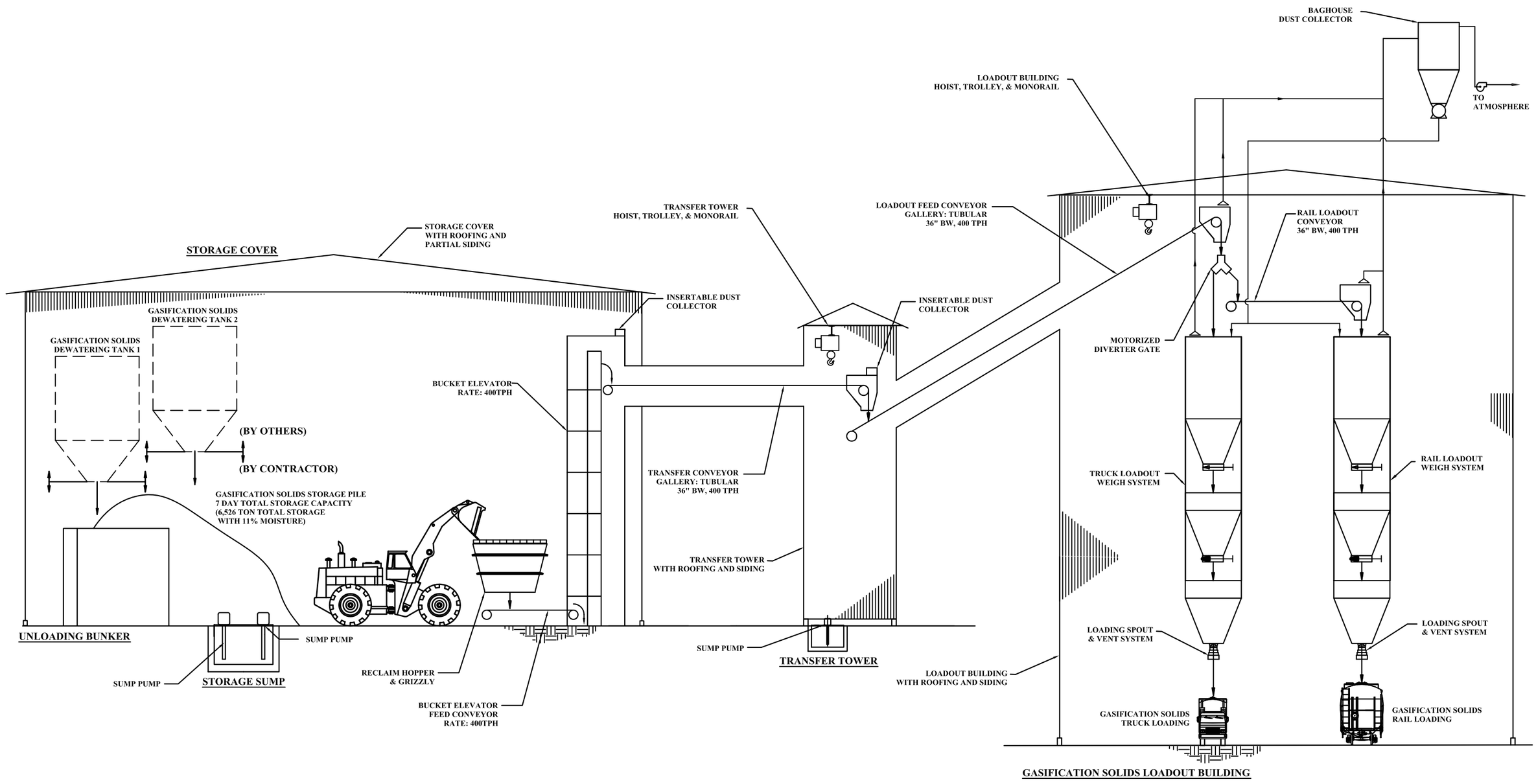
DATA REQUEST

A108. Please clarify how the daily volume of gasification solids generated would be temporarily stored at HECA. Will the solids be placed in bins or containers, or be stockpiled directly on the gas solids pad?

RESPONSE

Gasification solids generated at the HECA facility will be placed directly onto the gasification solids pad for dewatering before shipment.

Figure A108-1 shows the current design of the gasification solids handling system.



8/21/12 vsa. T:\HECA-SCS 2012\Data Requests\Aug 2012\FigA108-1_process_flow_gas_solids.ai

Source:
Fluor; HECA-SCS, 2012 AFC Update; Process Block Flow Diagram Gasification Solids Material Handling System;
Drawing No: A4UV-124-59-PFD-01_RD, Rev. D (7/17/12).

PROCESS FLOW DIAGRAM
GASIFICATION SOLIDS MATERIAL HANDLING SYSTEM

August 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A108-1

DATA REQUEST

A109. Please describe the design of the gas solids pad, and how precipitation would be contained and conveyed to the storm water collection system or the water treatment unit.

RESPONSE

Please see the response to Data Request No. A112 for a description of the design of the gasification solids pad. The gasification solids pad will be covered with roofing and partial siding to exclude precipitation from the pad. The roofing will have gutters and downspouts to collect and convey direct precipitation from the roof to the stormwater system. A concrete curb will be located along the perimeter of the entire pad and will contain the water that drains from the gasification solids on the gasification solids pad. This curb will also keep precipitation runoff from the surrounding area away from the gasification solids pad.

DATA REQUEST

A110. Please provide the location and design of the collection sump used for the gasification solids.

RESPONSE

Based on preliminary design, the storage pad sump will be located in the southwestern corner of the storage pad. Sump dimensions will be determined during the detailed engineering phase. The sump will be supplied with two vertical cantilever sump pumps (primary and secondary) currently designated to operate at 150 gallons per minute each.

DATA REQUEST

A111. Please describe the operational procedures to remove and dispose of the gasification solids and water from the collection sump.

RESPONSE

The sump, located at the gasification solids storage pad, will have "collection baskets" along the perimeter of the sump opening to trap and prevent large debris, rocks, and other foreign materials from entering the sump. Gasification solids fines that are too small to be collected in the "collection baskets" will pass through the baskets, and will either settle at the bottom of the sump, or will be pumped out of the sump back into the Gasification Solids Handling System. During regular maintenance shutdowns, the sump will be drained, and any gasification solids that have settled at the bottom of the sump will be removed and placed back on the storage pad to be dewatered and included with the accumulated gasification solids for shipment.

DATA REQUEST

A112. Please provide additional details about the location and design of the solids handling collection facility. Does the facility include the three storm water retention ponds with impermeable liners? Is the "collection sump" described in section 2.2.3.3 part of the solids handling collection facility?

RESPONSE

The gasification solids generated at the HECA facility will be collected and accumulated on a concrete pad until transported. The facility will be covered with a roof and partial siding. The south section of the Solids Handling Collection Facility will have a concrete collection bunker and concrete push wall where two dewatering tanks will unload gasification solids directly onto the concrete pad. The east section of the facility will have a concrete push wall where front-end loaders will manage the temporary piles of gasification solids.

The Solids Handling Collection Facility is completely separate from the three impermeably lined stormwater retention ponds.

The "collection sump" described in Section 2.2.3.3, Gasification Solids and Water Handling, of the Project Description, is not part of the gasification solids pad. Rather, this "collection sump" is located in the Gasification Island, and is part of the Gasification Solids Handling System. The collection sump described in the response to Data Request No. A110 is separate and distinct from the "collection sump" described in Section 2.2.3.3 of the 2012 Amended AFC.

DATA REQUEST

A113. Please provide additional information about the design of the solids drain sumps and the operations procedures to remove the solids and fluid that collect in the sumps.

RESPONSE

The design and procedures for the solids drain sumps will be similar to those described in the response to Data Request No. A111 for the gasification solids and water. The sumps will have two vertical cantilever pumps designated to serve each sump. One pump will act as primary, and the other as secondary. Each sump pump will have sensors that automatically trigger the pump to engage once water levels have reached a certain height. If the primary pump fails to activate, the secondary back-up pump will engage instead. Solids fines that are too small to be collected in the "collection baskets" will pass through the baskets, and will either be pumped out of the sump back into the solids handling system, or will collect at the bottom of the sump. During regular maintenance shutdowns, the sump will be drained, and any solids settled at the bottom of the sump will be shoveled out and combined with the other solids.

DATA REQUEST

A114. Please submit information about potential chemical constituents of concern in the water discharged to the gasification solids collection sump and solids drain sumps or that could be mobilized from the solids in these sumps.

RESPONSE

The following constituents may be present in the discharge water on a parts per million level: ammonia, formate, sulfide, chloride, sulfate, calcium, iron, magnesium, manganese, silica, and sodium. Cyanide may be present with a concentration in parts per billion.

BACKGROUND

Section 5.14.1.8 of the Amended Application for Certification (AFC) indicates that although previous submittals, namely the Preliminary Hydrology Study and the Draft Drainage, Erosion, and Sedimentation Control Plan (filed November 2010 in response to Data Request 202), no longer reflect the updated project, the overall approach for the drainage system and storm water management remain the same.

DATA REQUEST

A115. Please submit an updated Hydrology Study that accurately reflects the Amended AFC.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A116. Please submit an updated Draft Drainage, Erosion, and Sedimentation Control Plan that accurately reflects the Amended AFC.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

Technical Area: Visual Resources
Author: Elliott Lum

BACKGROUND

According to the Amended Application for Certification (AFC) for the HECA project, both the visual impact susceptibility and visual impact severity from Key Observation Point (KOP) No. 1 have been characterized as high (see Table 5.11-1 and 5.11-4, respectively). As such, the aesthetic impact significance has been classified as significant.

To mitigate this impact to a level of less than significant, the amended AFC recommends a conceptual landscaping plan for screening purposes (see Mitigation Measure VRMM-1). The plan will include information on the plant species proposed; their size, quantity, and spacing at planting; their expected heights at 5 years and at maturity; and their expected growth rates.

However, the visual resources section of the amended AFC does not include the above plan or visual simulations that Energy Commission staff requires to address the adequacy of the Mitigation Measure VRMM-1. Staff has concluded that additional project information is necessary before a significance conclusion can be reached for the impact at KOP 1.

DATA REQUEST

A117. Please provide an electronic copy of a conceptual landscaping plan for review by staff. The primary purpose of the plan is to show how landscaping at the project site will contribute to screening views to the maximum extent feasible for the view from KOP 1. Consistency with applicable sections of Chapter 19.86, Landscaping, of the Kern County Zoning Ordinance is required.[3] To ensure that the information provided in the on-site landscaping plan will allow for a thorough assessment of this impact, the plan will need to include these elements, as well as those listed below, at a minimum:

a. Information on the type of plant species proposed: size, quantity, and spacing at planting; expected height at 5 years and maturity; and expected growth rates. Staff requires preparation of this information by a qualified professional arborist or botanist familiar with local growing conditions.

b. Electronic and paper copies of 11-inch by 17-inch color photographic simulations at life size scale showing the landscaping 5 years after planting and at maturity from the viewpoint for KOP 1.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, the Applicant is requesting additional time to address this Data Request.

[3] *See* http://www.co.kern.ca.us/planning/pdfs/KCZODec11.pdf.

Technical Area: Visual Resources – Visible Plume
Author: Joseph Hughes

BACKGROUND

The proposed manufacturing complex unit contains several exhaust stacks. Staff is assessing the need to perform a visible plume modeling analysis for the urea unit's high pressure (HP) and low pressure (LP) absorber exhausts and exhaust from the ammonium nitrate/urea ammonium nitrate (AN/UAN) unit's process condensate tank vent scrubber. Staff requires additional operating information to assess the urea unit sources and confirm that the AN/UAN exhaust is small enough that there is no need to conduct this analysis.

DATA REQUEST

A118. Please confirm the data provided and complete missing data from the following table that summarizes for the urea absorbers (HP scrubber exhaust and LP scrubber exhaust), and the AN/UAN vent scrubber exhaust, the stack release parameters and the exhaust conditions that affect visible vapor plume formation. Staff assumes that the exhaust parameters are stable under all ambient temperature conditions. Please correct this assumption, if incorrect, by providing data for a range of ambient temperature conditions where appropriate.

Parameter	HP Scrubber	LP Scrubber	AN/UAN Vent Scrubber
Stack Height	39.62 m (130 ft)	15.24 m (50 ft)	12.19 m (40 ft)
Stack Diameter	0.3 m (1 ft)	0.3 m (1 ft)	0.05 m (0.17 ft)
Temperature	323.15°K (125°F)	321.48°K (119°F)	310.93°K (100°F)
Flow Rate (lbs/sec)			
Moisture Content (wt%)			

Note: these parameters have been filled out by staff using available data from the air quality modeling files.

RESPONSE

The stack height, stack diameter, temperature, flow rate, and moisture content information has been included in the table below. Please note that the Overhead vents from the Urea Unit MP Absorber and LP Absorber will be combined into one atmospheric vent (Urea Unit Absorber Vent). Also, the vent from the Urea Ammonium Nitrate Complex Vent Scrubber varies based on the start-of-run and end-of-run in the Nitric Acid Plant.

Parameter	Urea Unit Absorber Vent	UAN Complex Vent Scrubber	
		SOR	EOR
Stack Height	44.2 m (145 ft)	12.2 m (40 ft)	
Stack Diameter	0.3 m (1.0 ft)	0.41 m (1.33 ft)	
Temperature	38.2°C (100.8°F)	55.6°C (132°F)	93.3°C (200°F)
Flow Rate (lbs/sec)	0.90	0.14	0.44
Moisture Content (wt%)	0.71	10.59	70.9

BACKGROUND

While staff is aware that the cooling tower fogging frequency curves are not currently available (Amended AFC, p. 5.11-23), staff would like to confirm the plume frequency results of the visible plume modeling analysis with cooling tower fogging frequency curves if they become available later during the licensing process.

DATA REQUEST

A119. Please provide staff copies of the fogging frequency curves for the cooling towers if they become available prior to the licensing decision.

RESPONSE

The fogging frequency curves for the cooling towers will be obtained upon selection of a Cooling Tower equipment supplier. HECA will provide this information to CEC upon receipt.

BACKGROUND

Staff is assessing the need to perform a plume modeling analysis for the carbon dioxide (CO_2) recovery plant unit exhausts. The Amended AFC, Appendix A, "Supplemental Environmental Information for the Occidental of Elk Hills, Inc., CO_2 Enhanced Oil Recovery Project" (submitted 5/2/2012) references and states that the addendum supplements "The Preliminary Project Description for the CO_2 enhanced oil recovery (EOR) at the Elk Hills Oil Field" (dated 4/16/2010). The Preliminary Project Description (2010) describes several process systems that may have the potential to create visible plumes or strong thermal plumes, however additional information is needed to make that determination. For example, it is unclear how the heat from the propane refrigeration system and the discharge cooler are used or released.

DATA REQUEST

A120. Please describe all exhaust equipment associated with the CO_2 recovery plant unit (i.e., fractation system, natural gas liquids (NGL) recovery system, demethanizer system, and refrigeration system) including but not limited to the propane refrigeration system and discharge cooler and related heat rejection devices (air cooled or water cooled). Please complete data from the following table that summarizes exhaust parameters and the exhaust conditions that affect visible vapor plume formation and thermal plume strength. Staff assumes that the exhaust parameters are stable under all ambient temperature conditions. Please correct this assumption, if incorrect, by providing data for a range of ambient temperature conditions where appropriate in the same manner as the cooling tower exhaust data provided in Section 5.11 of the Amended AFC.

Parameter	Refrigeration System	Discharge Cooler	Additional Equipment as Needed
Stack Height			
Stack Diameter			
Temperature			
Flow Rate (lbs/sec)			
Moisture Content (wt%)			

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

Technical Area: Waste Management
Author: Ellen Townsend-Hough, REA

BACKGROUND

The Naval Petroleum Reserve Number 1 (NPR-1) is an oil-producing field owned by Occidental of Elk Hills, Inc. (Oxy). The facility was formerly owned by the United States Department of Energy (DOE) and Chevron Oil Company (Chevron). The NPR-1 occupies approximately 47,985 acres or 75 square miles. Petroleum has been produced on NPR-1 since 1919. Occidental of Elk Hills, Inc., is proposing to extend the life of the enhanced oil recovery (EOR) operations by utilizing carbon dioxide from the Hydrogen Energy California (HECA) project to facilitate oil production from the Elk Hills Unit operations.

DOE sold its interest in the NPR-1 to Occidental Petroleum in 1997. As a result of the land transfer to Occidental, California Department of Toxic Substances Control (DTSC) entered into an Agreement for Site Assessment (ASA) with DOE and completed a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) of NPR-1 in 1998. DOE agreed to head up an environmental and human health risk assessment of the entire site with remediation to address the effects of past practices at the site. The working arrangement with DTSC began with an Agreement for Site Assessment (ASA) starting in 1997. Three amendments have been made to the ASA, the last of which was for a work plan for the assessment of 131 Areas of Concern (AOCs). The AOCs consist of both small and large areas of contamination. The work was stalled for seven years. On December 23, 2008 DOE and DTSC signed a Corrective Action Consent Agreement to complete the work. In December 2011 and early 2012, DOE representatives submitted numerous Pre-Decisional Project Approach documents. The documents include an "overview of the planned approach to achieve site closure" for each of the 131 AOCs (DTSC ENVIROSTOR Occidental of Elk Hills Inc. [80001254]). To ensure that contamination is not spread and that construction workers are not exposed to hazardous materials, safety procedures should be developed and implemented for the construction of the project.

DATA REQUEST

A121. To ensure public health and safety are maintained please identify what steps or methodology the applicant and Oxy propose to avoid impacts from identified Areas of Concern and potential unidentified hazardous waste sites on the Occidental Elk Hills Oil Field project site.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A1-A123,* docketed on August 9, 2012, OEHI is requesting additional time to address this Data Request.

BACKGROUND

The gasifier will produce a solid vitrified by-product called "gasification solids." The solids are comprised of ash from coal and petcoke that exit the gasifier. During operation the gasifier may produce as much as 246,016 cubic yards per year of solids. The large volume of gasifier solids could negatively impact capacity of Kern County landfills. Assuming the gasifier solids are non-hazardous and that a market for the solids is not immediately available, all non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a solid waste disposal facility, in accordance with Title 14, California Code of Regulations, section 17200 et seq. CalRecycle is California's authority on recycling, waste reduction, and product reuse. Under the authority of the California Department of Resources Recycling and Recovery (now CalRecycle formerly California Integrated Waste Management Board) jurisdictions such as Kern County are currently required to divert 50 percent of their waste from landfill disposal; this percentage is due to change in the summer 2012 under AB341. Jurisdictions select and implement the combination of waste prevention, reuse, recycling, and composting programs that best meet the needs of their community while achieving the diversion requirements. SB 1016, Wiggins (Chapter 343 Statutes of 2008), introduced a per capita disposal measurement system that measures the percentage of diversion requirement using a disposal measurement equivalent.

Another option for disposal of gasification solids would be to dispose of waste out of state. According to Title 14, California Code of Regulations (CCR) Section 18808.9, a public contract hauler who exports solid waste from California shall provide the county that the waste originated from with a report of the total volume of solid waste exported from each jurisdiction. The hauler shall identify the name of the disposal site and the state, county, or other authorized jurisdiction to which the waste was sent.

DATA REQUEST

A122. Please provide information showing how and where the gasifier solids would be disposed of if the waste is designated nonhazardous and a reuse market is not identified.

RESPONSE

Gasification solids that are not beneficially used would be preferentially transported by truck or rail to a distant facility and disposed of at a permitted Subtitle D solid waste disposal facility. The applicant is continuing to develop a comprehensive and complete list of the most environmentally acceptable and cost effective backup disposal options. Distant offsite facilities must have substantial railcar handling infrastructure and large volume permitted capacity. Our preliminarily evaluation has identified the following two rail capable locations:

- Clean Harbors Sawyer Landfill, USEPA ID: NDD000351270 in North Dakota.
- ECDC Environmental, L.C. Class V Landfill Permit #9422R1 in Utah

DATA REQUEST

A123. Please describe what if any arrangements have been made with Kern County officials for reuse, recycling or disposal of the gasification solids, and reporting of volumes recycled and disposed, and potential impacts to county facilities from recycling and disposal.

RESPONSE

The Applicant understands that this is a topic of interest for the County and will be working with the County in the coming months.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

AMENDED APPLICATION FOR CERTIFICATION
FOR THE HYDROGEN ENERGY CALIFORNIA PROJECT

Docket No. 08-AFC-08A
(Revised 8/14/12)

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DECLARATION OF SERVICE

I Dale Shileikis, declare that on August 22, 2012, I served and filed a copy of the attached Responses to CEC Data Requests Nos. A1-A123 dated August, 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 via CD to all addresses on the Proof of Service list;

_x_ 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 via CD to the address below; 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:

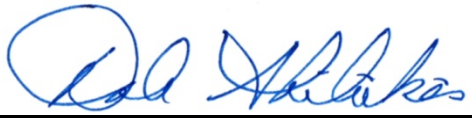
CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 08-AFC-08A
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.ca.gov

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.

Original Signed By: 
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