Association of Irritated Residents
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DOCKET
08-AFC-8
DATE Feb 14 2011
RECD. Feb 14 2011

February 14, 2011

CEC docket # 08-AFC-8

To the CEC, HECA, and all parties concerned:

This is a data request from the Association of Irritated Residents concerning the response to CEC data request #181 from HECA and OXY about the GHG emissions during the CO2 injection and Enhanced Oil Recovery process.

First, the applicant has not answered the question staff intended (or should have intended) to ask about leakage. It seems they have merely estimated leakage during maintenance operations. The important question here is what is the leakage in regard to the CO2 that comes to the surface with the oil, water, etc., during oil and gas production which is not captured and reinjected? Is the assumption that 100% of this CO2 is always recaptured and reinjected? If not, what percent is estimated to be lost? It would be difficult to believe 100% is always recovered from the oil and water mix that comes to the surface. This could be a very significant source of leakage since a large proportion (50-70% according to the applicant) of the injected CO2 is predicted to come back to the surface during the Enhanced Oil Recovery with the produced oil and water. If there is not a good estimate for the percent of CO2 never recovered there is obviously too little known about the entire HECA application for the CEC and the public to make a sound judgement about its efficiency.

The applicant also uses an incorrect CO2e factor for electricity production. **The applicant chooses to use the lowball figure (524 lb/MWH) for electricity produced only in the San Joaquin Valley and only from one specific power plant company. Why is that choice appropriate in this case? What amount of CO2e will be produced from this electricity using the average California electrical generation CO2e factor (880 lb/MWH) or even the emission factor for all electricity used in the state which is higher still (946 lb/MWH)?** This state average factor is significantly higher and more appropriate since the electricity from HECA is not needed directly in the San Joaquin Valley, the CO2 emissions from HECA itself are higher than the average in the San Joaquin Valley by PG&E, and the produced electricity will certainly go into the statewide grid.

With these new figures from Enhanced Oil Recovery operations what is the total CO2e rate per unit of electricity exported to the grid for the entire HECA project? These figures must include the CO2 emitted from the process of injecting the CO2. What is the final rate in pounds per mega-watt hour? How does this rate compare

to a new natural gas plant such as the one approved by the CEC for Avenal? How does this rate compare to the state average and the San Joaquin Valley average? It may well be that this rate is below the state required performance standard of 1100 lbs of CO2e per MWH but so is any new natural gas plant. The real question is whether this rate of GHG emissions is low enough to help California reach 2020 and, more importantly, 2050 emission targets. It is AIR's understanding that electricity production and use in California must double by 2050 and the average CO2e emission rate must drop to under 50 lbs per MWH average. It is also important if the expense of this project together with related taxpayer and ratepayer subsidies can be justified with this relatively high level of GHG emissions.

AIR wishes for the above underlined data requests to be answered. It is becoming very clear to AIR that the HECA proposal is not an efficient way to reduce CO2 emissions from California's electricity use and will be practically useless in helping California meet its 2050 GHG reduction goals.

Figures and tables from the applicant, which are copied below, show 226,908 annual tons of CO2e from the Enhanced Oil Recovery operations plus 442,998 annual tons of CO2e from the power plant operations. This is a total of 669,906 tons of CO2e from producing the electricity for the grid and injecting the CO2. What appears to be missing are GHG emissions from the delivery of the coal and pet coke to the facility. These are between 15,000 and 20,000 tons per year. That gives a total of at least 685,000 tons of CO2e annually for what is advertised as a low-carbon source of energy.

Using the statewide electrical production average CO2e emission rate for the electricity used in the EOR process, instead of the low-ball SJV PG&E only average, there are another 75,000 tons of CO2e annually. Also, the true leakage figure in the CO2 recovery operations during EOR is not given, as mentioned above, so the total is even higher and very likely exceeds 800,000 tons of CO2e annually. In this case, HECA will produce more CO2e per unit of grid available electricity than the proposed Avenal natural gas power plant. There may well be other as yet undisclosed CO2 emissions that will make HECA even more inefficient in reducing CO2. The loss of farmland and pumping of groundwater comes immediately to mind as sources of more CO2 emissions. HECA maintains their carbon footprint is significantly below a natural gas power plant which is a blatantly false statement.

Although AIR is asking the applicant to provide these calculations, the estimated carbon footprint using the applicant's figures (assuming 80% efficiency of the power plant and 685,000 tons of CO2e) is 782 lbs of CO2e/MWH. Avenal (assuming 80% efficiency) is rated at 840 lbs CO2e/MWH. If the higher California electricity production CO2e emission rate average is used, then HECA is emitting 760,000 tons of CO2e annually which is 868 lbs of CO2e/MWH and 3% higher than Avenal.

In the following segment of a paper commissioned by HECA the California goals for 2050 GHG emissions from the electricity sector are clearly laid out:

Meeting California's Long-Term Greenhouse Gas Reduction Goals

Prepared for:

Hydrogen Energy International LLC

November 2009

Energy and Environmental Economics, Inc.

4. ***Electrification and low-carbon generation.*** Fuel-switching from liquid fossil fuels to low-carbon sources of electricity generation will be required in all sectors of the economy, including the transportation, residential, commercial, industrial and agricultural sectors. Electrification can take the form of electric heat pumps, plug-in hybrid electric vehicles, and electric hot water and electric space heaters. Low-carbon generation needs can be met with different types of renewable energy, nuclear energy and/or generation with CCS. The electricity sector's GHG emissions intensity (including emissions from imported electricity) must decrease from its current average of about 0.43 metric tons of CO_2 per MWh to 0.02 metric tons of CO_2 per MWh by 2050. The combination of electrification and low-carbon generation is expected to represent approximately 43 percent of California's total GHG emissions savings in 2050.

These goals require going from the current 946 lbs. of CO2e/MWH which is the above stated California average, down to 44 lbs. of CO2e/MWH in 2050 while essentially doubling electricity production at the same time. It is very difficult to comprehend how a plant like HECA with a GHG footprint ranging from 500 to over 850 lbs. of CO2e/MWH (depending on who you talk to) will help in this effort considering that it will still need to be operating 20 or 30 years from now to pay back its investment.

In conclusion, something is seriously wrong with this project since HECA, in comparison to a new natural gas power plant, is 10 times as costly to build, per unit of electrical capability, and it is also much more costly to operate. The additional oil from the Enhanced Oil Recovery cannot be used to justify this project but the energy used in getting the CO2 permanently into the ground must be calculated and added to the GHG totals in relation to the electricity produced. National security cannot be used to justify this project even though more oil will be made available from local sources. This additional oil production is really a negative when it is realized that it will help lower the price of oil for consumers, raise the relative cost of truly clean energy like wind, wave, and solar, plus cause more fossil fuel to be consumed in terms of the corresponding increase in GHG emissions. This project will also significantly increase pollution of the overloaded and highly polluted air in the San Joaquin Valley without decreasing GHG emissions from what is already possible with more economical, plus locally available, natural gas that can produce energy while emitting significantly less criteria air pollutants. HECA will require around 100 heavy duty diesel truck trips per day from outside the SJV for its fuel source. We see coal (which is technically illegal for new power plants in California) and pet coke being imported into the San Joaquin Valley which increases heavy duty truck and rail air pollution plus clogs further highways and rail lines. Heavy duty trucks are already 55% of the air pollution problem in the lower end of the San Joaquin Valley so why is fuel for a new power plant being proposed which requires delivery by truck? AB 32 was supposed to significantly lower GHG emissions and decrease air pollution at the same time. HECA will do neither.

AIR recommends that the applicant drop this project immediately because it is obvious it is not meeting its own stated goals nor the goals of the State of California in regard to reducing GHG emissions from energy production. AIR also recommends that the CEC make it clear to HECA immediately that this project is not appropriate for California and will most likely not be approvable. Closing the books on this project now will save the taxpayers, both in California and the United States, lots of money that can better be used elsewhere. It is very difficult to believe that investors will ever be found to actually get this project financed and built without even more massive subsidy from consumers and taxpayers.

Below are copies of the relevant tables from applicant supplied documents referred to in these comments and data requests by AIR.

Response to Set Three Data Request No. 181 for the HECA Project (08-AFC-8)

#181 Please provide an estimate, with all assumptions and calculations provided in electronic form (editable Excel spreadsheet), of the EOR processes greenhouse gas emissions and electricity consumption that includes the following:

a. The direct annual CO_2 and CO2E emissions from the EOR facility heaters and other fuel fired equipment.

Response: Upon full build-out, the facilities associated with the Oxy CO2 EOR Project ("EOR Project") will include a Central Tank Battery (CTB), a gas Reinjection Compression Facility (RCF) and a CO2 Recovery Plant (CRP). The preliminary design of the EOR Project facilities is underway. The combustion equipment included in the preliminary design and the greenhouse gas (GHG) emissions resulting from the operation of the equipment is summarized below:

Table-a.1
Greenhouse Gas Emissions from Combustion Equipment

Equipment Description and Process Information	Annual Heat Input (MMBtu/Yr)/1000	Carbon Dioxide CO2e Tonne/Year	Methane CH4 as CO2e Tonne/Year	Nitrous Oxide N2O as CO2e Tonne/Year
CO2 Injection Heater	525.600	27,788.47	9.93	16.29
Regen Gas Heater	87.600	4,631.41	1.66	2.72
TEG Reboiler	43.800	2,315.71	0.83	1.36
Amine Unit	8.760	463.14	0.17	0.27
Fire Pump Engine (175 Hp) X2	0.031	2.23	0.00	0.00
CTB – Flare (Pilot + Purge)	21.444	1,133.77	0.41	0.66
RCP – Flare (Pilot + Purge)	21.444	1,133.77	0.41	0.66
GHG Emissions from the Reasonably Foreseeable Use of the "Emergency Use Only Flares"				
CTB – Flare (Emergency Use)	21.32	4,443.70	0.40	0.66
RCF – Flare (Emergency Use)	21.32	4,131.07	0.40	0.66
Constituent GHG Emissions	-------	46,043.27	14.20	23.29
Total GHG Emission from All Natural Gas Combustion Equipment (CO2e Tonne/Year)				46,080.76

b. The annual CO2E emissions for the mobile sources (employee vehicles, maintenance delivery vehicles, etc.) required to operate the EOR facility.

<u>Response:</u> The operations associated with the EOR Project facilities are expected to require approximately 25 full time employees. The operation of the facility is not expected to require any additional maintenance delivery vehicles, beyond those that would occur even in the absence of the proposed project. The GHG emissions attributed to mobile source activity required for the operation of the EOR project is summarized below.

Table-b.1
GHG Emissions from Mobile Source
Activities Required for the Operation of the EOR Project

GHG Emissions from Light Duty Autos (Employee Commute)				
50 Vehicle Trips / Day 30 Miles per Trip or 1500 Miles per Day	Carbon Dioxide CO2	Methane CH4 as CO2e	Nitrous Oxide N2O as CO2e	Total CO2e Tonne/Year
	165.07	0.17	1.53	166.77

c. Provide the annual CO_2 leakage from the EOR process, including the leakage from all of the aboveground piping components stating at the HECA fence line.

<u>Response:</u> OEHI interprets the phrase "leakage" to be a reference to the following sources of GHG emissions: fugitive GHG emissions; GHG emissions resulting from maintenance activities conducted on the CO2 injection system and the crude oil and natural gas production system; GHG emissions resulting from pressure relief venting (PRV); and GHG emissions resulting from blowdown and purge activities associated with such maintenance activities.

Table-c.1
Summary of GHG Emission Leakage
From Various Processes Associated with the EOR Project

Greenhouse Gas Emissions From Production Operations	Average Greenhouse Gas Emissions (Tonne/Year)			
	CO_2 Tonne/Year	CH_4 as CO_2e Tonne/Year	N_2O as CO_2e Tonne/Year	Total CO_2e Tonne/Year
Fugitive GHG Emissions	39.06	63.45	------------	102.51
Maintenance GHG	159.60	214.98	------------	374.58
Pressure Relief GHG	0.83	1.17	------------	2.00
Miscellaneous Small Tanks	1.33	2.21	------------	3.53
Total GHG Emissions	200.81	281.81	0.00	482.62
GHG Emissions by Year				
By Project Year	2015	2017	2019	2025
	1,002.13	336.06	305.93	287.75

Note:

1. Spreadsheets detailing the equipment included in each of the processes summarized above are included with this submittal. The composition of the gas streams are expected to change over time as the CO_2 flood matures. Consequently the average composition was used to calculate the emissions summarized above. The composition of the streams versus time and greenhouse gas emissions estimated for 2015, 2017, 2019 and 2025 are contained in the spreadsheets included with this submittal.

2. "Fugitive GHG" includes the GHG emissions from leaking components used by: CO_2 injection wells, production wells, satellite setting, the CTB, the RCF and the CRP.

3. "Maintenance GHG" includes the GHG emissions resulting from the venting of CO_2 injection wells, crude oil and gas production wells, process vessels, tanks and other equipment that is expected to occur during annual turnarounds. Maintenance also includes the GHG emissions resulting from the blowdown of pipeline systems (CO_2 injection, crude oil and natural gas production system and the line from HECA to OEHI).

4. "Pressure Relief GHG" includes the GHG emissions from the venting of gasses through PRV serving process equipment (mainly vessels).

d. Provide the annual electricity consumption (in MWh) for the EOR process.

Response: The annual electric power consumption for the EOR project and the resulting GHG emissions from power consumption are listed below.

Table-d.1

EOR Project Electricity Consumption and GHG Emissions

GHG Emissions from Project Power Consumption (Tonne/Year)				
Horsepower Require for the Project X PG&E Factor 0.524 CO2e Lb/KWh	Electrical Hp/Hr	MWh per Year	GHG (Kg/MWh)	GHG CO2e
	116,000.00	758,055.36	237.68	180,176.63
Note: The GHG factor is the CPUC verified and SJVAPCD approved GHG emission factor for electrical power consumption for the PG&E grid within the San Joaquin Valley.				

Below are the GHG Emissions Summary from the September 2009 Amendment to the Revised Application for Certification where the natural gas auxiliary combustion turbine generator (CTG) has been eliminated from the project.

GHG Emissions Summary by Source **Emissions Summary**

Hydrogen Energy, Inc
HECA Amendment
9/28/2009

GHG emissions are numerically depicted as metric tons (tonne) of carbon dioxide equivalents (CO_2e). CO_2e represents CO_2 plus the additional warming potential from CH_4 and N_2O. CH_4 and N_2O have 21 and 310 times the warming potential of CO_2, respectively.

Natural Gas GHG Emission Factors						Diesel GHG Emission Factors				
CO_2 =	52.78	kg/MMBtu =	116.36	lb/MMBtu		CO_2 =	10.15	kg/gal =	22.38	lb/gal
CH_4 =	0.0059	kg/MMBtu =	0.013	lb/MMBtu		CH_4 =	0.0003	kg/gal =	0.001	lb/gal
N_2O =	0.0001	kg/MMBtu =	0.00022	lb/MMBtu		N_2O =	0.0001	kg/gal =	0.0002	lb/gal

CO_2, CH_4, and N_2O emission factors are taken from Appendix C of the California Climate Action Registry (CCAR) General Reporting Protocol Version 2.2 (March 2007)

HRSG Stack

Operating Hours		50	hr/yr			
HRSG Heat Input		1,998	MMBtu/hr			
CO_2 =	5,274	tonne/yr				
CH_4 =	1	tonne/yr =	12	tonne CO_2e/yr		
N_2O =	0.01	tonne/yr =	3	tonne CO_2e/yr	Total tonne CO_2e/yr =	5,290

During mature operation of the HRSG, the unit will fire only syngas, except during periods of startup and shutdown.
Startup and shutdown of the HRSG will be accomplished using natural gas. The total startup and shutdown operating hours are estimated at 50 hr/yr.
HRSG heat input rate is assumed to be the maximum heat input rate firing natural gas, which corresponds to winter minimum (20 F).

HRSG Stack - Burning Hydrogen-Rich Fuel

Operating Hours		8,322	hr/yr		Syngas GHG Emission Factors		
HRSG Heat Input		2,432	MMBtu/hr		CO_2 =	28.1	lb/MMBtu
CO_2 =	257,881	tonne/yr			Total tonne CO_2e/yr =		257,881

During mature operation of the HRSG, the unit will fire only syngas, except during periods of startup and shutdown.
HRSG heat input rate is assumed to be the maximum heat input rate firing syngas.

Auxiliary Boiler

Operating Hours		2,190	hr/yr			
HRSG Heat Input		142	MMBtu/hr			
CO_2 =	16,418	tonne/yr				
CH_4 =	2	tonne/yr =	39	tonne CO_2e/yr		
N_2O =	0.03	tonne/yr =	10	tonne CO_2e/yr	Total tonne CO_2e/yr =	16,466

Emergency Generators

Operating Hours		50	hr/yr			
HRSG Heat Input		2,800	Bhp			
CO_2 =	3,201	lb/hr =	73	tonne CO_2/yr		
CH_4 =	0.09	lb/hr =	0.045	tonne CO_2e/yr		
N_2O =	0.03	lb/hr =	0.2218	tonne CO_2e/yr	Total tonne CO_2e/yr* =	146

The following conversions were used to convert from lb/gallon to lb/hp-hour; and then multiplying by the rated horsepower rating: 1 gallon/137,000 Btu; and 7,000 Btu/hp-hour.

* Total tonnes CO_2e per year represent the contributions from both generators.

Fire Water Pump

Operating Hours		100	hr/yr			
HRSG Heat Input		556	Bhp			
CO_2 =	636	lb/hr =	29	tonne CO_2/yr		
CH_4 =	0.02	lb/hr =	0.018	tonne CO_2e/yr		
N_2O =	0.01	lb/hr =	0.0881	tonne CO_2e/yr	Total tonne CO_2e/yr =	29

The following conversions were used to convert from lb/gallon to lb/hp-hour; and then multiplying by the rated horsepower rating: 1 gallon/137,000 Btu; and 7,000 Btu/hp-hour.

Gasification Flare

Pilot Operation						
Operating Hours		8,760	hr/yr			
HRSG Heat Input		0.5	MMBtu/hr			
CO_2 =	231	tonne/yr				
CH_4 =	0.03	tonne/yr =	0.5	tonne CO_2e/yr		
N_2O =	0.0004	tonne/yr =	0.1	tonne CO_2e/yr	Total tonne CO_2e/yr =	232
Flaring Events						
Total Operation		115,500	MMBtu/yr			
CO_2 =	6,098	tonne/yr				
CH_4 =	0.7	tonne/yr =	14	tonne CO_2e/yr		
N_2O =	0.01	tonne/yr =	4	tonne CO_2e/yr	Total tonne CO_2e/yr =	6,116

GHG emissions from flaring events are conservatively estimated using GHG emission factors for natural gas combustion.

SRU Flare

Pilot Operation						
Operating Hours		8,760	hr/yr			
HRSG Heat Input		0.3	MMBtu/hr			
CO_2 =	139	tonne/yr				
CH_4 =	0.02	tonne/yr =	0.3	tonne CO_2e/yr		
N_2O =	0.0003	tonne/yr =	0.08	tonne CO_2e/yr	Total tonne CO_2e/yr =	139
Flaring Events (assist gas)						
Operating Hours		6	hr/yr			
HRSG Heat Input		36	MMBtu/hr			
CO_2 =	11	tonne/yr				
CH_4 =	0.001	tonne/yr =	0.03	tonne CO_2e/yr		
N_2O =	0.00002	tonne/yr =	0.007	tonne CO_2e/yr	Total tonne CO_2e/yr =	11
Throughput (inerts)						
H_2S =		25	%			
CO_2 (inerts) =		75	%			
H_2S =		72	lbmol/hr			
CO_2 (inerts) =		216	lbmol/hr			
CO_2 (inerts) =		9,488	lb/hr			
Operating Hours		6	hr/yr			
					Total tonne CO_2e/yr =	26

GHG emissions from flaring events are conservatively estimated using GHG emission factors for natural gas combustion.

Throughtput (inerts) amount calculated from the relationship of CO2 to H2S in the SRU Flare.

Rectisol Flare

Pilot Operation						
Operating Hours		8,760	hr/yr			
HRSG Heat Input		0.3	MMBtu/hr			
CO_2 =	139	tonne/yr				
CH_4 =	0.02	tonne/yr =	0.3	tonne CO_2e/yr		
N_2O =	0.0003	tonne/yr =	0.08	tonne CO_2e/yr	Total tonne CO_2e/yr =	139

GHG emissions from flaring events are conservatively estimated using GHG emission factors for natural gas combustion.

Tail Gas Thermal Oxidizer

Process Vent Disposal Emissions						
Operating Hours		8,760	hr/yr			
HRSG Heat Input		10	MMBtu/hr			
CO_2 =	4,625	tonne/yr				
CH_4 =	0.52	tonne/yr =	10.9	tonne CO_2e/yr		
N_2O =	0.0088	tonne/yr =	2.7	tonne CO_2e/yr	Total tonne CO_2e/yr =	4,638
SRU Startup Waste Gas Disposal						
Operating Hours		300	hr/yr			
HRSG Heat Input		10	MMBtu/hr			
CO_2 =	158	tonne/yr				
CH_4 =	0.018	tonne/yr =	0.37	tonne CO_2e/yr		
N_2O =	0.00030	tonne/yr =	0.093	tonne CO_2e/yr	Total tonne CO_2e/yr =	159

GHG emissions from flaring events are conservatively estimated using GHG emission factors for natural gas combustion.

Intermittent CO_2 Vent

Operating Hours	504	hr/yr		
CO_2 Emission Rate	656,000	lb/hr		
			Total tonne CO_2e/yr =	150,011

Assumes 21 days per year venting at full rate.

Gasifier Warming

Operating Hours		1,800	hr/yr			
HRSG Heat Input		18	MMBtu/hr			
CO_2 =	1,711	tonne/yr				
CH_4 =	0	tonne/yr =	4	tonne CO_2e/yr		
N_2O =	0.00	tonne/yr =	1	tonne CO_2e/yr	Total tonne CO_2e/yr =	1,716

Total tonne CO_2e/yr =	**442,998**

total emissions summary from the same document cited above:

Total Annual Project Emissions **Emissions Summary**

Hydrogen Energy, Inc
HECA Amendment
9/28/2009

Pollutant	Total Annual (ton/yr)	CTG/HRSG Maximum (1) (ton/yr)	Cooling Towers (2) (ton/yr)	Auxiliary Boiler (ton/yr)	Emergency Generators (3) (ton/yr)	Fire Water Pump (ton/yr)	Gasification Flare (ton/yr)	SRU Flare (ton/yr)	Rectisol Flare (ton/yr)	Tg Thermal Oxidizer (ton/yr)	CO_2 Vent (ton/yr)	Gasifier Warming (ton/yr)	Feedstock (4) (ton/yr)
NO_X	186.4	167.2	--	1.7	0.2	0.1	4.3	0.2	0.2	10.9	--	1.8	--
CO	322.7	150.2	--	5.8	0.1	0.2	48.8	0.1	0.1	9.1	106.9	1.5	--
VOC	36.1	32.5	--	0.6	0.03	0.01	0.003	0.002	0.002	0.3	2.4	0.1	--
SO_2	38.4	29.2	--	0.3	0.001	0.0003	0.004	0.055	0.003	8.8	--	0.03	--
PM_{10}	111.4	82.4	24.1	0.8	0.01	0.001	0.007	0.004	0.004	0.4	--	0.1	3.6
$PM_{2.5}$ (5)	99.2	82.4	14.5	0.8	0.01	0.001	0.007	0.004	0.004	0.4	--	0.1	1.0
NH_3	75.9	75.9	--	--	--	--	--	--	--	--	--	--	--
H_2S	1.3	--	--	--	--	--	--	--	--	--	1.3	--	--
CO_2e (6)	442,998	263,170	--	16,466	146	29	6,348	176	139	4,797	150,011	1,716	--

(1) Total annual HRSG emissions represents the maximum emissions rate from a composite firing scenario (all three fuels)
(2) Includes contributions from all three cooling towers
(3) Includes contributions from both emergency generators
(4) Feedstock emissions are shown as the contribution of all dust collection points.
(5) Where PM10 = PM2.5, it is assumed that PM10 is 100% PM2.5
(6) CO2e emission rates are shown as metric tons (tonnes)

Feedstock (fuel) transportation was inaccurately calculated in the original documents because there was an assumption that 10% of the pet coke would come from the Bakersfield area and there is none available currently. Even with changes in where the fuel comes from, CO2 emissions from fuel feedstock transportation can still be estimated between 15,000 and 20,000 tons per year according to the applicant's figures shown below.

Table 5.1-25
Statewide Net Emission Difference

Operation Emissions tons/year	**CO**	**CO_2**	**CH_4**	**N_2O**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_x**	**ROG**
Current Scenario									
Route 1 (California Petcoke, Santa Maria Area)	7.51	2,744.87	0.08	0.03	41.10	1.44	1.33	2.05	2.38
Route 2 (California Petcoke, Carson Area)	1.18	671.41	0.01	1.69E-03	3.22	0.17	0.14	0.01	0.28
Route 3 (California Petcoke, Bakersfield Area)	1.78	1,019.15	0.02	2.57E-03	4.99	0.24	0.20	0.01	0.43
Route 4 (California Petcoke, Bakersfield Area)	3.01	1,729.77	0.03	4.40E-03	8.86	0.38	0.31	0.02	0.72
Misc. Trucks	–	–	–	–	–	–	–	–	–
Coal	–	–	–	–	–	–	–	–	–
Statewide Total	**13.48**	**6,165.21**	**0.15**	**0.04**	**58.17**	**2.23**	**1.99**	**2.08**	**3.81**
Project Site Scenario									
Route 1 (California Petcoke, Santa Maria Area)	7.23	8,471.11	0.02	0.02	14.77	0.85	0.76	0.04	1.70
Route 2 (California Petcoke, Carson Area)	6.43	7,712.72	0.05	0.02	13.33	0.72	0.51	0.06	1.27
Route 3 (California Petcoke, Bakersfield Area)	0.12	155.70	8.33E-04	3.99E-04	0.26	0.01	0.01	1.67E-03	0.03
Route 4 (California Petcoke, Bakersfield Area)	0.12	155.70	8.33E-04	3.99E-04	0.26	0.01	0.01	1.67E-03	0.03
Misc. Trucks	0.83	1,032.17	0.01	2.65E-03	1.75	0.09	0.06	0.01	0.18
Coal	4.40	2,058.38	0.05	0.02	22.36	0.80	0.73	0.29	1.33
Statewide Total	**19.13**	**19,585.78**	**0.12**	**0.06**	**52.74**	**2.49**	**2.07**	**0.41**	**4.54**
Difference	**5.65**	**13,420.58**	**(0.03)**	**0.03**	**(5.43)**	**0.25**	**0.08**	**(1.67)**	**0.73**

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

APPLICATION FOR CERTIFICATION
FOR THE *HYDROGEN ENERGY CALIFORNIA, LLC PROJECT*

Docket No. 08-AFC-8

PROOF OF SERVICE LIST
Rev. 10/21/10

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STATE OF CALIFORNIA
State Energy Resources
Conservation and Development Commission

In the Matter of:	)	08-AFC-8
	)	
Hydrogen Energy California	)	**DECLARATION OF SERVICE**
______________________	)	

I, _Tom Frantz______________________ declare that on __February 14, 2011_______, I served and filed copies of the attached ***data request and comments***, accompanied by a copy of the most recent *Proof of Service* list (most recent version is located on the proceeding's web page) with the Docket Unit OR with the presiding committee member of the proceeding. The document has been sent to the Commission AND the applicant, as well as the other parties in this proceeding (as shown on the *Proof of Service* list), in the following manner:

(C*heck all that Apply*)

FOR SERVICE TO THE APPLICANT AND ALL OTHER PARTIES:

_✕_ sent electronically to all email addresses on the Proof of Service list;

AND

FOR FILING WITH THE ENERGY COMMISSION:

__✕__ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-8
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

-or-

CALIFORNIA ENERGY COMMISSION
Presiding Member ________________
1516 Ninth Street
Sacramento, CA 95814-5512
Re: Docket No. [___08 -AFC-__8__]

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

__________Tom Frantz______________________ _____February 14, 2011______
Name Date