OEHI Responses to CEC Workshop Requests Nos. A39-A42 (Responses to CEC Supplemental Questions Regarding Data Requests A30, A33c, A38, A40)

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

January 2013

Occidental of Elk Hills, Inc.

California Energy Commission (CEC)

Data Requested – November 7, 2012

Workshop Follow-up

Question A30, A33c, A38 and A40

November 2012

Mike Kelly
Vector Environmental, Inc.

A. Question A30 Is the Table 1. Emission Factor Heading, Kg/MMBtu correct?

Response: The correct greenhouse gas emission factors were used for assessing GHG emissions from the emergency use diesel engines. The factors were obtained from Table-4 of "Appendix-A to the Regulation for the Mandatory reporting of Greenhouse Gas Emissions". The factors used in the calculations are listed below.

Response: There were two factors entered incorrectly in the Factors column of Table-1 and they have been corrected. The correct factors were used for the calculations.

Table-1
Emission Factors for 175 BHP Diesel Fueled Engines

GHG	Factor Kg/MMBtu	GHG Emissions Factor Reference GHG Factors for Diesel Fuel Combustion in Stationary Sources
CO2	73.10	CARB- Mandatory Reporting Regulation Appendix-A, Table 4
CH4	0.003	CARB- Mandatory Reporting Regulation Appendix-A, Table 6
N2O	0.0006	CARB- Mandatory Reporting Regulation Appendix-A, Table 6

B. Question A33c What is the reference source for the 1.0 grain sulfur per 100 SCF assumption used in the flared gas. Is it based on experience and testing of what would be a similar gas sources, or was some other reference used. My question relates to that fact that this is a fairly low sulfur content…not much more than pipeline quality natural gas, but it is my understanding that the flared gas would not have undergone any sulfur reduction treatment, so I'm looking to confirm that this sulfur level is reasonable for this flared gas stream.

Response: The 1 gr/100 SCF of total sulfur content is conservative assumption for Elk Hills gas production. The Total sulfur in Elk Hills gas is typically about 5 ppmv or less. A total sulfur content equal to 1 grain/100 SCF is approximately 16 ppmv. The higher sulfur content should allow for excursions and changes in Quality that might occur over time.

C. Question A38 We need copies of the noted "Attachment I, Table 1.A through 4.A" .pdf file, which was not provided with the rest of the data response.

Response: There were typos in the response and the reference should have been to: Attachment-I, Table 1.A. through 1.D. and Attachment II, Table 2.A. through 2.D.

Table-2
Factor for Prorating
Emission from CO2 Enhanced Oil Recovery Project

CO2 EOR Design Case	Recycle Volume (MMScfd)	HECA Volume (MMScfd)	Total Gas Volume MMScfd	Emission Prorata Factor
Revised Case	550	135	685	1.2409
Original Case	422	130	522	

The maximum daily emissions from the original design case of 522 MMScfd are summarized in Attachment-I, Table-1.A. through Table-1.D.

The maximum daily and annual emissions corresponding to the design case of 635 MMScfd are summarized in Attachment-II, Table 2.A. through 2.D.

D. Question A40 We would like clarification of whether the statement "included in the emissions calculations" also means that the flare emissions and/or flare pilot emissions were included in the New Source Review balance for determining offset needs

The SJVAPCD has handled the emissions resulting from the use of pilot gas and purge gas differently over the years. In the past, the Air District included the pilot/purge gas emissions in the calculations. In more recent years, the District has excluded the emissions from pilot gas/purge gas. The calculations used for determining the flare emissions are based on the more conservative approach. The emissions from the flare pilot/purge gas are included in the emission calculations.

Response: The flare pilot emissions and the flare emissions are not subject to SJVAPCD offset requirements and are not included in the NSR balance for determining offset needs. The flare pilot and the flare emissions are included in the total operational emissions shown in the attached Tables.

Attachment-I

Design Case of 522 MMScfd

Maximum Daily and Annual Emissions
Of Criteria Pollutants and Greenhouse Gases

Criteria Pollutant Emissions (552 MMScfd Design Basis)

Table-1.A
Maximum Daily Emissions of Criteria Pollutants

Design Basis 552 MMScfd						
Process Equipment	NOx Lb/Day	VOC Lb/Day	CO Lb/Day	PM10 Lb/Day	PM2.5 Lb/Day	SOx Lb/Day
Stationary Source Equipment	9,389.05	8,714.84	50,817.16	1,112.39	1,112.39	388.97
Well Maintenance Activity	10.29	2.67	12.562	0.404	0.404	0.053
Mobile Source Activities	0.643	0.184	5.356	0.117	0.117	0.012
Total Operational Emissions	9,399.98	8,717.69	50,835.08	1,112.91	1,112.91	389.04

Note:

1. Emissions from stationary source activities include emissions from stationary source equipment and emissions from equipment used for well maintenance activities. Maximum daily emissions from stationary source equipment were calculated using the maximum rated capacity of the equipment assuming a 24 hour per day operating schedule at 100% load.

2. The maximum daily emissions from well maintenance activities were calculated by dividing the emission for year 2034 by the number of days of well maintenance conducted during the year (150 days per year).

3. Per the San Joaquin Valley Air Pollution Control District calculation procedures, maximum daily emissions from emergency use only stationary source equipment include the potential emissions that could result from a 24 hour emergency event.

4. The maximum daily emissions from mobile source activity was estimated by dividing the annual emission by 365.

Table-1.B
Annual Emissions of Criteria Pollutants

Design Basis 552 MMScfd						
Process Equipment	NOx Lb/Year	VOC Lb/Year	CO Lb/Year	PM10 Lb/Year	PM2.5 Lb/Year	SOx Lb/Year
Stationary Source Activities	14,399.57	47,523.85	63,958.45	5,805.67	5,805.67	2,112.420
Mobile Source Activities	234.55	67.01	1,954.77	42.61	42.61	4.377
Total Operational Emissions	14,634.12	47,590.86	65,913.22	5,848.28	5,848.28	2,116.80

Note:

1. Annual emissions include the emissions from the reasonably foreseeable use of the emergency flares and the emissions from the maintenance and testing of the emergency use only equipment.

Table-1.C
Maximum Daily Emissions of Greenhouse Gases

Design Basis 552 MMScfd				
Equipment Description and Process Information	Carbon Dioxide CO2e Tonne/Day	Methane CH4 as CO2e Tonne/Day	Nitrous Oxide N2O as CO2e Tonne/Day	Total CO2e Tonne/Day
Stationary Source	27,652.36	3.02	4.31	27,659.68
Indirect (Electric Power)	---------	---------	---------	493.63
Well Maintenance	1.06	0.00	0.00	0.48
Mobile Source	0.45	0.00	0.00	0.46
Total GHG Emissions	27,653.87	3.02	4.31	28,154.25

Note:

1. Maximum daily emissions from stationary source equipment were calculated using the maximum rated capacity of the equipment assuming a 24 hour per day operating schedule at 100% load.

2. The maximum daily emissions from well maintenance activities were calculated by dividing the emission for year 2034 by the number of days of well maintenance conducted during the year (150 days per year).

3. Per the San Joaquin Valley Air Pollution Control District calculation procedures, maximum daily emissions from emergency use only stationary source equipment include the potential emissions that could result from a 24 hour emergency event.

4. The maximum daily emissions from mobile source activity were estimated by dividing the annual emission by 365.

Table-1.D
Annual Emissions of Greenhouse Gases

Design Basis 552 MMScfd				
Equipment Description and Process Information	Carbon Dioxide CO2e Tonne/Year	Methane CH4 as CO2e Tonne/Year	Nitrous Oxide N2O as CO2e Tonne/Year	Total CO2e Tonne/Year
Stationary Source	46,132.35	156.53	23.29	46,312.17
Indirect (Electric Power)	---------	---------	---------	180,176.63
Well Maintenance	386.05	0.32	0.97	173.44
Mobile Source	165.07	0.17	1.53	166.77
Total GHG Emissions	46,683.47	157.03	25.79	226,829.01

Attachment-II

Design Case of 685 MMScfd

Maximum Daily and Annual Emissions
Of Criteria Pollutants and Greenhouse Gases

Criteria Pollutant Emissions (685 MMScfd Design Basis)

Table-2.A
Maximum Daily Emissions of Criteria Pollutants

Design Basis 685 MMScfd						
Process Equipment	NOx Lb/Day	VOC Lb/Day	CO Lb/Day	PM10 Lb/Day	PM2.5 Lb/Day	SOx Lb/Day
Stationary Source Equipment	12,320.880	11,436.141	66,685.354	1,459.745	1,459.745	510.430
Well Maintenance Activity	13.503	3.504	16.485	0.530	0.530	0.070
Mobile Source Activities	0.844	0.241	7.028	0.154	0.154	0.016
Total Operational Emissions	12,335.227	11,439.886	66,708.867	1,460.429	1,460.429	510.515

Note:

1. Emissions from stationary source equipment, well maintenance activities and mobile sources were calculated for the 685 MMScfd design case using a proration factor of 1.2409 (= 685/552). For additional information on the calculation procedures refer to the notes included in Table-1.A found in Attachment-I.

Table-2.B
Annual Emissions of Criteria Pollutants

Design Basis 685 MMScfd						
Process Equipment	NOx Lb/Year	VOC Lb/Year	CO Lb/Year	PM10 Lb/Year	PM2.5 Lb/Year	SOx Lb/Year
Stationary Source Activities	18,895.989	62,363.676	83,930.149	7,618.548	7,618.548	2,772.045
Mobile Source Activities	307.789	87.938	2565.170	55.920	55.920	5.744
Total Operational Emissions	19,203.778	62,451.614	86,495.320	7,674.468	7,674.468	2,777.790

Note:

1. Emissions from stationary source equipment, well maintenance activities and mobile sources were calculated from the 635 MMScfd design case using a proration factor of 1.2409 (= 685/552). For additional information on the calculation procedures refer to the notes included in Table-1.B found in Attachment-I.

Table-2.C
Maximum Daily Emissions of Greenhouse Gases

Design Basis 685 MMScfd				
Equipment Description and Process Information	Carbon Dioxide CO2e Tonne/Day	Methane CH4 as CO2e Tonne/Day	Nitrous Oxide N2O as CO2e Tonne/Day	Total CO2e Tonne/Day
Stationary Source	34,314.97	3.74	5.34	34,324.06
Indirect (Electric Power)	---------	---------	---------	612.57
Well Maintenance	1.31	0.00	0.00	0.59
Mobile Source	0.56	0.00	0.01	0.57
Total GHG Emissions	34,316.85	3.74	5.35	34,937.79

Note:

1. Greenhouse gas emissions from equipment and indirect GHG emissions from electric power consumption were calculated for the 685 MMScfd design case using a proration factor of 1.2409 (= 685/552). For additional information on the calculation procedures refer to the notes included in Table-2.A found in Attachment-I.

Table-2.D
Annual Emissions of Greenhouse Gas Emissions

Design Basis 685 MMScfd				
Equipment Description and Process Information	Carbon Dioxide CO2e Tonne/Year	Methane CH4 as CO2e Tonne/Year	Nitrous Oxide N2O as CO2e Tonne/Year	Total CO2e Tonne/Year
Stationary Source	57,247.57	194.25	28.90	57,470.72
Indirect (Electric Power)	---------	---------	---------	223,588.76
Well Maintenance	479.07	0.40	1.21	215.22
Mobile Source	204.84	0.22	1.90	206.96
Total GHG Emissions	57,931.48	194.86	32.00	281,481.66

Note:

1. Greenhouse gas emissions from equipment and indirect GHG emissions from electric power consumption were calculated for the 685 MMScfd design case using a proration factor of 1.2409 (= 685/552). For additional information on the calculation procedures refer to the notes included in Table-2.B found in Attachment-I.

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
PROOF OF SERVICE
(Revised 12/24/12)

SERVICE LIST:

APPLICANT
SCS Energy, LLC
Marisa Mascaro
30 Monument Square, Suite 235
Concord, MA 01742
mmascaro@scsenergyllc.com

Tiffany Rau
2629 Manhattan Avenue, PMB# 187
Hermosa Beach, CA 90254
trau@heca.com

Hydrogen Energy California, LLC
George Landman
Director of Finance and
Regulatory Affairs
500 Sansome Street, Suite 750
San Francisco, CA 94111
glandman@heca.com

CONSULTANT FOR APPLICANT
URS Corporation
Dale Shileikis, Vice President
Energy Services Manager
Major Environmental Programs
One Montgomery Street, Suite 900
San Francisco, CA 94104-4538
dale_shileikis@urscorp.com

COUNSEL FOR APPLICANT
Latham & Watkins, LLP
Michael J. Carroll
*Marc T. Campopiano
650 Town Center Drive, 20th Fl.
Costa Mesa, CA 92626-1925
michael.carroll@lw.com
*marc.campopiano@lw.com

INTERESTED AGENCIES
California ISO
e-recipient@caiso.com

Department of Conservation
Office of Governmental and
Environmental Relations
(Department of Oil, Gas &
Geothermal Resources)
Marni Weber
801 K Street, MS 2402
Sacramento, CA 95814-3530
marni.weber@conservation.ca.gov

INTERVENORS
California Unions for Reliable Energy
Thomas A. Enslow
Marc D. Joseph
Adams Broadwell Joseph & Cardozo
520 Capitol Mall, Suite 350
Sacramento, CA 95814
tenslow@adamsbroadwell.com

Association of Irritated Residents
Tom Frantz
30100 Orange Street
Shafter, CA 93263
tfrantz@bak.rr.com

Kern-Kaweah Chapter
of the Sierra Club
Andrea Issod
Matthew Vespa
85 Second Street, 2nd Floor
San Francisco, CA 94105
andrea.issod@sierraclub.org
matt.vespa@sierraclub.org

INTERVENORS (con't.)
Environmental Defense Fund (EDF)
Timothy O'Connor, Esq.
123 Mission Street, 28th Floor
San Francisco, CA 94105
toconnor@edf.org

Natural Resources Defense Council
George Peridas
111 Sutter Street, 20th Fl.
San Francisco, CA 94104
gperidas@nrdc.org

Kern County Farm Bureau, Inc.
Benjamin McFarland
801 South Mt. Vernon Avenue
Bakersfield, CA 93307
bmcfarland@kerncfb.com

HECA Neighbors
c/o Chris Romanini
P.O. Box 786
Buttonwillow, CA 93206
roman93311@aol.com

ENERGY COMMISSION – PUBLIC ADVISER
Jennifer Jennings
Public Adviser
publicadviser@energy.ca.gov

COMMISSION DOCKET UNIT
CALIFORNIA ENERGY
COMMISSION – DOCKET UNIT
Attn: Docket No. 12-CAI-04
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.ca.gov

*Indicates Change

OTHER ENERGY COMMISSION PARTICIPANTS (LISTED FOR CONVENIENCE ONLY):

After docketing, the Docket Unit will provide a copy to the persons listed below. Do not send copies of documents to these persons unless specifically directed to do so.

KAREN DOUGLAS
Commissioner and Presiding Member

ANDREW McALLISTER
Commissioner and Associate Member

Raoul Renaud
Hearing Adviser

Eileen Allen
Commissioners' Technical
Adviser for Facility Siting

Galen Lemei
Adviser to Presiding Member

Jennifer Nelson
Adviser to Presiding Member

David Hungerford
Adviser to Associate Member

Patrick Saxton
Adviser to Associate Member

Robert Worl
Project Manager

John Heiser
Associate Project Manager

Lisa DeCarlo
Staff Counsel

DECLARATION OF SERVICE

I, Dale Shileikis, declare that on January 29, 2013, I served and filed copies of the attached OEHI Responses to CEC Workshop Requests Nos. A39-A42 (Responses to CEC Supplemental Questions Regarding Data Requests A30, A33c, A38, A40), dated January, 2013. This document is accompanied by the most recent Proof of Service list, which I copied from the web page for this project at: http://www.energy.ca.gov/sitingcases/hydrogen_energy/index.html.

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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that I am over the age of 18 years.

Dated: 1/29/13