Appendix T

Description of Offset Package

APPENDIX T

DESCRIPTION OF OFFSET PACKAGE

HYDROGEN ENERGY CALIFORNIA PROJECT
KERN COUNTY, CALIFORNIA

Prepared For:

- San Joaquin Valley Air Pollution Control District

- California Energy Commission

- U.S. Environmental Protection Agency Region IX

Prepared on behalf of

Hydrogen Energy International LLC

June 10, 2008

URS

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This section discusses the mitigation measures proposed by the Applicant that will be implemented to reduce Project-related impacts to air quality.

1.0 Mitigation Measure AQ1

Section 4.5.3 of San Joaquin Valley Air Pollution Control District (SJVAPCD) Rule 2201 requires a project with operational emissions above 10 tons per year of nitrogen oxide (NO_x) or volatile organic compounds (VOC), 100 tons per year (tpy) of carbon monoxide (CO), 14.6 tpy of particulate matter less than 10 microns in diameter (PM_{10}) and 27.375 tpy of sulfur oxides (SO_x) to provide offsets for net emissions increases resulting from the project as project mitigation. Pursuant to the rule, the Hydrogen Energy California project (HECA or Project) is required to provide emission offsets in the form of emissions reduction credits (ERC) for increases in emissions of non-attainment pollutants in excess of specified thresholds that will result from the operation of the Project on a pollutant-specific basis.

Section 4.6.1 of SJVAPCD Rule 2201 exempts projects from the offset requirement for increases in carbon monoxide in attainment areas if the Applicant demonstrates to the satisfaction of the Air Pollution Control Officer (APCO), that the Ambient Air Quality Standards (AAQS) are not violated in the areas to be affected, and such emissions will be consistent with Reasonable Further Progress, and will not cause or contribute to a violation of Ambient Air Quality Standards. Modeling results presented in Section 5.1, Air Quality, of the Application for Certification (AFC) provide this demonstration for carbon monoxide. Thus, offsets for this pollutant are not proposed.

Based on operational emissions data presented in Section 5.1, Air Quality, and summarized in Table T-1, Project Annual Operating Emissions, the annual Project emissions exceed the offset thresholds for four criteria pollutants. According to Rule 2201 Section 4.7.2, offsets need to be provided for the quantity of emissions above the offset thresholds described above.

Table T-1
Project Annual Operating Emissions

Pollutant	Annual Operational Emissions (tons/year)	Annual Operational Emissions (pounds/year)	Offset Requirement Thresholds (pounds/year)
VOC	40.7	81,400	20,000
NO_x	199.0	398,000	20,000
SO_x	42.5	85,000	54,750
PM_{10}	148.6	297,200	29,200

Source: HECA Project
Notes:
NO_x = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 microns in diameter
SO_x = sulfur oxides
VOC = volatile organic compounds

2.0 Emission Reduction Credits Estimates

Hydrogen Energy International LLC (HEI or Applicant) will obtain sufficient ERCs to comply with SJVAPCD and CEC requirements. ERCs are required to be provided at an appropriate distance offset ratio to determine the final quantity of offsets required.

Section 4.5.3 of Rule 2201 states that the required offset amounts for stationary sources that remain constant throughout the year are expressed in pounds per year, whereas offsets for quarterly potential to emit that is not constant throughout the year and seasonal sources are calculated in pounds per quarter. The Project will not be a seasonal source (a source with more than 90 percent of annual emissions occurring within a consecutive 120-day period, as stated in Rule 2201 Section 3.35).

Table T-2, Estimated ERCs Required, lists the estimated offset requirements for the operation of the Project. Annual Project emissions from Table T-2 have been apportioned equally among the four calendar quarters. The quantity of ERCs needed to offset emissions for each pollutant will depend on the distance from the Project Site at which the offsetting emission reductions occurred. Rule 2201 Section 4.8 specifies distance ratios that must be applied in determining the quantity of ERCs to be provided for a new source. If the location of the offsetting emission reduction is less than 15 miles from the new source, the ratio for a major source is 1.3 to 1. If the location of the offsetting emission reduction is 15 miles or more from the new source, the applicable offset ratio is 1.5 to 1. Note that the Project will be a major source as defined in Section 3.24 of Rule 2201 (25 tpy of NO_x or VOC, 15 tons of PM_{10} or SO_x, 100 tpy of CO).

Due to the very rural character of the Project Site and the lack of significant nearby emission sources, it is probable that the maximum distance ratio of 1.5 to 1 will be applicable for most of the ERCs used to offset Project emissions. Accordingly, the ERC amounts presented in Table T-2, Estimated ERCs Required, reflects an assumed 1.5 distance ratio.

Table T-2
Estimated ERCs Required

Pollutant	Total Annual Offset Requirement (pounds/year)	Total Quarterly Offset Requirement (pounds/quarter)	Annual ERC* (pounds/year)	Quarterly ERC* (pounds/quarter)
VOC	61,334	15,334	92,002	23,000
NO_X	378,674	94,669	568,011	142,003
SO_2	31,535	7,884	47,303	11,826
PM_{10}	272,053	68,013	408,080	102,020

* assumed 1.5 distance ratio

Notes:

ERC = emission reduction credits
NO_X = nitrogen oxide(s)
SO_2 = sulfur oxides
VOC = volatile organic compounds

3.0 Emission Reduction Credits Availability

The Applicant has been active in pursuing ERCs for the Project, and has determined that sufficient ERCs are available to cover the offset requirements shown in Table T-2, Estimated ERCs Required. Discussions are ongoing with various ERC owners and ERC brokers. Table T-3, San Joaquin Valley Air Pollution Control District ERC Registry, shows the simplified ERC registry from SJVAPCD showing a sufficient amount of ERCs available for purchase to provide the required emission offsets for the Project. The table includes the locations of the offset sources and the nature of their source reduction activities, as well as ERC certificate numbers. As shown in Table T-3, San Joaquin Valley Air Pollution Control District ERC Registry, the Applicant is capable of providing the required emission offsets for the Project.

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Table T-3
San Joaquin Valley Air Pollution Control District
ERC Registry

Region	Facility Name	Certificate	Pollutant	1st QTR	2nd QTR	3rd QTR	4th QTR	Total Annual	Facility City	State
S	AERA ENERGY LLC	S-843-6	H2S	11097	11220	11344	11344	45,005	BAKERSFIELD	CA
C	AERA ENERGY LLC	C-681-2	NOx	26900	26900	26900	26900	107,600	BAKERSFIELD	CA
C	CHEVRON USA INC	C-364-2	NOx	30130	29673	29217	29217	118,237	BAKERSFIELD	CA
S	OCCIDENTAL OF ELK HILLS, INC. (OEHI)	S-2824-2	NOx	29265	29810	30356	30356	119,787	TUPMAN	CA
S	CHEVRON USA INC	S-2456-2	NOx	32003	32799	31884	32561	129,247	BAKERSFIELD	CA
S	CHEVRON USA INC (REFINERY)	S-2273-2	NOx	34198	34786	35373	35373	139,730	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-158-2	NOx	38057	29690	32405	43791	143,943	BAKERSFIELD	CA
N	CASTLE AIRPORT AVIATION & DEVELOP CENTER	N-109-2	NOx	38954	39386	39819	39819	157,978	ATWATER	CA
S	AERA ENERGY LLC	S-140-2	NOx	36695	46397	47292	36806	167,190	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-1437-2	NOx	42372	49588	46800	43954	182,714	BAKERSFIELD	CA
S	CHEVRON USA INC	S-1256-2	NOx	45238	45741	46244	46244	183,467	BAKERSFIELD	CA
S	CHEVRON USA INC	S-2448-2	NOx	45847	46388	46930	46930	186,095	BAKERSFIELD	CA
S	OCCIDENTAL OF ELK HILLS, INC (OEHI)	S-2761-2	NOx	53738	54477	55216	55214	218,645	TUPMAN	CA
S	CHEVRON USA INC	S-1102-2	NOx	57160	57795	58430	58430	231,815	BAKERSFIELD	CA
S	CHEVRON USA INC	S-1100-2	NOx	62167	62857	63548	63548	252,120	BAKERSFIELD	CA
N	GALLO GLASS COMPANY	N-276-2	NOx	69524	70655	72080	67173	279,432	MODESTO	CA
S	AERA ENERGY LLC	S-1030-2	NOx	93295	83665	32600	77083	286,643	BAKERSFIELD	CA
N	CANTORCO2E LP	N-767-2	NOx	75000	75000	75000	75000	300,000	SAN JUAN	CA
N	GALLO GLASS COMPANY	N-278-2	NOx	83525	66849	77176	81929	309,479	MODESTO	CA
S	CHEVRON USA INC	S-1584-2	NOx	78972	79850	80728	80728	320,278	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-163-2	NOx	96698	107197	101158	78678	383,731	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-2573-2	NOx	96355	108387	107025	102992	414,759	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-162-2	NOx	128454	152970	128743	130786	540,953	BAKERSFIELD	CA
S	CHEVRON USA INC	S-2041024/401	NOx	151178	149517	149517	152840	603,052	BAKERSFIELD	CA
S	BIG WEST	S-2183-2	NOx	219700	222089	224530	224530	890,849	BAKERSFIELD	CA
S	PASTORIA ENERGY FACILITY, LLC	S-2321-2	NOx	288729	290804	292880	294361	1,166,774	LEBEC	CA
C	OLDUVAI GORGE, LLC	C-789-4	PM10	0	0	0	40000	40,000	NEW YORK	NY

ERC Registry

Region	Facility Name	Certificate	Pollutant	1st QTR	2nd QTR	3rd QTR	4th QTR	Total Annual	Facility City	State
N	CE2 ENVIRONMENTAL MARKETS LP	N-696-4	PM10	5973	10000	10000	14027	40,000	SAN DIEGO	CA
C	EVOLUTION MARKETS LLC	C-941-4	PM10	0	0	0	41215	41,215	WHITE PLAINS	NY
C	CHEVRON USA INC	C-339-4	PM10	11300	11300	11301	11301	45,202	BAKERSFIELD	CA
N	LA PALOMA GENERATING COMPANY	N-500-4	PM10	11695	16203	9929	8254	46,081	SAN FRANCISCO	CA
S	EVOLUTION MARKETS LLC	S-2876-4	PM10	0	0	0	46954	46,954	WHITE PLAINS	NY
C	PARAMOUNT FARMS, INC.	C-288-4	PM10	1000	1000	36000	12000	50,000	LOST HILLS	CA
N	PARAMOUNT FARMS	N-206-4	PM10	0	0	65	52685	52,750	LOST HILLS	CA
N	CALPINE CORPORATION	N-297-4	PM10	0	0	101	66394	66,495	SAN JOSE	CA
N	BERRY SEED & FEED COMPANY	N-104-4	PM10	19353	17086	18646	20750	75,835	KEYES	CA
N	GALLO GLASS COMPANY	N-161-4	PM10	23150	22909	24274	22565	92,898	MODESTO	CA
S	CHEVRON USA INC	S-1971-4	PM10	29973	24037	28773	29743	112,526	BAKERSFIELD	CA
C	CALPINE CORPORATION	C-942-4	PM10	50845	67976	8408	841	128,070	SAN JOSE	CA
S	CHEVRON U S A INC	S-2080-5	SOx	35848	36301	36756	36756	145,661	BAKERSFIELD	CA
N	CORN PRODUCTS	N-264-5	SOx	39050	39050	39050	39050	156,200	STOCKTON	CA
S	AERA ENERGY LLC	S-1032-5	SOx	28371	72172	48856	9900	159,299	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-1339-5	SOx	102863	63756	0	10468	177,087	BAKERSFIELD	CA
N	GWF POWER SYSTEMS INC	N-575-5	SOx	50000	50000	50000	50000	200,000	PITTSBURG	CA
N	EVOLUTION MARKETS LLC	N-771-5	SOx	88068	87945	37822	37822	251,657	WHITE PLAINS	NY
S	BIG WEST	S-2177-5	SOx	55479	65755	62724	69141	253,099	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-4012274/201	SOx	67335	68084	68832	68832	273,083	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-2008-5	SOx	85594	40615	57148	91993	275,350	BAKERSFIELD	CA
S	FEDERAL POWER AVENAL, LLC	S-2791-5	SOx	92179	23666	69157	96288	281,290	OAKLAND	CA
S	AERA ENERGY LLC	S-1337-5	SOx	127827	90500	22163	48838	289,328	BAKERSFIELD	CA
S	KERN OIL & REFINING COMPANY	S-2726-5	SOx	139037	123574	56345	168359	487,315	BAKERSFIELD	CA
S	FRITO-LAY NORTH AMERICA INC	S-2746-5	SOx	140703	140500	144296	144296	569,795	BAKERSFIELD	CA
C	DART CONTAINER CORPORATION	C-555-1	VOC	30481	26626	14213	50680	122,000	MASON	MI
S	FEDERAL POWER AVENAL, LLC	S-2812-1	VOC	31432	31424	31417	31417	125,690	OAKLAND	CA
S	CLEAN HARBORS BUTTONWILLOW, LLC	S-685-1	VOC	31195	31541	31888	31888	126,512	BUTTONWILLOW	CA

ERC Registry

Region	Facility Name	Certificate	Pollutant	1st QTR	2nd QTR	3rd QTR	4th QTR	Total Annual	Facility City	State
N	CASTLE AIRPORT AVIATION & DEVELOP CENTER	N-523-1	VOC	31801	32175	32549	32549	129,074	ATWATER	CA
S	SAN JOAQUIN FACILITIES MGMT	S-2148-1	VOC	34024	28739	32822	38107	133,692	BAKERSFIELD	CA
S	CHEVRON USA INC (REFINERY)	S-657-1	VOC	35011	35399	35788	35788	141,986	BAKERSFIELD	CA
S	CHEVRON USA INC	S-621-1	VOC	37551	37968	38385	38385	152,289	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-1142-1	VOC	39631	39976	40411	40489	160,507	BAKERSFIELD	CA
S	SOUTH KERN INDUSTRIAL CENTER LLC	S-2792-1	VOC	48000	48000	48000	48000	192,000	TAFT	CA
C	PACIFIC GAS & ELECTRIC CO.	C-280-1	VOC	21981	68020	71348	53244	214,593	WALNUT CREEK	CA
S	BIG WEST	S-2452-1	VOC	53758	54557	54966	54874	218,155	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-2395-1	VOC	59410	59839	60983	61950	242,182	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-2725-1	VOC	65082	65830	66578	66578	264,068	BAKERSFIELD	CA
S	CHEVRON USA INC	S-2766-1	VOC	72796	73747	74664	74698	295,905	BAKERSFIELD	CA
S	OCCIDENTAL OF ELK HILLS, INC (OEHI)	S-2756-1	VOC	69571	78250	80826	76139	304,786	TUPMAN	CA
S	CHEVRON USA INC	S-620-1	VOC	83316	84241	85167	85167	337,891	BAKERSFIELD	CA
S	OCCIDENTAL OF ELK HILLS, INC. (OEHI)	S-2822-1	VOC	83976	85157	86339	86339	341,811	TUPMAN	CA
S	FEDERAL POWER AVENAL, LLC	S-2813-1	VOC	87500	87500	87500	87500	350,000	OAKLAND	CA
S	CHEVRON USA INC	S-2887-1	VOC	113431	114707	116073	116094	460,305	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-1082-1	VOC	130768	132221	133675	133675	530,339	BAKERSFIELD	CA
S	CHEVRON USA INC	S-1432-1	VOC	135357	136861	138364	138364	548,946	BAKERSFIELD	CA
S	AERA ENERGY LLC	S-2085-1	VOC	237019	239607	242250	242303	961,179	BAKERSFIELD	CA
S	BIG WEST	S-2776-1	VOC	899725	891948	922375	922378	3,636,426	BAKERSFIELD	CA

Source: San Joaquin Valley Air Pollution Control ERC Registry

Notes:

VOC = volatile organic Compounds

4.0 Reference

San Joaquin Valley Air Pollution Control District, 2008, ERC Registry, June 2008.