MODELING PROTOCOL SUPPLEMENT FOR THE HYDROGEN ENERGY CALIFORNIA (HECA) PROJECT

Prepared for:

U.S. Environmental Protection Agency Region IX

California Energy Commission

San Joaquin Valley Air Pollution Control District

Prepared on behalf of:

Hydrogen Energy California LLC

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URS

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Acronyms and Abbreviations

AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AFC	Revised Application for Certification
AGR	acid gas removal
AOI	area of impact
ASU	Ammonia Synthesis Unit
ATC	Application to Construct
BACT	Best Available Control Technology
CAAQS	California Ambient Air Quality Standard
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	carbon monoxide
CO_2	carbon dioxide
CT	combustion turbine
CTG/HRSG	combustion turbine generator and heat recovery steam generator
DPM	diesel particulate matter
EOR	enhanced oil recovery
FLAG	Federal Land Managers' Air Quality Related Values Work Group
HECA	Hydrogen Energy California
HNO_3	nitric acid
HRA	Health Risk Assessment
HRSG	heat-recovery steam generator
IGCC	integrated gasification combined-cycle
MHI	Mitsubishi Heavy Industries
MMBtu/hr	Million British thermal units per hour
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standard
NH_2-CO-NH_2	urea
NH_3	ammonia
NH_4	ammonium nitrate
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NPS	National Park Service
OLM	ozone-limiting method
petcoke	petroleum coke
PM_{10}	particulate matter with aerodynamic diameter less than 10 microns
$PM_{2.5}$	particulate matter with aerodynamic diameter less than 2.5 microns
ppm	parts per million
PSA	Pressure Swing Adsorption
PSD	Prevention of Significant Deterioration
SCR	selective catalytic reduction
SCS	SCS Energy California LLC
SIL	Significant Impact Level

SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
TAC	toxic air contaminant
U.S. EPA	United States Environmental Protection Agency
UAN	urea ammonia nitrate

1. INTRODUCTION

Following acquisition of the Hydrogen Energy California (HECA) Project in September, 2011, SCS Energy California LLC (SCS) proposed modifications to the previous design, including the addition of an integrated Fertilizer Complex. Due to the change in ownership and plant modifications, San Joaquin Valley Air Pollution Control District (SJVAPCD) requires a new application to construct (ATC). The California Energy Commission (CEC) and the United States Environmental Protection Agency (U.S. EPA) also require revised air quality modeling analyses that incorporate the modified facility sources.

This document supplements the two previous modeling protocols submitted to SJVAPCD, CEC, and U.S. EPA. On April 22, 2008, URS submitted the "Air Quality Modeling Protocol for the Hydrogen Energy California (HECA) Project." U.S. EPA, CEC, National Park Service (NPS), and U.S. Forest Service provided minor comments on the 2008 protocol, which were addressed in the previous analyses and have been incorporated into this supplement.

On January 20, 2011, URS submitted to SJVAPCD, CEC, and U.S. EPA the "Modeling Protocol for Parameter Selection Specific to the 1-Hour NO_2 NAAQS Regional Modeling for the Hydrogen Energy California (HECA) Project." On March 11, 2011, U.S. EPA approved the January 2011 modeling protocol, with the caveat that the new March 1, 2011 U.S. EPA guidance document may afford additional flexibility on some parameters; thus, a modification of the protocol in some respects may be possible in the near future.

Due to recent changes in some national ambient air quality standards (NAAQS) and associated modeling guidance, some analyses may be conducted differently than described in the previous modeling protocols. This supplement outlines only the differences in the techniques that will be used to conduct the modeling of the revised facility for both the NAAQS and California ambient air quality standards (CAAQS). Techniques described and approved in the previous protocols that will not change are not described here. A brief discussion of previous techniques is included only where clarification is needed.

2. PROJECT DESCRIPTION

Many Project components remain unchanged from previous application submittals. As before, the HECA Project will consist of an Integrated Gasification Combined Cycle (IGCC) facility to produce low-carbon baseload electricity by capturing carbon dioxide (CO_2) and transporting it for Enhanced Oil Recovery (EOR) and sequestration. The HECA Project location has remained unchanged, and is located approximately 7 miles west of the outermost edge of the City of Bakersfield, and 1.5 miles northwest of the unincorporated community of Tupman in western Kern County, California, in the San Joaquin Valley Air Basin. Key environmental controls also remain incorporated into the design such as the use of state-of-the-art emission control technologies, brackish water supply for process water needs and Zero Liquid Discharge technology.

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Similar to previous applications, the HECA Project will utilize a coal and petroleum coke (petcoke) fuel blend for gasification. The produced syngas will be processed in the Gasification Block to produce hydrogen-rich fuel. This hydrogen-rich fuel will be sent to one of three destinations:

- To the combustion turbine (CT) for low-carbon electric power generation.
- To the Pressure Swing Adsorption (PSA) Unit, where it is processed to produce a high-purity hydrogen stream. The high-purity hydrogen is used to make ammonia, which is primarily used to make nitrogen-based fertilizer or exported as a product.
- As a supplemental fuel to fire the heat-recovery steam generator (HRSG) that produces steam from the CT exhaust heat. This steam is converted to power by the steam turbine.

The net electrical generation output from the HECA Project will provide California with approximately 265-300 megawatts of low-carbon baseload power to the grid. The Gasification Block will capture approximately 90 percent of the carbon from the raw syngas at steady-state operation, which will be transported to the Elk Hills Oil Field for CO_2 EOR and sequestration. The Project will have significantly lower criteria pollutant emissions than existing pulverized coal or integrated gasification combined-cycle (IGCC) power plants. To minimize air emissions, state-of-the-art emission control technologies will be implemented for the HECA Project.

Figure 1 shows the preliminary layout of the proposed Project, including the locations of all major equipment. Emission points are identified on Figure 1 by number, and shown in the legend.

As mentioned above, several basic Project components remain unchanged, including the following:

- Plant Location remains the same
- The Project continues to use IGCC technology.
- 90 percent carbon capture is achieved via CO_2 EOR and sequestration at the adjacent Elk Hills Oil Field.
- State-of-the-art emission controls are included in the design.
- Baseload power generation.

The following are some of the notable Project changes:

- Mitsubishi Heavy Industries (MHI) oxygen-blown dry-feed gasification technology has been selected.
- An MHI 501GAC® combustion-turbine generator (CTG) has been selected, which will provide a nominal 405-megawatt gross output of electricity.
- NO_x emissions from the CTG/HRSG will be lower, at 2.5 parts per million (ppm) for

hydrogen-rich fuel.

- Anhydrous ammonia (produced onsite) will be used with the selective catalytic reduction (SCR).
- The three 18-million British thermal units per hour (MMBtu/hr) gasifier preheaters and the methanol startup system are not needed with the MHI gasifier. The gasifier will instead be pre-heated and started using a natural feed burner/nozzle under a much shorter time duration.
- A new rail spur will be constructed to the Project Site in order to facilitate feedstock and equipment delivery, as well as fertilizer and product off-take.
- A new, integrated fertilizer complex will produce approximately 1 million tons per year of nitrogen-based fertilizer.
- A 75 percent coal and 25 percent petcoke fuel blend will be used for the life of the facility.
- Additional baghouses to control fugitive dust associated with feedstock and product material handling.
- Some modification to the routes of the natural gas pipeline, potable water pipeline, and electrical transmission lines.

2.1 FERTILIZER PLANT

A brief description of the fertilizer plant and its components and emission sources is presented below.

Two Pressure Swing Adsorption Units

The PSA units will take a portion of clean syngas from the Acid Gas Removal (AGR) Unit to generate a high-purity hydrogen gas stream for use as a feedstock to the Ammonia Synthesis Unit (ASU). The off-gas from the PSA unit is compressed and sent to the HRSG for use as duct-burner fuel.

Ammonia Synthesis Unit

The high-purity hydrogen stream, from the PSA Unit, and nitrogen, from the ASU, are combined in an exothermic ammonia synthesis reaction that takes place at high temperature and high pressure across an iron-based catalyst. There is a large degree of heat integration within the Ammonia Synthesis Unit, and the substantial heat of reaction is recovered and used to generate steam. Cold liquid ammonia is stored in a tank at atmospheric pressure. A 55-MMBtu/hr natural-gas–fired startup heater is provided in the Ammonia Synthesis Unit to raise the catalyst-bed temperatures during initial plant commissioning or during startup after a long period of plant shutdown. The heater will use a low-NO_x burner to control emissions to 9 ppm.

Urea Unit

The purified and compressed carbon dioxide and the liquid ammonia are reacted in the Urea Unit to create a concentrated urea solution, which is pumped to the Urea Pastillation Unit. Lower-concentration urea solution is produced as a feedstock to the urea ammonia nitrate (UAN) Solution Plant. Vacuum evaporator/separator systems are used to produce the required urea solutions. Vapors from the vacuum system are scrubbed in an absorber using process condensates. The treated vapors, essentially inerts, and some ammonia, are released to the atmosphere from the medium-pressure and low-pressure absorber stacks.

Urea Pastillation Unit

The pastillation process is used to convert the urea melt into high-quality pastilles. This process is enclosed with a hood, passed through a wet scrubber, then vented to the atmosphere. Limited ammonia and urea dust are emitted from this source. The urea pastille is transferred via enclosed conveyors to an enclosed storage structure equipped with a baghouse to control fugitive dust.

Nitric Acid Unit

Nitric acid production is a three-step process consisting of ammonia oxidation, nitric oxide (NO) oxidation, and absorption. Tail gas from the absorber column will be cleaned before being discharged to the atmosphere by catalytic decomposition and reduction of both nitrous oxide (N_2O) and NO_x. The tail-gas-abatement unit complies with the application of Best Available Control Technology (BACT).

Ammonium Nitrate Unit

The ammonia and nitric acid are the feedstocks to the Ammonium Nitrate Unit, which makes the ammonium nitrate solution. Particulate matter is emitted from the Ammonium Nitrate Unit, and will be minimized with a wet scrubber.

UAN Solution Unit

In order to produce UAN solution, it is necessary to combine nitric acid (HNO_3), ammonium nitrate (NH_4NO_3), and urea (NH_2-CO-NH_2), produced in previous processes.

3. CAAQS AND NAAQS MODELING FOR U.S. EPA AND SJVAPCD PERMITS

To determine the analyses required, the attainment status of the Project region is needed, along with the expected annual emissions from the Project. Table 1 describes the attainment status of Kern County. Table 2 presents the estimated annual Project emissions and the pollutants for which Prevention of Significant Deterioration (PSD) is applicable. Emissions of the newly revised HECA Project have decreased for nitrogen dioxide (NO_2) and CO, and remained similar for the other pollutants.

Table 1
Attainment Status for Kern County with Respect to
Federal and California Ambient Air Quality Standards

Pollutant	Federal Attainment Status	State Attainment Status
Ozone	Extreme Non-attainment	Non-attainment
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
PM_{10}	Attainment	Non-attainment
$PM_{2.5}$	Non-attainment	Non-attainment
Lead	Unclassified	Attainment

Source: CARB 2012

Notes:
CO = carbon monoxide
NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
SO_2 = sulfur dioxide

Table 2
PSD Emission Threshold Triggers for New Stationary Sources

Pollutant	PSD Applicability Thresholds (tpy)	Significant Emission Rate (tpy)	Preliminary Estimated Project Emissions (tpy)	PSD Triggered by Project?
CO	100	100	288	Yes
SO_2	100	40	37	No
NO_X	100	40	152	Yes
PM_{10}	100	15	95	Yes
$PM_{2.5}$	100	10	84	No Non-attainment
VOCs	100	40	40	Yes
CO_2	100,000	NA	>100,000	Yes
Lead (Pb)	NA	0.6	<0.6	No
Mercury (Hg)	NA	0.1	0.01	No
Sulfuric acid mist (H_2SO_4)	NA	7	~6	No
Hydrogen sulfide (H_2S)	NA	10	~4	No
Total reduced sulfur (TRS)	NA	10	~6	No

Source: 40 CFR § 52.21 and HECA Project.

Notes:
CO = carbon monoxide
CO_2 = carbon dioxide
NO_x = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns in diameter
PSD = Prevention of Significant Deterioration
SO_2 = sulfur dioxide
VOC = volatile organic compound

Modeling for compliance with all CAAQS and NAAQS will be conducted, with the exception that no modeling will be conducted for ozone or the revoked SO_2 annual and 24-hour NAAQS. The most recent version of American Meteorological Society/U.S. EPA Regulatory Model (AERMOD) will be used, which is currently version 11353.

PSD modeling will be conducted to determine if impacts are less than the Significant Impact Level (SIL) for NO_2 1-hour and annual, and PM_{10} 24-hour and annual. It is expected that the modeling for NO_2 1-hour impacts will be greater than the SIL, while impacts for the other pollutants and averaging times are expected to be less than the applicable SIL. Therefore, the only refined cumulative analysis expected to be conducted would be for the NO_2 1-hour NAAQS (described later).

Because the Project is located in a federal non-attainment area for $PM_{2.5}$, PSD modeling will not be needed for $PM_{2.5}$ impacts, although SJVAPCD has "Procedures for Modeling $PM_{2.5}$," and modeling will be conducted following this guidance. Because HECA is expected to be a minor source of $PM_{2.5}$ emissions, this modeling will examine the impacts from directly emitted $PM_{2.5}$, and no secondarily formed $PM_{2.5}$ will be included in the analysis. Both the filterable and condensable portions of the $PM_{2.5}$ will be included in the emissions and impact modeling. Per U.S. EPA and SJVAPCD guidance, all modeling conducted for PSD and NAAQS compliance will include permitted source emissions, but no mobile-related emissions will be included. For California Environmental Quality Act (CEQA) compliance, all modeling for the CAAQSs will include both permitted source emissions and mobile source emissions. All permitted sources will be modeled using their maximum potential emission rate from either normal or startup/shutdown operations for all CAAQS and NAAQS, with the exception of the NO_2 and SO_2 1-hour NAAQS modeling analyses (described later).

3.1 AQRV AND CLASS I AREA ANALYSES

The nearest Class I Area to the HECA Project is Domelands Wilderness Area, approximately 60 kilometers away. The updated FLAG guidance, "Federal Land Managers' Air Quality Related Values Work Group (FLAG)," provides a method to determine if projects greater than 50 kilometers from a Class I Area need to conduct analyses in the Class I Area. This screening method is based on the sum of the annualized daily emissions of PM_{10}, NO_2, SO_2, and H_2SO_4 emissions divided by the distance to the nearest Class I Area (Q/d). The Q/d value for the HECA Project to Domelands is approximately 5, which is less than the screening threshold of 10; therefore HECA will not prepare Class I Area analyses.

It should be noted that in the previous PSD application, HECA prepared Class I Area analyses, all of which showed less-than-significant impacts. The emissions of the newly revised HECA Project have decreased or stayed similar; thus, impacts should decrease or remain similar, and impacts from the HECA Project in Class I Areas would remain less than significant.

3.2 CLASS II AREA VISIBILITY ANALYSIS

NPS PSD guidance states that projects should not degrade air quality and/or visibility in Class II areas. Class II areas are defined as the following areas when greater than 10,000 acres, and in existence since 1977:

- National monuments;
- National primitive areas;
- National preserves;
- National recreation areas;
- National wild and scenic rivers;
- National wildlife refuges;
- National lakeshores and seashores; and
- National parks and wilderness areas.

The nearest parks that fit the Class II area definition are Sequoia National Forest, approximately 55 kilometers away; and Los Padres National Forest, approximately 50 kilometers away from HECA. Since both of these parks are 50 kilometers or greater from HECA, and the Q/d is approximately 6 (when d=50 kilometers), per the FLAG guidance screening technique, impacts would be less than significant. Therefore, no Class II Area visibility analysis will be conducted.

4. CEQA/NEPA MODELING APPROACH FOR CEC

In addition to the analyses required for U.S. EPA and SJVAPCD permitting, CEC requires analyses for compliance with CEQA.

To analyze the impacts from all emissions associated with the Project for CEQA, modeling will be conducted for both the construction and operational phases of the Project. The operational-phase modeling will include emissions from the permitted stationary sources, and from the exhaust and fugitive dust from the mobile sources (trucks and train) associated with the delivery and off-take of feedstock and products, and operations and maintenance. Emissions from on-road vehicles will be estimated using EMFAC2007, because this is the version of the model that is approved for federal projects. Modeling results plus a representative background will be compared to the CAAQS.

Due to the short duration of construction activities, the variability of equipment usage, and the statistical nature of the NO_2 and SO_2 1-hour NAAQS, construction impacts will not be compared to these standards. Construction impacts will be compared to the NO_2 and SO_2 1-hour CAAQS. Similarly, impacts from commissioning activities will not be compared to the NO_2 and SO_2 1-hour NAAQS, although they will be compared to the NO_2 and SO_2 1-hour CAAQS.

The operational-phase analysis for the NO_2 and SO_2 1-hour CAAQS will include maximum hourly emissions from sources with intermittent operations. AERMOD will be run separately for each year of meteorological data to obtain the peak hourly impact from the 5 years.

As identified in the response to CEC Data Request 32, there are no sources within 6 miles of HECA that emit more than 5 tons per year of any criteria pollutant that have been recently permitted or are in the process of being permitted. SJVAPCD was contacted and will identify if any sources have recently been permitted or are in the process of being permitted for 2010 and 2011. It is expected that there are no new sources that meet the 5 ton per year criteria; therefore, cumulative modeling for CEQA will not be conducted. If any sources are identified, URS will contact CEC to determine the appropriate analysis.

To evaluate potential health effects of toxic air contaminant (TAC) emissions from the operation of the Project, a health risk assessment (HRA) will be conducted. During construction, the main TAC of concern is diesel particulate matter (DPM). An HRA will be conducted to assess the DPM from the construction equipment and delivery vehicle exhaust on the Project site. This HRA will assess the risk from the approximate 3-year construction period exposure, not a 70-year exposure.

5. METEOROLOGICAL AND BACKGROUND DATA

HECA will use the most recent 5-year meteorological, ozone, and NO_2 data set processed by SJVAPCD in all the modeling analyses. The meteorological data are from the same station used in the previous analyses: Bakersfield Meadows Field Airport for years 2007-2011. SJVAPCD has also prepared hourly ozone and NO_2 data sets for the same period from the Shafter, Walker Street station.

6. NO_2 1-HOUR NAAQS MODELING APPROACH

In addition to techniques described in the January 20, 2011 "Modeling Protocol for Parameter Selection Specific to the 1-Hour NO_2 NAAQS Regional Modeling for the Hydrogen Energy California (HECA) Project," HECA will conduct the NO_2 1-hour NAAQS analysis incorporating guidance from three documents, the U.S. EPA "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard," March 2011; CAPCOA "Modeling Compliance of The Federal 1-Hour NO_2 NAAQS," October 2011; and SJVAPCD "Assessment of Non-Regulatory Option in AERMOD Specifically OLM and PVMRM," September 2010.

The changes to the modeling techniques for the 1-hour NO_2 analysis described below are primarily a result of the March 1, 2011, U.S. EPA–published guidance document for conducting 1-hour NO_2 and SO_2 NAAQS analyses called "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard."

Nearby sources with intermittent emissions will not be included in the cumulative 1-hour NO_2 NAAQS analysis. No additional nearby sources will be included in the analysis beyond those identified in the January 2011 NO_2 1-hour modeling protocol, because it anticipated that there

are no new significant sources near HECA. If new sources are identified that meet the criteria outlined in the January 2011 modeling protocol, they will be included in the analysis.

Intermittent sources associated with the HECA Project will be included in the NO_2 1-hour (and SO_2 1-hour) NAAQS modeling analysis using the higher of either their normal operational emission rates, or their annualized intermittent emission rates. These sources include the testing of the emergency generators and fire-water pump, along with each emission source in startup mode. It is expected that HECA will have two planned facility startups and shutdowns per year, in which each affected emission source will be in startup/shutdown mode for between 30 minutes to 52 hours. Only the flares, CTG/HRSG, coal dryer, and thermal oxidizer emissions vary in startup mode from their normal operational emissions.

The area of impact (AOI) will be determined from the SIL analysis, and will be limited to 50 kilometers. The AOI is the area where the Project impacts are greater than or equal to the SIL. Only receptors that are shown to have Project impacts greater than or equal to the SIL will be included in the cumulative modeling.

All other aspects for the NO_2 analysis will be performed as described in the January 20, 2011 "Modeling Protocol for Parameter Selection Specific to the 1-Hour NO_2 NAAQS Regional Modeling for the Hydrogen Energy California (HECA) Project."

7. REFERENCES

California Air Resources Board (CARB), 2012. *Standards and Area Designations*, http://www.arb.ca.gov/desig/desig.htm, February 6, 2012.

California Air Pollution Control Officers Association (CAPCOA), 2011. *Modeling Compliance of the Federal 1-Hour NO_2 NAAQS*, October 27.

National Park Service (NPS), 2006. *PSD – Prevention of Significant Deterioration*, http://www.nature.nps.gov/air/regs/psd.cfm, November 2.

National Park Service (NPS), 2010. *Federal Land Managers' Air Quality Related Values Work Group (FLAG), Phase I Report – Revised (2010)*, October.

SJVAPCD (San Joaquin Valley Air Pollution Control District), 2010. *Procedures for Downloading and Processing NCDC Meteorological Data*. Permit Services Department. Villalvazo, Leland and Ester Davila. May.

SJVAPCD, 2010. *Assessment of Non-Regulatory Option in AERMOD Specifically OLM and PVMRM*, September 16.

SJVAPCD (San Joaquin Valley Air Pollution Control District), 2011. *Procedures for Modeling $PM_{2.5}$*. October 2011.

U.S. EPA (United States Environmental Protection Agency), 2005. *Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule.* 40 CFR Part 51. Appendix W, Guideline on Air Quality Models. November 9.

U.S. EPA (United States Environmental Protection Agency), 2010. *Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program.* June 29.

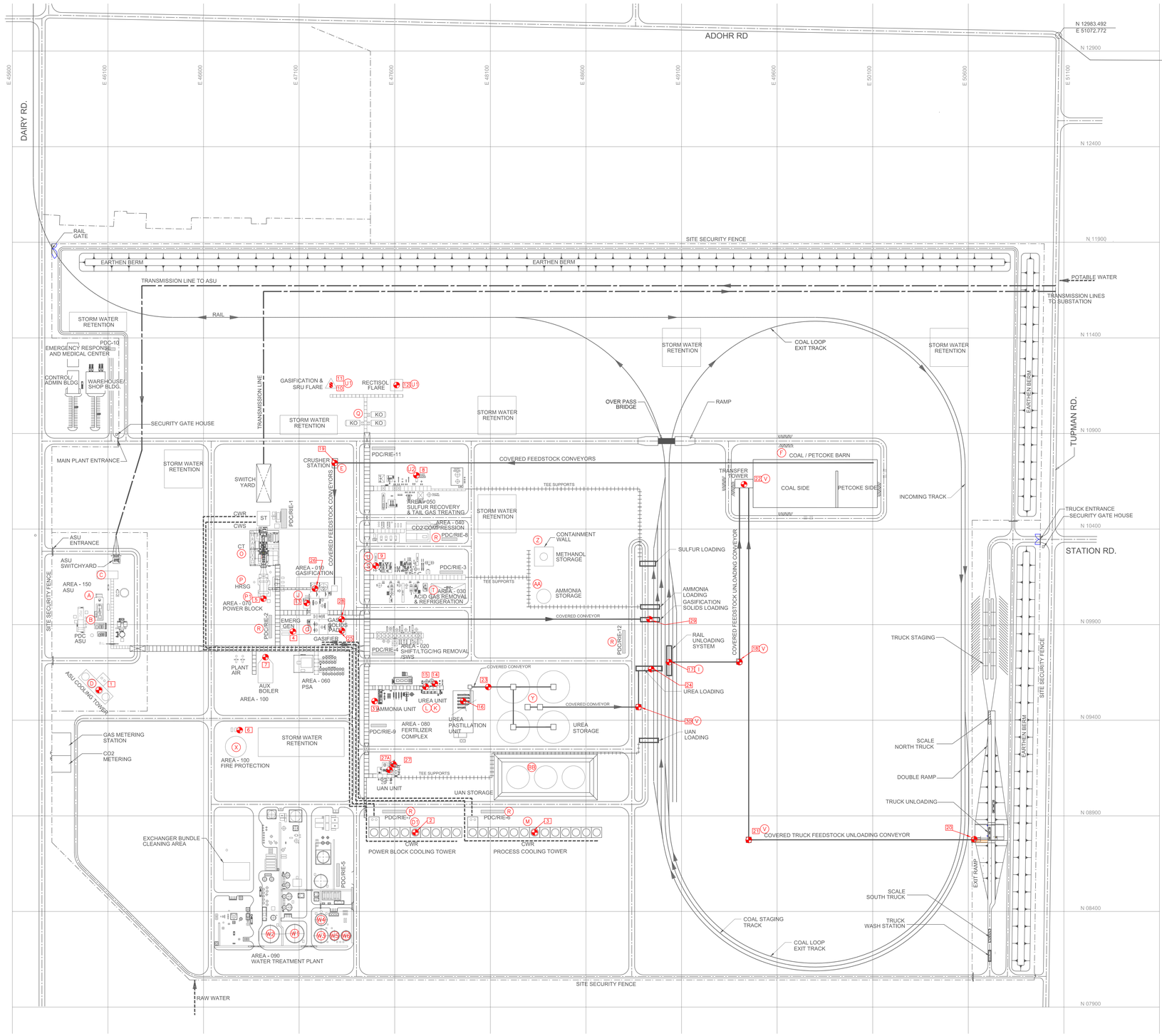
U.S. EPA (United States Environmental Protection Agency), 2011. *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*. March 1.

URS, 2008. *Air Quality Modeling Protocol for the HECA Power Project, Kern County, California*. April 22.

URS, 2011. *Modeling Protocol for Parameter Selection Specific to the 1 Hour NO_2 NAAQS Regional Modeling for the Hydrogen Energy California (HECA) Project*. January 20.

FIGURES

FIGURE 1
PRELIMINARY EMISSIONS SOURCES PLOT PLAN



DWA #20001: (CALCULATED)	NORTHING	EASTING
STATE PLANE COORD.	2312983.492	6151072.772
NAD83 ZONE V (U.S. FEET)		
LATITUDE: 35°20'25.11200"	LONGITUDE: 119°22'36.21665"	
LATITUDE: 35.340309°	LONGITUDE: 119.37672°	

PREVAILING WIND

PLANT (STATE PLANE)

NAD83

PLANT COORDINATE AND DATUM NOTES

1. PLANT COORDINATES IN FEET EQUATE TO E. 61XXXXX AND N. 23YYYYY OF CALIFORNIA STATE PLANE COORDINATE SYSTEM (NAD 83 ZONE V.)
2. PLANT ELEVATION 100.00' EQUATE TO 288.50' ABOVE MSL (NAVD88.)
3. ACCURACY/TOLERANCE OF EMISSION POINT(S) COORDINATES ARE WITHIN A 50 FOOT RADIUS OF SOURCE POINT NOTED.
4. LOCATION OF EMISSION POINTS ARE SUBJECT TO COMPLETION OF DETAILED DESIGN BY LICENSORS AND EQUIPMENT SUPPLIERS.
5. SEE SHEETS 2 THROUGH 9 FOR INFORMATION ON COMPOSITION AND FLOW RATE FROM EACH SOURCE.
6. EMISSION POINT IS SHOWN FOR INFORMATION ONLY. ZERO EMISSIONS ARE EXPECTED DURING STEADY STATE OPERATION.

EMISSIONS SOURCES

ID	SOURCE	STATE PLANE COOR. (ROUNDED) EAST	NORTH	APPX. ELEVATIONS FROM GRADE (FT)
1	ASU COOLING TOWER	46053'-0"	9557'-8"	55'
2	POWER BLOCK COOLING TOWER	47708'-0"	8813'-0"	55'
3	PROCESS COOLING TOWER	48332'-0"	8813'-0"	55'
4	EMERGENCY ENGINES (GENERATORS)	47067'-5"	9864'-0"	20'
5	HRSG STACK	46913'-4"	10035'-10"	213'
6	EMERGENCY ENGINES (FIRE WATER PUMP)	46789'-0"	9348'-0"	20'
7	AUXILIARY BOILER (NOTE 6)	46924'-0"	9730'-0"	80'
8	TAIL GAS THERMAL OXIDIZER	47713'-7"	10681'-0"	165'
9	CO2 VENT (NOTE 6)	47501'-0"	10208'-0"	260'
10	SRU FLARE	47267'-0"	11147'-0"	250'
11	GASIFICATION FLARE	47267'-0"	11159'-0"	250'
12	RECTISOL FLARE	47610'-0"	11153'-0"	250'
13	COAL DRYER STACK	47140'-3"	10013'-3"	305'
14	UREA PLANT HP ABSORBER	47810'-0"	9591'-0"	130'
15	UREA PLANT LP ABSORBER	47762'-0"	9575'-0"	50'
16	UREA PASTILLATION STACK	47958'-0"	9500'-0"	50'
17	COAL RAIL UNLOADING STATION	49034'-11"	9704'-0"	30'
18	COAL TRANSFER TOWER	49403'-0"	9704'-0"	100'
19	COAL/COKE CRUSHER BUILDING	47285'-11"	10745'-10"	100'
20	COAL/COKE TRUCK UNLOADING STATION	50631'-0"	8778'-0"	60'
21	COAL/COKE TRANSFER TOWER B	49452'-0"	8774'-0"	100'
22	COAL/COKE TRANSFER TOWER C	49427'-0"	10634'-0"	100'
23	UREA TRANSFER CONVEYOR	48089'-0"	9574'-0"	110'
24	UREA LOAD-OUT SYSTEM	48942'-0"	9667'-0"	30'
25	GASIFICATION SOLIDS BUNKER & PAD	47323'-7"	9868'-7"	N/A
26	BLEND COAL/COKE SILOS	47183'-0"	10088'-5"	150'
27	NITRIC ACID PLANT	47573'-0"	9140'-0"	145'
27A	AMMONIUM NITRATE PLANTS	47593'-0"	9170'-0"	40'
28	GASIFICATION SOLIDS TRANSFER TOWER	47322'-2"	9928'-4"	30'
29	GASIFICATION SOLIDS LOAD-OUT SYSTEM	48932'-8"	9928'-6"	30'
30	UREA TRANSFER TOWER	48875'-0"	9469'-0"	100'
31	AMMONIA PLANT STARTUP HEATER	47495'-0"	9500'-0"	80'

MAJOR STRUCTURES/ EQUIPMENT AND TANKS

ID	DESCRIPTION	APPX. ELEVATIONS FROM GRADE (FT)
A	ASU MAIN AIR COMPRESSOR ENCLOSURE	40
B	LIQUID OXYGEN STORAGE (LOX) TANK	90
C	AIR SEPARATION COLUMN CAN	200
D	ASU COOLING TOWER	55
D1	POWER BLOCK COOLING TOWER	55
E	COAL/COKE CRUSHER BUILDING	100
F	COAL/COKE BARN	160
G	GASIFICATION STRUCTURE	305
H	GASIFICATION SOLIDS LOADING	30
I	COAL UNLOADING	30
J	COAL DRYER STACK	305
K	UREA PLANT HP ABSORBER	50
L	UREA PLANT LP ABSORBER	130
M	PROCESS COOLING TOWER	55
N	UREA PASTILLATION STACK	100
O	COMBUSTION TURBINE GENERATOR STRUCTURE	50
P	HEAT RECOVERY STEAM GENERATOR STRUCTURE	90
P1	HRSG STACK	213
Q	FLARE K.O. DRUMS (QTY 3)	35
R	POWER DISTRIBUTION CENTERS	25
S	AGR METHANOL WASH COLUMN	235
T	AGR REFRIGERATION COMPRESSOR STRUCTURE	40
U	CO2 VENT STACK	260
U1	FLARE STACKS	250
U2	TAIL GAS THERMAL OXIDIZER STACK	165
V	CONVEYANCE TRANSFER TOWERS	100
W1	RAW WATER TANK	100'DIA X 48'H
W2	TREATED WATER TANK	95'DIA X 40'H
W3	PURIFIED WATER TANK	75'DIA X 48'H
W4	BACKWASH TANK	65'DIA X 48'H
W5	UTILITY WATER TANK	50'DIA X 32'H
W6	DEMINERALIZED WATER STORAGE TANK	52'DIA X 40'H
X	FIREWATER STORAGE TANK	110'DIA X 48'H
Y	UREA STORAGE (4 DOMES)	162'DIA X 70'H
Z	METHANOL SOLVENT STORAGE TANK	40'DIA X 40'H
AA	AMMONIA STORAGE SPHERE	75'DIA
BB	UAN STORAGE (QTY 3)	120'DIA X 48'H

TANKS SET AT GRADE ELEVATION

0 100' 200' 400' 600' 800' 1000'

SCALE: 1"=200'

PRELIMINARY

REV	DATE	REVISION DESCRIPTION	BY	CHK	APPV
A	07NOV11	ISUED FOR EARLY FEED REPORT	TD	DA	GB
B	21DEC11	ADDED MAJOR STRUCTURES/EQUIP/TANKS TABLE	SH	DA	HS
C	07FEB12	UPDATED FOR PERMITTING, PREVOUSLY ISSUED DWG NO: A4UV-SK-00000-50-002	JG	DA	HS

REFERENCE DWG NUMBER	REFERENCE DRAWINGS

FLUOR

NOTICE: THIS DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF FLUOR AND IS LENT TO THE BORROWER FOR THEIR CONFIDENTIAL USE ONLY, AND IN CONSIDERATION OF THE LOAN OF THIS DRAWING, THE BORROWER PROMISES AND AGREES TO RETURN IT UPON REQUEST AND AGREES THAT IT WILL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS FURNISHED.

CONTRACT	A4UV	
DESIGNED BY	T. DINH	
CHECKED BY	D. AJIFU	
SUPERVISOR	R. MANNING	APP. DATE 07NOV11
LEAD ENGR/SPEC.	J. LONEY	APP. DATE 07NOV11
FLUOR	C. LEEDS	APP. DATE 07NOV11
CLIENT		APP. DATE

hydrogen energy

PRELIMINARY EMISSIONS SOURCES PLOT PLAN

FIGURE 1

SCALE	DRAWING NUMBER	REV
1"=200'	A4UV-000-50-SK-0002	C

CAD FILE NAME A4UV-000-50-SK-0002_C.dwg

PLOT DATE: K:\CAD\250\Plot Plan\SCS HECA Plot Plan\Emission Sources\A4UV-000-50-SK-0002_C.dwg 02-08-12 11:06 am Printed By: gon45270

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
(Revised 2/21/12)

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DECLARATION OF SERVICE

I, Dale Shileikis declare that on, February 21, 2012, I served and filed copies of the attached Modeling Protocol Supplement for the Hydrogen Energy California (HECA) Project . This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: **[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:

____ Served electronically to all email addresses on the Proof of Service list;

__X__ Served by delivering on this date, either personally, 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 **NOT** marked "email preferred."

AND

For filing with the Docket Unit at the Energy Commission:

__X__ by sending an original paper copy and one electronic copy, mailed with the U.S. Postal Service with first class postage thereon fully prepaid and e-mailed respectively, to the address below (preferred method); ***OR***

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-8
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

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
mlevy@energy.state.ca.us

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.