Date: October 30, 2012

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From: Julie Mitchell, URS

Subject: Hydrogen Energy California Class II Visibility Analysis

As noted in the Prevention of Significant Deterioration (PSD) application (May 2012), the nearest Class II areas that meet the National Park Service PSD guidance definition are Sequoia National Forest, 54 kilometers away, and Los Padres National Forest, 49 kilometers away from the Hydrogen Energy California (HECA) Project. Since both of these parks are approximately 50 kilometers or farther from HECA, with an emissions to distance factor (Q/d) of less than 6, the U.S. Forest Service agreed that impacts would be less than significant. Therefore, no Class II area visibility analysis was conducted in the PSD application.

U.S. EPA has since requested that a Class II area visibility analysis be conducted, even though there is no officially defined Class II area near the Project. Therefore, this Class II visibility analysis was performed for the Elk Hills area that lies south of the facility.

This visibility analysis was conducted in accordance with U.S. Environmental Protection Agency (U.S. EPA) guidance in Workbook for Plume Visual Impact Screening and Analysis (Revised), 1992, hereafter referred to as “1992 U.S. EPA Guidance.” U.S. EPA’s VISCREEN model (Version 1.01) was used to evaluate visibility impacts. The model is expected to provide a conservative estimate of the Project’s impact on visibility in the Elk Hills area.

The VISCREEN model is designed to determine whether the plume from a facility has the potential to be perceptible to an untrained observer under “reasonable worst case” conditions. The model measures the change in perceptibility of a plume due to an increase in emissions as a
function of contrast and color changes at different values of the scattering angle (angle between
direct solar radiation and the line of sight). The green contrast value (Cp) was developed as a
measure of the perceived reduction in contrast. The color difference parameter (∆E) was
developed to specify the perceived magnitude of brightness and color changes due to a plume.

The VISCREEN model performs four tests that are based upon the Level 1 screening criteria for
∆E and Cp (2.0 and 0.05, respectively). The first two tests refer to visual impacts caused by plume
parcels located inside the boundaries of a given area. The last two tests refer to visual impacts
cau\sed by plume parcels located outside the boundaries of a given area. For internal and external
visibility assessments, the two tests assess the perceptibility of the plume in relation to two plume-
viewing backgrounds (i.e., the horizon sky and a black terrain object).

The area around the HECA Project Site is at an elevation of 90 meters, and is generally very flat
with no nearby terrain features for a visibility assessment. An exception to this are the Elk Hills
(300 to 470 meters elevation), which are in an area to the south and southwest of the Project Site.
In this area, the terrain provides a contrast that makes changes in visibility perceptible. Although
the Tule Elk Reserve State Park is closer, there are no terrain features within the park for a
visibility assessment. Thus, the area that is examined in this visibility analysis is the Elk Hills.
The analysis examines the potential visual impacts inside the Elk Hills area; impacts outside the
area are not considered.

Onsite emissions from all HECA stationary sources were included at normal daily operating rates
for oxides of nitrogen (NOX) and particulate matter, as well as primary nitrogen dioxide (NO2)
emissions from the nitric acid unit. The nitric acid unit emissions leaving the stack are composed
of about 50 percent NOX and 50 percent NO2. Because the VISCREEN model assumes that
10 percent of NOX emissions are initially converted to NO2, the nitric acid unit emissions included
in the visibility modeling analysis were 55.6 percent directly emitted primary NOX emissions, and
44.4 percent NO2 emissions. Table 1 includes emission rates used in the modeling.

<table>
<thead>
<tr>
<th>Total HECA Facility Emission Rates (g/s)</th>
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<tbody>
<tr>
<td>PM 24 hour</td>
</tr>
<tr>
<td>NOX 24 hour</td>
</tr>
<tr>
<td>Primary NO2 24 hour</td>
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</tbody>
</table>

Notes:
PM = particular matter
NOX = oxides of nitrogen
NO2 = nitrogen dioxide
Other input parameters, such as observer and Class II distances from the Project, background visible ranges, the background ozone concentration, and meteorological conditions for a Level I analysis are included in Tables 2 and 3, respectively. The parameters outlined in Table 3 are all defaults provided from the 1992 U.S. EPA Guidance for a Level 1 analysis. The visibility analysis was completed in the Elk Hills, where hill peaks are between 11 and 15 kilometers south of the Project area. The Level 1 screening approach uses worst-case meteorological conditions, which include extremely stable atmospheric conditions (stability category F), low wind speed (1 meter per second) persisting for 12 hours, and a wind direction that would transport the plume directly adjacent to the observer.

Table 2
Visibility Analysis Distances (kilometers)

<table>
<thead>
<tr>
<th>Distance</th>
<th>Value</th>
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<tbody>
<tr>
<td>Distance between HECA sources and observer in Class II Area/Elk Hills (d)</td>
<td>11</td>
</tr>
<tr>
<td>Distance between HECA sources and closest Class II area boundary/Elk Hills (x_{min})</td>
<td>11</td>
</tr>
<tr>
<td>Distance between HECA sources and farthest Class II area boundary/Elk Hills (x_{max})</td>
<td>15</td>
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Table 3
Level 1 Modeling Parameters used in VISCREEN

<table>
<thead>
<tr>
<th>Model Input</th>
<th>Value</th>
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<tr>
<td>Background Visible Range (R_{vo})</td>
<td>25 kilometers</td>
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<tr>
<td>Background Ozone concentration</td>
<td>0.04 parts per million</td>
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<tr>
<td>Meteorological parameters, Level 1</td>
<td>1 meter per second, stability category F</td>
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<table>
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<tr>
<th>Significance Thresholds</th>
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<tbody>
<tr>
<td>Color Difference Critical Value (ΔE)</td>
</tr>
<tr>
<td>Contrast Critical Value (C)</td>
</tr>
</tbody>
</table>

Table 4 presents the results of the Level 1 screening analysis for the proposed project in the Elk Hills. The Delta E and Contrast values were below the default screening threshold values inside the Elk Hills range. Therefore, visibility impacts caused by emissions from the HECA Project will not be perceptible to most individuals in the Elk Hills south of the Project.
<table>
<thead>
<tr>
<th>Background</th>
<th>Theta</th>
<th>Azimuth</th>
<th>Distance</th>
<th>Alpha</th>
<th>Delta E Criteria</th>
<th>Delta E Plume</th>
<th>Contrast Criteria</th>
<th>Contrast Plume</th>
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<tr>
<td>SKY</td>
<td>10</td>
<td>142</td>
<td>15</td>
<td>27</td>
<td>2</td>
<td>1.765</td>
<td>0.05</td>
<td>0.013</td>
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<tr>
<td>SKY</td>
<td>140</td>
<td>142</td>
<td>15</td>
<td>27</td>
<td>2</td>
<td>0.532</td>
<td>0.05</td>
<td>-0.012</td>
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<td>TERRAIN</td>
<td>10</td>
<td>84</td>
<td>11</td>
<td>84</td>
<td>2</td>
<td>1.932</td>
<td>0.05</td>
<td>0.019</td>
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<td>TERRAIN</td>
<td>140</td>
<td>84</td>
<td>11</td>
<td>84</td>
<td>2</td>
<td>0.291</td>
<td>0.05</td>
<td>0.01</td>
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</table>
References:

AMENDED APPLICATION FOR CERTIFICATION FOR THE
HYDROGEN ENERGY CALIFORNIA PROJECT

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<td>Project Manager</td>
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DECLARATION OF SERVICE

I, Dale Shileikis, declare that on November 6, 2012, I served and filed a copy of the attached Hydrogen Energy California Class II Visibility Analysis, dated October 30, 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:

____ Served electronically to all e-mail addresses on the Proof of Service list;

___ 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:

___ by sending one electronic copy to the e-mail address below (preferred method); 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.

[Signature]

3