From: Stein, Kenneth [mailto:Kenneth.Stein@nexteraenergy.com]
Sent: Friday, January 23, 2009 12:09 PM
To: Eric Solorio
Cc: Head, Sara; Wakita, Allison; Luckhardt, Jane; Russell, Meg; Busa, Scott
Subject: RE: Visible Plume Response

Eric:

Attached are the additional cooling tower load cases per CEC staff request. AECOM (ENSR) has also provided the responses below to related questions sent to Sara Head by Will Walters.

Let me know if you have any questions.

Kenny

Kenny Stein | Environmental Manager | kenneth.stein@nexteraenergy.com
NextEra Energy Resources, 700 Universe Boulevard, Juno Beach, FL. 33408
T: 561.691.2216| M: 561.762.5875

-----Original Message-----

From: Eric Solorio [mailto:ESolorio@energy.state.ca.us]
Sent: Tuesday, January 13, 2009 3:08 PM
To: Head, Sara; Kenneth Stein; Meg Russell
Cc: WWalters@aspeneg.com
Subject: BEACON Heat Rejection Daily Load Profile

Kenny,

Staff is trying to wrap up the plume modeling effort and requests that your staff provide the daily heat rejection profile and/or daily load profile. If I understand correctly, there is a substantial variation in the daily load profile, depending on the month. If you can provide this info relatively soon then we won't have to make overly conservative assumptions related to heat rejection. Thanks.

Eric

From: Will Walters [mailto:WWalters@aspeneg.com]
Sent: Sat 1/10/2009 7:22 PM
To: Head, Sara
Subject: Beacon - Cooling Tower Questions/Notes

Sara,

Thanks. I have another request. I just received approval to work on the visible plume analysis for the project and had I been active during discovery I would have had several questions to make sure I didn't overstate the potential for plume formation based on operating profile for this type of use. In particular the following:

1) What is the daily cooling load profile (either an estimate by season and hour, or even better by sun angle, such as max load time a function of hourly average sun angle which I would assume would be essentially the same profile as the power output)?

Response: Please see the attached "Beacon Cooling Load.pdf" that provides the requested daily load profile.

2) How will cells be shutdown, basically to keep constant cooling load per cell or some other function, as cooling load drops from peak?

Response: It is difficult to pinpoint a pattern on how the cooling tower cells would be turned on/off for differing loads. When power output is at 25% of rated, generally half of the fans are in service. At full load all the fans are in service. Between those two points there would be a stair step as load is increased. It is important to note that from our experience that to shutdown a cell it is only turning the fan off. There is no isolation of the cells by closing valves once the return risers to each cell. Therefore, when the fan is turned off in a particular cell the water is still flowing / cascading through the fill, just with no assist from the fan in that cell.

Unfortunately, I can't replicate the SACTI results presented due to various input issues I discovered, and other non-critical items, as follows:

1) Gas flow rate was too high and based on AQ model would be closer to 6,700 kg/s, I also dropped the heat rejection to 438.4 MW to match the heat balance in the PD. (probably most critical item)

Response: The *input* air flow rate is required by SACTI, not the exhaust flow rate required for the air quality model; the input flow rate should be higher than the output flow rate. The input air flow and heat dissipation rates input to SACTI, 7,618 kg/sec and 451.2 MW, respectively, are correct as confirmed by WorleyParsons.

2) Solar insolation and clearness index was for New York City. Inyokern is presented in the SACTI manual and considered the best proxy for the site. (probably not critical)

Response: Solar insolation and clearness are not required for visible plume calculations or fogging. They are used for plume shadowing. As noted, there

would be no effect on the modeling results if these parameters were changed to Inyokern.

3) The temperature for 100+ hours dropped the initial 1, about 102 hours impacted in the daytime data. (not critical for Nov-Apr analysis)

Response: We agree that 100+ temperatures are not critical to the period of concern as noted.

4) We look at a six month seasonal period November through April to determine initial potential for significance, so I reset the Tables.usr file to give those results.

Response: OK, we agree with this change.

5) Input spacing issues that caused the first digit in some of the distance from tower to be truncated...frankly I'm amazed that this didn't crash SACTI given how easily it crashes. (I'm not sure how this impacted the results but it is interesting to note that the first 300 meter results don't match the second 300 meter results, although there is a break in the given frequencies after the truncation.

Response: We have confirmed this is the case. It seems to have affected select dimension/frequency output tables. We corrected this and re-ran the model to see what the effect was and it is inconsequential to the analyses. That is, there are some minor changes in some of the results tables, but they are small and not significant enough to change the results of the analysis.

I am showing both larger maximum plumes, which is not critical and considerably higher frequency of larger plumes, which is more critical. I would like to run additional modeling with actual hourly cooling load and cell operating assumptions to give a better determination of plume frequency, but to do so assuming maximum cooling load all day would not provide anything more useful that what I'm getting from SACTI, which is why I'm asking the two questions above. The good news is that ground fogging was not found to be a problem...not predicted to make it to the site fence line.

Response: The differences noted from the modeling submitted must be associated with the alteration of the input air flow rate and heat dissipation rate. As noted above, we have confirmed with WorleyParsons the performance data used for the modeling results that were provided with the AFC.

I would appreciate it if you could let me know if you might be able to answer these two questions soon, otherwise we're likely going to have to present the limited SACTI data comparison and note additional work is necessary prior to the FSA to finalize conclusions.

Response: Additional load cases needed to be run in order to provide the requested information.

Thanks,

Will

WorleyParsons

resources & energy

By: B. Doar
Checked By: G. Pratt

Beacon Solar Energy

Rev. A **1/15/2009**

Cooling Tower Duty (MMBtu/hr) for a 250 MW Solar Power Plant with Wet Cooling

Hours	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
0.5	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5	0	0	0	0	0	0	0	0	0	0	0	0	0
4.5	0	0	0	0	0	0	0	0	0	0	0	0	0
5.5	0	0	0	0	0	0	0	0	0	0	0	0	0
6.5	0	0	0	228	477	707	508	203	0	0	0	0	177
7.5	0	0	417	1060	1169	1352	1183	1054	937	427	0	0	633
8.5	189	487	957	1294	1322	1449	1325	1328	1346	945	483	197	943
9.5	540	790	1121	1401	1329	1454	1392	1405	1384	998	756	492	1089
10.5	602	791	1131	1414	1343	1461	1395	1380	1347	989	737	547	1095
11.5	583	758	1081	1421	1405	1462	1395	1384	1285	925	689	503	1074
12.5	593	751	1096	1359	1387	1403	1434	1356	1268	924	676	521	1064
13.5	678	803	1101	1371	1383	1464	1416	1350	1256	1016	717	600	1096
14.5	758	854	1109	1387	1338	1382	1445	1313	1255	1067	768	655	1111
15.5	700	870	1072	1291	1311	1378	1396	1223	1101	980	600	464	1032
16.5	226	542	860	1236	1227	1268	1266	1098	828	396	0	0	746
17.5	0	0	223	557	669	877	880	583	241	0	0	0	336
18.5	0	0	0	0	0	203	201	0	0	0	0	0	34
19.5	0	0	0	0	0	0	0	0	0	0	0	0	0
20.5	0	0	0	0	0	0	0	0	0	0	0	0	0
21.5	0	0	0	0	0	0	0	0	0	0	0	0	0
22.5	0	0	0	0	0	0	0	0	0	0	0	0	0
23.5	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL (MMBtu)	4870	6645	10168	14021	14361	15860	15236	13677	12245	8667	5426	3979	10430
# of Days	31	28	31	30	31	30	31	31	30	31	30	31	
Total Duty (MMBtu)	150973	186049	315206	420619	445196	475801	472305	423987	367352	268681	162784	123364	
												Total Annual Cooling Duty	**3,812,318**

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE BEACON SOLAR ENERGY PROJECT	DOCKET NO. 08-AFC-2 **PROOF OF SERVICE** (Revised 1/13/09)

INSTRUCTIONS: All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-2
1516 Ninth Street, MS-14
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT	**APPLICANT'S CONSULTANTS**
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APPLICANT'S COUNSEL Jane Luckhardt, Esq. Downey Brand, LLP 621 Capitol Mall, 18th Floor Sacramento, CA 95814 jluckhardt@downeybrand.com	

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DECLARATION OF SERVICE

I, Lois Navarrot, declare that on January 27, 2009, I deposited copies of the attached **Beacon Solar Energy Project's Response to E-Mailed Data Requests Regarding Plume Modeling** in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of the California Code of Regulations, title 20, sections 1209, 1209.5 and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

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

Lois Navarrot