Felicia Miller - RE: Palmdale - Data Response 152 Inconsistencies

From: "Head, Sara" <Sara.Head@aecom.com>
To: "Will Walters" <WWalters@aspeneg.com>
Date: 6/2/2009 3:29 AM
Subject: RE: Palmdale - Data Response 152 Inconsistencies
CC: <Fmiller@energy.state.ca.us>, "Paula David" <PDavid@energy.state.ca.us>, "Tony Penna" <tonypenna@inlandenergy.com>, <MICHAEL.CARROLL@LW.com>
Attachments: Revised Data Responses 152&153.pdf

Will:

Attached are the revised values for the cooling tower dimensions and operating data previously submitted in Data Request 152 as part of the May 1, 2009 submittal. As you noted, the previously submitted cooling tower alignment (10 cells in-line) and dimensions were incorrect, we're sorry for this confusion. The correct alignment (2x5) and dimensions are shown in the revised table for Data Response 152 (attached). As you can see on the comparison table below, the correct tower dimensions now are consistent with the SACTI input and plot plan data. The data used in the modeling were heat dissipation of 455 MW and inlet air flow of 7922 kg/sec. In the revised annual average case (64 degF) for example, the values for Solar plant on and duct firing, are 488 MW and 7561 kg/sec. Compared to what we modeled, differences are about 7% higher for heat dissipation and 5% lower inlet air flow. Please discard the previous submittal for Data Request 152 and use the data provided in this revised submittal for your analysis. We apologize for any inconvenience that may have been caused by this error.

Variable	DR 150 Data (Revised)	SACTI Input Data	Plot Plan Data
Tower Configuration	10 Cells Inline **(2x5)**	2x5	2x5
Tower Length	481 feet **(318.5 feet)**	318.5 feet	~300 feet
Tower Width	56 feet **(108.6 feet)**	108.6 feet	~110 feet
Tower Cell Height	46.84 feet **(62.3 feet)**	62.3 feet	~69 feet
Cell Diameter	48.67 feet **(28 feet)**	28 feet	n/a
Exhaust Flow	6,224 to 7,728.4 kg/sec **(6,184 to 7,900 kg/sec)**	7,922 kg/sec	n/a

In addition, we are submitting the attached revised fogging curve that was recently provided from the cooling tower vendor. Please note the curve is virtually identical to the one previously submitted in our May 1, 2009 submittal. The only difference is that the fan motor horsepower has been reduced from 250 hp to 200 hp and the fan RPM was increased from 119 RPM to 146 RPM. Otherwise, all other design conditions remained the same.

We will also docket the attached revised response. Please let us know if you have additional questions.

Sara

Sara J. Head
AECOM Environment
805-388-3775, ext 227
sara.head@aecom.com

From: Will Walters [mailto:WWalters@aspeneg.com]
Sent: Monday, May 11, 2009 3:19 PM
To: Head, Sara
Cc: Fmiller@energy.state.ca.us; Paula David
Subject: Palmdale - Data Response 150 Inconsistencies

Sara,

My review of Data Response 150 shows the following discrepancies with the plot plan and/or SACTI modeling inputs. I need to figure out the correct values for these variables before I can complete my plume assessment.

Variable	DR 150 Data	SACTI Input Data	Plot Plan Data
Tower Configuration	10 Cells Inline	2x5	2x5
Tower Length	481 feet	318.5 feet	~300 feet
Tower Width	56 feet	108.6 feet	~110 feet
Tower Cell Height	46.84 feet	62.3 feet	~69 feet
Cell Diameter	48.67 feet	28 feet	n/a
Exhaust Flow	6,224 to 7,728.4 kg/sec	7,922 kg/sec	n/a

I assume that the DR 150 exhaust flows are likely ok, but the DR 150 tower configuration/size data listed above would require a major change to the cooling tower, so am I correct in assuming that this has not happened and that I should use the SACTI input data or the data taken from the plot plan for the tower dimension data?

Thank you,

Will Walters

Data Request 152:

Please summarize for the cooling tower the conditions that affect vapor plume formation including cooling tower heat rejection, exhaust temperature, and exhaust mass flow rate. Please provide values to complete the table, and additional data as necessary for staff to be able to determine how the heat rejection load varies with ambient conditions and also determine at what ambient conditions cooling tower cells may be shut down.

Additional combinations of temperature and relative humidity or curves showing heat rejection vs. ambient condition and solar condition, if provided by the applicant, will be used to more accurately represent the cooling tower exhaust conditions. Please include appropriate design safety margins for the heat rejection, exhaust flow rate and exhaust temperature in consideration that the air flow per heat rejection ratio is often used as Condition of Certification confirmation of design limit.

Revised Response:

A table summarizing the conditions that will affect the cooling tower heat rejection and potential for vapor plume formation is provided below. This table is a revision to the previously provided response, as the previous table was based on a different cooling tower design.

The Applicant assumes a certain amount of tower exhaust recirculation to the tower inlet. This recirculation assumption results in the difference between the Ambient Wet Bulb and the Cooling Tower Inlet Plane Wet Bulb. For operational safety margin, the exhaust temperature at 105% heat duty or 95% air flow use is also provided.

Data Request 153:

Please provide the cooling tower manufacturer and model number information and a fogging frequency curve from the cooling tower vendor, if available, that corresponds to the altitude of the project site.

Revised Response:

The cooling tower design is based on an SPX/Marley F4910-5.3-10B cooling tower.
A revised Fogging Frequency Curve is provided as Attachment DR-153 at the end of this section.

Parameter	Cooling Tower Exhaust					
Number of Cells	10 cells (2 cells x 5 cells back to back)					
Cell Height*	62.3 feet					
Exhaust Stack Diameter*	28 feet					
Tower Housing Length	318.5 feet					
Tower Housing Width	108.6 feet					
Ambient Temperature*	23°F		64°F		98°F	
Ambient Relative Humidity	92%		40%		17%	
Ambient Wet Bulb	22.40		51.00		65.90	
Tower Inlet Plane Wet Bulb	22.63		52.85		67.70	
Solar On/Off	Solar On					
Case	PB-11	PB-6	PB-13	PB-8	PB-14	PB-9
Duct Firing	Yes	No	Yes	No	Yes	No
Number of Cells in Operation	10	10	10	10	10	10
Heat Rejection (MW/hr)	495	457	488	449	485	445
Exhaust Temperature (°F)	71.9	69.3	85.8	83.8	93.6	92.0
Exhaust Temperature (°F) at 105% heat duty or 95% Exhaust Flow	73.6	70.9	87.0	85.0	94.6	93.0
Exhaust Flow Rate (Kg/Sec)	7870	7900	7720	7740	7630	7640
Solar On/Off	Solar Off					
Case	PB-16	PB-1	PB-18	PB-3	PB-19	PB-4
Duct Firing	Yes	No	Yes	No	Yes	No
Number of Cells in Operation	10	8	10	10	10	10
Heat Rejection (MW/hr)	465	333	463	326	468.2	322
Exhaust Temperature (°F)	69.9	67.2	84.5	77.0	93.0	86.5
Exhaust Temperature (°F) at 105% heat duty or 95% Exhaust Flow	70.2	68.8	85.7	78.0	94.0	87.3
Exhaust Flow Rate (Kg/sec)	7890	6184	7730	7790	7630	7680

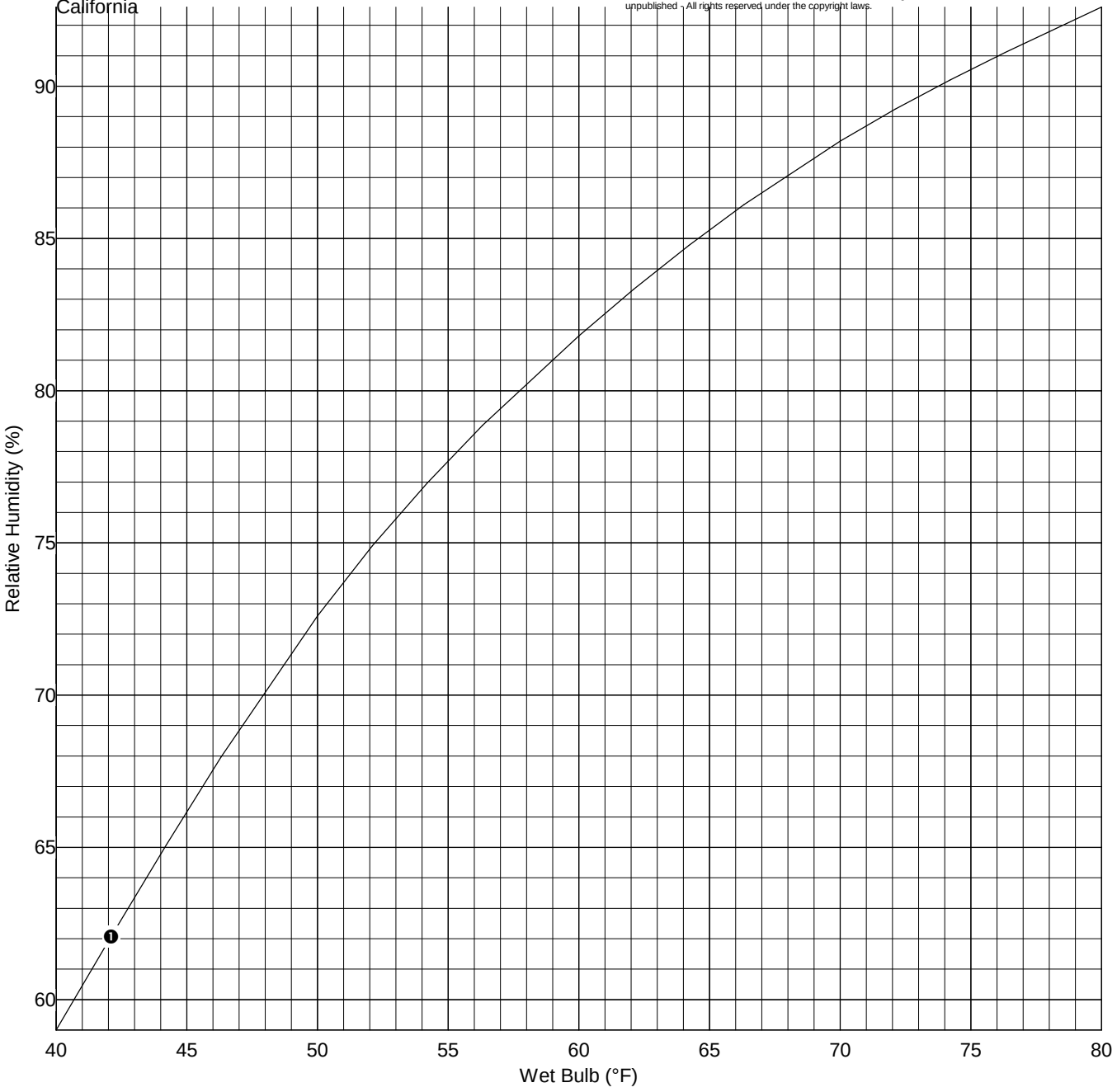
Heat rejection values provided, neglecting water makeup and blowdown.

Visual Resources

Attachment DR-153

Fogging Frequency Curve

Fogging Frequency Estimate
Inland Palmdale
California



SPX Cooling Technologies
TRACS Version 18-SEP-08

Model	F488-5.3-10
Number of Cells	10
Motor Output	200HP
Motor RPM	1800
Fan	336HP7-7
Fan RPM (Full Speed)	146

Design Conditions:

Flow Rate	120200GPM
Hot Water	97.20°F
Cold Water	78.90°F
Wet-Bulb	71.09°F

Curve Conditions:

Fan Pitch	Constant
Dry Dampers	Closed
Flow Rate (100% Design Flow)	120200GPM

Tangency 100.0%

FOGGING FREQUENCY CURVE: The curve shown to the left is referred to as a 'Fogging Freqency Curve'. The Fogging Freqency Curve separates entering cooling tower conditions that produce fog at the discharge (Top-Left region of chart) from those that do not produce fog (Bottom-Right region of chart)

❶ 18.3 °F Range
X Design Point

Time: 16:34:05 Date: 05-27-2009 Drawn By: MP

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
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1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
For the *PALMDALE HYBRID POWER PROJECT*

Docket No. 08-AFC-9

PROOF OF SERVICE
(Revised 4/30/2009)

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*indicates change

DECLARATION OF SERVICE

I, Hilarie Anderson, declare that on June 2, 2009, I served and filed copies of the attached Data Response 152 Corrections. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:
[http://www.energy.ca.gov/sitingcases/palmdale/index.html]. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

_x_ sent electronically to all email addresses on the Proof of Service list;

_x_ by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

_x_ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

OR

_____depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-9
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

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

Original Signature in Dockets
Hilarie Anderson