

**Timothy S. Rausch**  
Sr. Vice President & Chief Nuclear Officer

**PPL Susquehanna, LLC**  
769 Salem Boulevard  
Berwick, PA 18603  
Tel. 570.542.3445 Fax 570.542.1504  
tsrausch@pplweb.com



JUL 15 2009

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Stop OP1-17  
Washington, DC 20555

**SUSQUEHANNA STEAM ELECTRIC STATION  
UNIT 2 OPERATING LICENSE NO. NPF-22  
LICENSE CONDITION 2.C. (20) (a) 3  
PLA-6527**

**Docket No 50-388**

The purpose of this letter is to docket the attached evaluation of steam dryer performance based on the data collected at the 3.5% power ascension step that was provided via electronic submission to the NRC on May 29, 2009 as required by the License Condition.

License Condition 2.C. (20) (a) 3 requires:

“PPL shall hold the facility at each 3.5% ascension step to collect data from License Condition 2.C.(20)(a) and conduct plant inspections and walk-downs, and evaluate steam dryer performance based on the data; shall provide the evaluation to the NRC staff by facsimile or electronic transmission to the NRC project manager upon completion of the evaluation; and shall not increase power above each hold point until 96 hours after the NRC project manager confirms receipt of transmission.”

Enclosure 1 contains the proprietary version of “SSES Replacement Dryer Report, Unit 2 Start-up, 103.5% Power Test Plateau.” The information in Enclosure 1 contains proprietary information as defined by 10CFR2.390. PPL, as the owner of the proprietary information, has executed the enclosed affidavit, which identify that the enclosed proprietary information has been handled and classified as proprietary, is customarily held in confidence, and has been withheld from public disclosure. The proprietary information has been faithfully reproduced in the enclosed information such that the affidavit remains applicable. PPL hereby requests that the enclosed proprietary information be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390.

A001  
NRR

The header of each page in this enclosure carries the notation "PPL Proprietary Information." PPL proprietary information is identified inside triple brackets. {{{This sentence is an example.<sup>{2}</sup>}}} In each case, the superscript notation<sup>{2}</sup> refers to Paragraph (2) of the PPL affidavit, which provides the basis for the proprietary determination. Specific information that is not so marked is not PPL proprietary.

Enclosure 2 contains the non-proprietary version of "SSES Replacement Dryer Report, Unit 2 Start-up, 103.5% Power Test Plateau." Enclosure 3 contains the signed affidavit.

If you have any questions or require additional information, please contact Mr. C. T. Coddington at (610) 774-4019.

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

Executed on: 7/15/09

T. S. Rausch



Enclosure 1 - "SSES Replacement Dryer Report, Unit 2 Start-up, 103.5% Power Test Plateau." - PPL Proprietary Information

Enclosure 2 - "SSES Replacement Dryer Report, Unit 2 Start-up, 103.5% Power Test Plateau." - Non-Proprietary Information

Enclosure 3 - Affidavit

Copy: NRC Region I

Mr. R. R. Janati, DEP/BRP

Mr. F. W. Jaxheimer, NRC Sr. Resident Inspector

Mr. B. K. Vaidya, NRC Project Manager

---

**Enclosure 3 to PLA-6527**

**Affidavit**

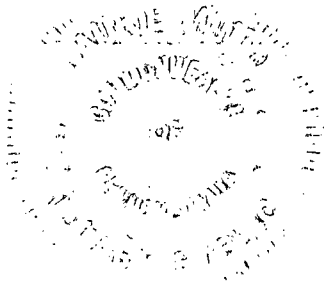
---

**AFFIDAVIT OF RICHARD D. PAGODIN**

I, Richard D. Pagodin General Manager-Nuclear Engineering PPL Susquehanna, LLC, do hereby affirm and state:

1. I am authorized to execute this affidavit on behalf of PPL Susquehanna, LLC (hereinafter referred to as "PPL").
2. PPL requests that the information attached and identified by text inside triple brackets {{{This sentence is an example.}}} be withheld from public disclosure under the provisions of 10 C.F.R. 2.390(a)(4).
3. The PPL Documents contain confidential commercial information, the disclosure of which would adversely affect PPL.
4. This information has been held in confidence by PPL. To the extent that PPL has shared this information with others, it has done so on a confidential basis.
5. PPL customarily keeps such information in confidence and there is a rational basis for holding such information in confidence. The information is not available from public sources and could not be gathered readily from other publicly available information.
6. Public disclosure of this information would cause substantial harm to the competitive position of PPL, because such information has significant commercial value to PPL.
7. The information identified in paragraph (2) above is classified as proprietary because it details the results of test data derived from test instrumentation installed specifically to collect this data. This instrumentation was installed at a significant cost to PPL. The data and the conditions under which it was collected constitute a major PPL asset.

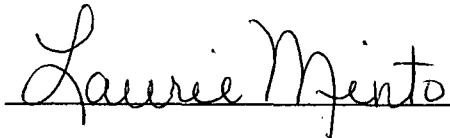
8. Public disclosure of the information sought to be withheld is likely to cause substantial harm to PPL by foreclosing or reducing the availability of profit-making opportunities. The information is of value to other BWR Licensee's and would support evaluations and analyses associated with extended power uprate license amendment submittals. Making this information available to other BWR Licensee's would represent a windfall and deprive PPL the opportunity to recover a portion of its large investment in the test instrumentation from which this data is derived.



PPL SUSQUEHANNA, LLC

  
Richard D. Pagodin

Subscribed and sworn before me,  
a Notary Public in and for the  
Commonwealth of Pennsylvania  
This 29<sup>th</sup> day of May, 2009

  
Laurie Minto

COMMONWEALTH OF PENNSYLVANIA  
Notarial Seal  
Laurie M. Minto, Notary Public  
Salem Twp., Luzerne County  
My Commission Expires July 24, 2010  
Member, Pennsylvania Association of Notaries

---

**Enclosure 2 to PLA-6527**

**Non-Proprietary Version of “SSES Replacement  
Dryer Report, Unit 2 Start-up, 103.5% Power  
Test Plateau.”**

---

# **SSES Replacement Steam Dryer Report**

## **Unit 2 Start-Up**

### **103.5% Power Test Plateau**

**May 29, 2009**

Prepared By: John A. Santos

Reviewed By: Kurt [Signature]

Approved by: John E. Kraiss pen telecon  
[Signature]

This report provides a summary of the SSES Unit 2 replacement steam dryer monitoring instrumentation (Main Steam Line Strain Gage) measurements at the 103.5% CLTP test plateau. This data was collected at a power level of 3610 MWth and a core flow of 99.35 M lb<sub>m</sub>/hr. The main steam line (MSL) strain gage locations are documented in Reference 1. Plant data log sheet for each power step from 3489 MWth to 3610 MWth is contained in Appendix A. The data log sheets provide a record of plant conditions during the power ascension.

Figures 1 through 8 provide power spectral density (PSD) plots of MSL strain gage readings. The Level 1 and Level 2 acceptance curves for each strain gage location are also plotted on each figure. The strain values represent average strain values observed over a 180 second test time period. A data sampling rate of 2500 Hz was used in the data processing. The test data was bandpass filtered between 3 and 250 Hz to be consistent with the load definition used in the replacement dryer structural analysis in Reference 2. There is substantial noise from the 60 Hz alternating current and the recirculation pump power supply, thus filtering of this electrical noise was performed. Also the reactor recirculation pump vane passing frequencies were filtered from the data sets. Testing on the instrumented Unit 1 steam dryer {{{

(2)}}

Reference 2 documented that the {{{

(2)}}} The filters applied to the 3610 MWth

data are contained in Table 1 below:

Table 1: PSD Notch Filter Specifications

{{{

Frequency	Width	Origin

(2)}}



PSDs were calculated on 2 second blocks of data from the test time period (180 seconds). In order to increase the number of spectral averages, the data blocks were overlapped by 50%. The PSDs were calculated using a Hanning window and a 0.5 Hz bin size. The resulting PSDs were then linearly averaged and are presented as Figures 1 through 8. This method of data processing was used to provide the results in a format consistent with the processing used to develop the monitoring curves.

There are also two monitoring curves included with the PSD plots. The Level 1 monitoring curve represents the response of the SSES dryer finite element (FE) model under the design acoustic load conditions factored by the minimum component analysis margin to the endurance limit. The Level 2 monitoring curve is based on 80% of the Level 1 curve. A more complete description is included in Reference 3 and Reference 4. The Limit Curves were generated in accordance with Reference 3 using a baseline data set from Unit 2 collected at 3489 MWth (CLTP). These monitoring curves provide guidance for evaluating the measured dryer response with respect to the structural analysis results and represent the acceptance criteria for the power ascension.

Table 2 below shows the maximum strain gage reading as a percent of acceptance limits generated in accordance with Reference 3 using a baseline data set from Unit 2 collected at 3489 MWth (CLTP). All values of strain are below the Level 1 and Level 2 acceptance limits.

Table 2: Maximum MSL Strain Gage Readings @ 3610 MW<sub>th</sub>  
Expressed as a Ratio of the Acceptance Limits

{{{


(2)}}}

For trending purposes, filtered MSL strain gage PSDs for powers up to 103.5% of CLTP (3610 MW<sub>th</sub>) have been plotted in a waterfall format and are presented in Figures 9 through 16. Figure 17 is a trend plot of the RMS value of the sample time histories plotted against total steam flow. Figures 9 through 17 shows that MSL stress are {{{  
(2)}}}

MSL strain gages mounted on the A and D steam lines have the highest magnitude readings. This is attributed to the large 15 HZ peak being generated by the SRV dead-legs on these two steam lines. The magnitude and frequency of the MSL strain gage PSDs is similar to the PSDs measured on Unit 1 in 2008 in both frequency content and magnitude.

### Summary

Based on the current margin to dryer acceptance limits shown in Table 1 and in Figures 1 through 8, there is adequate projected margin to the dryer acceptance limits for continued power ascension to 3733 MW<sub>th</sub>.

### References:

1. PPL Letter To USNRC, PLA-6176 (Figure 31-1), "Susquehanna Steam Electric Station Proposed License Amendment No. 285 For Unit 1 Operating License No. NPF-14 And Proposed License Amendment No. 253 For Unit 2 Operating License No. NPF-22 Extended Power Update Application Regarding Steam Dryer And Flow Effects Request For Additional Information Responses", dated 4/27/2007
2. GE-Hitachi Nuclear Energy Engineering Report 0000-0095-2113-P-R0, "Susquehanna Replacement Steam Dryer Updated Stress Analysis At Extended Power Uprate Conditions", Class III, February 2009 (Provided via PPL Letter To USNRC, PLA-6484, dated 2/27/09)
3. GE-Hitachi Nuclear Energy Engineering Report 0000-0096-5766-P-R1, "Revised Susquehanna Replacement Steam Dryer Limit Curves - Main Steam Line Mounted Instrumentation", Class III, February 2009 (Provided via PPL Letter To USNRC, PLA-6484, dated 2/27/09)
4. GE-Hitachi Nuclear Energy Engineering Report 0000-0101-0766-P-R0, "Main Steam Line Limit Curve Adjustment During Power Ascension", Class III, April 2009 (Provided via PPL Letter To USNRC, PLA-6510, dated 5/12/09)

{{{

**Figure 1: MSL A Upper Strain Gage PSD Plot**

<sup>(2)</sup>}}}

{{{

**Figure 2: MSL A Lower Strain Gage PSD Plot**

<sup>(2)</sup>}}}

{{{

(2)}}

**Figure 3: MSL B Upper Strain Gage Plot PSD Plot**

{{{

(2)}}

**Figure 4: MSL B Lower Strain Gage PSD Plot**

{{{

**Figure 5: MSL C Upper Strain Gage PSD Plot**

(2)}}

{{{

**Figure 6: MSL C Lower Strain Gage PSD Plot**

(2)}}

{{{

**Figure 7: MSL D Upper Strain Gage PSD Plot**

(2)}}

{{{

**Figure 8: MSL D Lower Strain Gage PSD Plot**

(2)}}

{{{

**Figure 9: MSL A Upper Strain Gage PSD Waterfall Plot**

(2)}}

{{{

**Figure 10: MSL A Lower Strain Gage PSD Waterfall Plot**

(2)}}

{{{

**Figure 11: MSL B Upper Strain Gage PSD Waterfall Plot**

(2)}}

{{{

**Figure 12: MSL B Lower Strain Gage PSD Waterfall Plot**

(2)}}



{{{

**Figure 13: MSL C Upper Strain Gage PSD Waterfall Plot**

(2)}}

{{{

**Figure 14: MSL C Lower Strain Gage PSD Waterfall Plot**

(2)}}

{{{

**Figure 15: MSL D Upper Strain Gage PSD Waterfall Plot**

(2)}}

{{{

**Figure 16: MSL D Lower Strain Gage PSD Waterfall Plot**

(2)}}

{{{

<sup>(2)</sup>}}}

**Figure 17: MSL Strain Gage Time History RMS Trends**

## **Appendix A**

### **Plant Data Log Sheets**

## Steam Dryer Data Log Sheets

Start

Date/Time	5/29/2009 9:05	(Start)
-----------	----------------	---------

	Computer ID	Value	Units
Thermal Power (Instantaneous)	u02.nba01	3516.95	MWth
Thermal Power (15 min Ave.)	u02.nba101	3498.48	MWth
Electrical Power	u02.gnj02	1153.56	Mwe
Total Core Flow	u02.nff12	95.24	M lbm/hr
Recirc Loop Flow A	u02.njf02	48.02	M lbm/hr
Recirc Loop Flow B	u02.njf03	47.77	M lbm/hr
Recirc Loop A Suction Temperature	u02.nrt01	523.63	°F
Recirc Loop B Suction Temperature	u02.nrt02	523.09	°F
Core Plate D/P	u02.njp51	14.71	PSI
Indicated Steam Flow Line A	u02.nff01	3.64	M lbm/hr
Indicated Steam Flow Line B	u02.nff02	3.82	M lbm/hr
Indicated Steam Flow Line C	u02.nff03	3.72	M lbm/hr
Indicated Steam Flow Line D	u02.nff04	3.65	M lbm/hr
Indicated Total Steam Flow	u02.nff10	14.89	M lbm/hr
Indicated Feedwater Flow	u02.nff11	14.47	M lbm/hr
Feedwater Temperature Line A	u02.fpt01	393.70	°F
Feedwater Temperature Line B	u02.fpt02	391.91	°F
Feedwater Temperature Line C	u02.fpt03	389.30	°F
Rx Dome Pressure Narrow Range	u02.nfp01	1008.22	PSIG
Rx Dome Pressure Wide Range	u02.nfp02	1007.12	PSIG
Steam Dome Temperature	u02.nfa05	547.11	°F
Recirculation Pump A Speed	vm.2p401a/2a_rrp_tac	1420.00	RPM
Recirculation Pump B Speed	vm.2p401b/2b_rrp_tac	1397.00	RPM
Recirculation Pump A Power	u02.nrj51	3.56	MWe
Recirculation Pump B Power	u02.nrj52	3.40	MWe
CRD Cooling Header Flow	u02.nef03	62.38	GPM
CRD System Flow	u02.nef01	62.26	GPM
CRD System Temperature	u02.ndt05	133.05	°F
Bottom Head Drain Temp	u02.nlt01	526.76	°F
Reactor Water Level Narrow Range	u02.nfl01	33.49	Inches H2O
Reactor Water Level Narrow Range	u02.nfl02	35.04	Inches H2O
Reactor Water Level Narrow Range	u02.nfl03	33.41	Inches H2O
Reactor Water Level Wide Range	u02.nbl02	29.56	Inches H2O
Recirculation Pump A Vane Passing Freq.	n/a	118.33	Hz
Recirculation Pump B Vane Passing Freq.	n/a	116.42	Hz
Recirculation Pump A Motor Frequency	n/a	47.81	Hz
Recirculation Pump B Motor Frequency	n/a	47.04	Hz

## Enhanced Steam Flow Calculations

Feed Flow Line A (LEFM)	u02.nff77	4.86	M lbm/hr
Feed Flow Line B (LEFM)	u02.nff78	4.84	M lbm/hr
Feed Flow Line C (LEFM)	u02.nff79	4.81	M lbm/hr
CRD Flow	u02.ndf01	0.03	M lbm/hr
Total Feedwater Flow	n/a	14.54	M lbm/hr
Steam Flow Line A	n/a	3.57	M lbm/hr
Steam Flow Line B	n/a	3.75	M lbm/hr
Steam Flow Line C	n/a	3.64	M lbm/hr
Steam Flow Line D	n/a	3.58	M lbm/hr
Total Steam Flow	n/a	14.54	M lbm/hr

### Steam Dryer Data Log Sheets Finish

Date/Time	5/29/2009 9:08	(Finish)	
	Computer ID	Value	Units
Thermal Power (Instantaneous)	u02.nba01	3516.69	MWth
Thermal Power (15 min Ave.)	u02.nba101	3504.28	MWth
Electrical Power	u02.gnj02	1153.93	Mwe
Total Core Flow	u02.nff12	95.34	M lbm/hr
Recirc Loop Flow A	u02.njf02	47.99	M lbm/hr
Recirc Loop Flow B	u02.njf03	47.75	M lbm/hr
Recirc Loop A Suction Temperature	u02.nrt01	523.67	°F
Recirc Loop B Suction Temperature	u02.nrt02	523.10	°F
Core Plate D/P	u02.njp51	14.71	PSI
Steam Flow Line A	u02.nff01	3.66	M lbm/hr
Steam Flow Line B	u02.nff02	3.83	M lbm/hr
Steam Flow Line C	u02.nff03	3.73	M lbm/hr
Steam Flow Line D	u02.nff04	3.64	M lbm/hr
Total Steam Flow	u02.nff10	14.90	M lbm/hr
Feedwater Flow	u02.nff11	14.48	M lbm/hr
Feedwater Temperature Line A	u02.fpt01	393.70	°F
Feedwater Temperature Line B	u02.fpt02	391.91	°F
Feedwater Temperature Line C	u02.fpt03	389.16	°F
Rx Dome Pressure Narrow Range	u02.nfp01	1008.07	PSIG
Rx Dome Pressure Wide Range	u02.nfp02	1007.55	PSIG
Steam Dome Temperature	u02.nfa05	547.14	°F
Recirculation Pump A Speed	vm.2p401a/2a_rrp_tac	1420.00	RPM
Recirculation Pump B Speed	vm.2p401b/2b_rrp_tac	1399.00	RPM
Recirculation Pump A Power	u02.nrj51	3.57	MWe
Recirculation Pump B Power	u02.nrj52	3.40	MWe
CRD Cooling Header Flow	u02.nef03	62.39	GPM
CRD System Flow	u02.nef01	62.27	GPM
CRD System Temperature	u02.ndt05	133.05	°F
Bottom Head Drain Temp	u02.nlt01	526.76	°F
Reactor Water Level Narrow Range	u02.nfl01	33.91	Inches H2O
Reactor Water Level Narrow Range	u02.nfl02	35.96	Inches H2O
Reactor Water Level Narrow Range	u02.nfl03	33.93	Inches H2O
Reactor Water Level Wide Range	u02.nbl02	29.56	Inches H2O
Recirculation Pump A Vane Passing Freq.	n/a	118.33	Hz
Recirculation Pump B Vane Passing Freq.	n/a	116.58	Hz
Recirculation Pump A Motor Frequency	n/a	47.81	Hz
Recirculation Pump B Motor Frequency	n/a	47.10	Hz

#### Enhanced Steam Flow Calculations

Feed Flow Line A (LEFM)	u02.nff77	4.86	M lbm/hr
Feed Flow Line B (LEFM)	u02.nff78	4.84	M lbm/hr
Feed Flow Line C (LEFM)	u02.nff79	4.81	M lbm/hr
CRD Flow	u02.ndf01	0.03	M lbm/hr
Total Feedwater Flow	n/a	14.54	M lbm/hr
Steam Flow Line A	n/a	3.58	M lbm/hr
Steam Flow Line B	n/a	3.74	M lbm/hr
Steam Flow Line C	n/a	3.65	M lbm/hr
Steam Flow Line D	n/a	3.56	M lbm/hr
Total Steam Flow	n/a	14.54	M lbm/hr

# Steam Dryer Data Log Sheets Start

Date/Time	5/29/2009 10:20	(Start)
-----------	-----------------	---------

	Computer ID	Value	Units
Thermal Power (Instantaneous)	u02.nba01	3544.81	MWth
Thermal Power (15 min Ave.)	u02.nba101	3532.10	MWth
Electrical Power	u02.gnj02	1156.86	Mwe
Total Core Flow	u02.nff12	96.50	M lbm/hr
Recirc Loop Flow A	u02.njf02	47.99	M lbm/hr
Recirc Loop Flow B	u02.njf03	48.68	M lbm/hr
Recirc Loop A Suction Temperature	u02.nrt01	524.02	°F
Recirc Loop B Suction Temperature	u02.nrt02	523.40	°F
Core Plate D/P	u02.njp51	14.96	PSI
Indicated Steam Flow Line A	u02.nff01	3.69	M lbm/hr
Indicated Steam Flow Line B	u02.nff02	3.87	M lbm/hr
Indicated Steam Flow Line C	u02.nff03	3.78	M lbm/hr
Indicated Steam Flow Line D	u02.nff04	3.70	M lbm/hr
Indicated Total Steam Flow	u02.nff10	15.01	M lbm/hr
Indicated Feedwater Flow	u02.nff11	14.63	M lbm/hr
Feedwater Temperature Line A	u02.fpt01	394.38	°F
Feedwater Temperature Line B	u02.fpt02	392.60	°F
Feedwater Temperature Line C	u02.fpt03	389.71	°F
Rx Dome Pressure Narrow Range	u02.nfp01	1009.74	PSIG
Rx Dome Pressure Wide Range	u02.nfp02	1008.11	PSIG
Steam Dome Temperature	u02.nfa05	547.33	°F
Recirculation Pump A Speed	vm.2p401a/2a_rrp_tac	1436.00	RPM
Recirculation Pump B Speed	vm.2p401b/2b_rrp_tac	1419.00	RPM
Recirculation Pump A Power	u02.nrj51	3.69	MWe
Recirculation Pump B Power	u02.nrj52	3.55	MWe
CRD Cooling Header Flow	u02.nef03	62.28	GPM
CRD System Flow	u02.nef01	62.17	GPM
CRD System Temperature	u02.ndt05	134.92	°F
Bottom Head Drain Temp	u02.nlt01	527.54	°F
Reactor Water Level Narrow Range	u02.nfl01	35.56	Inches H2O
Reactor Water Level Narrow Range	u02.nfl02	35.01	Inches H2O
Reactor Water Level Narrow Range	u02.nfl03	35.52	Inches H2O
Reactor Water Level Wide Range	u02.nbl02	29.29	Inches H2O
Recirculation Pump A Vane Passing Freq.	n/a	119.67	Hz
Recirculation Pump B Vane Passing Freq.	n/a	118.25	Hz
Recirculation Pump A Motor Frequency	n/a	48.35	Hz
Recirculation Pump B Motor Frequency	n/a	47.78	Hz

## Enhanced Steam Flow Calculations

Feed Flow Line A (LEFM)	u02.nff77	4.88	M lbm/hr
Feed Flow Line B (LEFM)	u02.nff78	4.95	M lbm/hr
Feed Flow Line C (LEFM)	u02.nff79	4.82	M lbm/hr
CRD Flow	u02.ndf01	0.03	M lbm/hr
Total Feedwater Flow	n/a	14.68	M lbm/hr
Steam Flow Line A	n/a	3.60	M lbm/hr
Steam Flow Line B	n/a	3.77	M lbm/hr
Steam Flow Line C	n/a	3.69	M lbm/hr
Steam Flow Line D	n/a	3.62	M lbm/hr
Total Steam Flow	n/a	14.68	M lbm/hr

## Steam Dryer Data Log Sheets

Finish

Date/Time	5/29/2009 10:23	(Finish)	
	Computer ID	Value	Units
Thermal Power (Instantaneous)	u02.nba01	3544.92	MWth
Thermal Power (15 min Ave.)	u02.nba101	3537.55	MWth
Electrical Power	u02.gnj02	1159.79	Mwe
Total Core Flow	u02.nff12	96.57	M lbm/hr
Recirc Loop Flow A	u02.njf02	48.16	M lbm/hr
Recirc Loop Flow B	u02.njf03	48.51	M lbm/hr
Recirc Loop A Suction Temperature	u02.nrt01	524.05	°F
Recirc Loop B Suction Temperature	u02.nrt02	523.67	°F
Core Plate D/P	u02.njp51	14.97	PSI
Steam Flow Line A	u02.nff01	3.69	M lbm/hr
Steam Flow Line B	u02.nff02	3.85	M lbm/hr
Steam Flow Line C	u02.nff03	3.78	M lbm/hr
Steam Flow Line D	u02.nff04	3.70	M lbm/hr
Total Steam Flow	u02.nff10	15.02	M lbm/hr
Feedwater Flow	u02.nff11	14.64	M lbm/hr
Feedwater Temperature Line A	u02.fpt01	394.38	°F
Feedwater Temperature Line B	u02.fpt02	392.60	°F
Feedwater Temperature Line C	u02.fpt03	389.71	°F
Rx Dome Pressure Narrow Range	u02.nfp01	1009.59	PSIG
Rx Dome Pressure Wide Range	u02.nfp02	1008.22	PSIG
Steam Dome Temperature	u02.nfa05	547.34	°F
Recirculation Pump A Speed	vm.2p401a/2a_rrp_tac	1436.00	RPM
Recirculation Pump B Speed	vm.2p401b/2b_rrp_tac	1419.00	RPM
Recirculation Pump A Power	u02.nrj51	3.68	MWe
Recirculation Pump B Power	u02.nrj52	3.55	MWe
CRD Cooling Header Flow	u02.nef03	62.31	GPM
CRD System Flow	u02.nef01	62.16	GPM
CRD System Temperature	u02.ndt05	134.92	°F
Bottom Head Drain Temp	u02.nlt01	527.57	°F
Reactor Water Level Narrow Range	u02.nfl01	33.60	Inches H2O
Reactor Water Level Narrow Range	u02.nfl02	35.99	Inches H2O
Reactor Water Level Narrow Range	u02.nfl03	33.49	Inches H2O
Reactor Water Level Wide Range	u02.nbl02	29.24	Inches H2O
Recirculation Pump A Vane Passing Freq.	n/a	119.67	Hz
Recirculation Pump B Vane Passing Freq.	n/a	118.25	Hz
Recirculation Pump A Motor Frequency	n/a	48.35	Hz
Recirculation Pump B Motor Frequency	n/a	47.78	Hz

## Enhanced Steam Flow Calculations

Feed Flow Line A (LEFM)	u02.nff77	4.88	M lbm/hr
Feed Flow Line B (LEFM)	u02.nff78	4.95	M lbm/hr
Feed Flow Line C (LEFM)	u02.nff79	4.82	M lbm/hr
CRD Flow	u02.ndf01	0.03	M lbm/hr
Total Feedwater Flow	n/a	14.68	M lbm/hr
Steam Flow Line A	n/a	3.61	M lbm/hr
Steam Flow Line B	n/a	3.77	M lbm/hr
Steam Flow Line C	n/a	3.69	M lbm/hr
Steam Flow Line D	n/a	3.62	M lbm/hr
Total Steam Flow	n/a	14.68	M lbm/hr



## Steam Dryer Data Log Sheets

Start

Date/Time	5/29/2009 11:26	(Start)
-----------	-----------------	---------

	Computer ID	Value	Units
Thermal Power (Instantaneous)	u02.nba01	3578.38	MWth
Thermal Power (15 min Ave.)	u02.nba101	3577.04	MWth
Electrical Power	u02.gnj02	1168.58	Mwe
Total Core Flow	u02.nff12	97.86	M lbm/hr
Recirc Loop Flow A	u02.njf02	48.99	M lbm/hr
Recirc Loop Flow B	u02.njf03	49.14	M lbm/hr
Recirc Loop A Suction Temperature	u02.nrt01	524.45	°F
Recirc Loop B Suction Temperature	u02.nrt02	523.93	°F
Core Plate D/P	u02.njp51	15.43	PSI
Indicated Steam Flow Line A	u02.nff01	3.75	M lbm/hr
Indicated Steam Flow Line B	u02.nff02	3.92	M lbm/hr
Indicated Steam Flow Line C	u02.nff03	3.82	M lbm/hr
Indicated Steam Flow Line D	u02.nff04	3.74	M lbm/hr
Indicated Total Steam Flow	u02.nff10	15.19	M lbm/hr
Indicated Feedwater Flow	u02.nff11	14.78	M lbm/hr
Feedwater Temperature Line A	u02.fpt01	395.07	°F
Feedwater Temperature Line B	u02.fpt02	393.15	°F
Feedwater Temperature Line C	u02.fpt03	390.54	°F
Rx Dome Pressure Narrow Range	u02.nfp01	1011.35	PSIG
Rx Dome Pressure Wide Range	u02.nfp02	1010.28	PSIG
Steam Dome Temperature	u02.nfa05	547.53	°F
Recirculation Pump A Speed	vm.2p401a/2a_rrp_tac	1455.00	RPM
Recirculation Pump B Speed	vm.2p401b/2b_rrp_tac	1440.00	RPM
Recirculation Pump A Power	u02.nrj51	3.84	MWe
Recirculation Pump B Power	u02.nrj52	3.70	MWe
CRD Cooling Header Flow	u02.nef03	62.25	GPM
CRD System Flow	u02.nef01	62.21	GPM
CRD System Temperature	u02.ndt05	136.80	°F
Bottom Head Drain Temp	u02.nlt01	527.53	°F
Reactor Water Level Narrow Range	u02.nfl01	34.40	Inches H2O
Reactor Water Level Narrow Range	u02.nfl02	33.36	Inches H2O
Reactor Water Level Narrow Range	u02.nfl03	34.22	Inches H2O
Reactor Water Level Wide Range	u02.nbl02	29.15	Inches H2O
Recirculation Pump A Vane Passing Freq.	n/a	121.25	Hz
Recirculation Pump B Vane Passing Freq.	n/a	120.00	Hz
Recirculation Pump A Motor Frequency	n/a	48.99	Hz
Recirculation Pump B Motor Frequency	n/a	48.48	Hz

## Enhanced Steam Flow Calculations

Feed Flow Line A (LEFM)	u02.nff77	4.93	M lbm/hr
Feed Flow Line B (LEFM)	u02.nff78	4.97	M lbm/hr
Feed Flow Line C (LEFM)	u02.nff79	4.90	M lbm/hr
CRD Flow	u02.ndf01	0.03	M lbm/hr
Total Feedwater Flow	n/a	14.83	M lbm/hr
Steam Flow Line A	n/a	3.65	M lbm/hr
Steam Flow Line B	n/a	3.81	M lbm/hr
Steam Flow Line C	n/a	3.72	M lbm/hr
Steam Flow Line D	n/a	3.65	M lbm/hr
Total Steam Flow	n/a	14.83	M lbm/hr

# Steam Dryer Data Log Sheets Finish

Date/Time	5/29/2009 11:29	(Finish)	
	Computer ID	Value	Units
Thermal Power (Instantaneous)	u02.nba01	3578.48	MWth
Thermal Power (15 min Ave.)	u02.nba101	3577.19	MWth
Electrical Power	u02.gnj02	1167.11	Mwe
Total Core Flow	u02.nff12	97.91	M lbm/hr
Recirc Loop Flow A	u02.njf02	48.82	M lbm/hr
Recirc Loop Flow B	u02.njf03	49.48	M lbm/hr
Recirc Loop A Suction Temperature	u02.nrt01	524.34	°F
Recirc Loop B Suction Temperature	u02.nrt02	523.97	°F
Core Plate D/P	u02.njp51	15.43	PSI
Steam Flow Line A	u02.nff01	3.70	M lbm/hr
Steam Flow Line B	u02.nff02	3.90	M lbm/hr
Steam Flow Line C	u02.nff03	3.82	M lbm/hr
Steam Flow Line D	u02.nff04	3.75	M lbm/hr
Total Steam Flow	u02.nff10	15.19	M lbm/hr
Feedwater Flow	u02.nff11	14.78	M lbm/hr
Feedwater Temperature Line A	u02.fpt01	394.93	°F
Feedwater Temperature Line B	u02.fpt02	393.15	°F
Feedwater Temperature Line C	u02.fpt03	390.54	°F
Rx Dome Pressure Narrow Range	u02.nfp01	1012.11	PSIG
Rx Dome Pressure Wide Range	u02.nfp02	1010.37	PSIG
Steam Dome Temperature	u02.nfa05	547.55	°F
Recirculation Pump A Speed	vm.2p401a/2a_rrp_tac	1456.00	RPM
Recirculation Pump B Speed	vm.2p401b/2b_rrp_tac	1439.00	RPM
Recirculation Pump A Power	u02.nrj51	3.84	MWe
Recirculation Pump B Power	u02.nrj52	3.71	MWe
CRD Cooling Header Flow	u02.nef03	62.21	GPM
CRD System Flow	u02.nef01	62.20	GPM
CRD System Temperature	u02.ndt05	136.80	°F
Bottom Head Drain Temp	u02.nlt01	528.01	°F
Reactor Water Level Narrow Range	u02.nfl01	35.45	Inches H2O
Reactor Water Level Narrow Range	u02.nfl02	35.06	Inches H2O
Reactor Water Level Narrow Range	u02.nfl03	35.37	Inches H2O
Reactor Water Level Wide Range	u02.nbl02	29.08	Inches H2O
Recirculation Pump A Vane Passing Freq.	n/a	121.33	Hz
Recirculation Pump B Vane Passing Freq.	n/a	119.92	Hz
Recirculation Pump A Motor Frequency	n/a	49.02	Hz
Recirculation Pump B Motor Frequency	n/a	48.45	Hz

## Enhanced Steam Flow Calculations

Feed Flow Line A (LEFM)	u02.nff77	4.93	M lbm/hr
Feed Flow Line B (LEFM)	u02.nff78	4.98	M lbm/hr
Feed Flow Line C (LEFM)	u02.nff79	4.90	M lbm/hr
CRD Flow	u02.ndf01	0.03	M lbm/hr
Total Feedwater Flow	n/a	14.84	M lbm/hr
Steam Flow Line A	n/a	3.62	M lbm/hr
Steam Flow Line B	n/a	3.81	M lbm/hr
Steam Flow Line C	n/a	3.74	M lbm/hr
Steam Flow Line D	n/a	3.66	M lbm/hr
Total Steam Flow	n/a	14.84	M lbm/hr

# **Steam Dryer Data Log Sheets** **Start**

Date/Time	5/29/2009 12:27	(Start)	
	Computer ID	Value	Units
Thermal Power (Instantaneous)	u02.nba01	3609.47	MWth
Thermal Power (15 min Ave.)	u02.nba101	3610.37	MWth
Electrical Power	u02.gnj02	1177.00	Mwe
Total Core Flow	u02.nff12	99.35	M lbm/hr
Recirc Loop Flow A	u02.njf02	49.31	M lbm/hr
Recirc Loop Flow B	u02.njf03	49.92	M lbm/hr
Recirc Loop A Suction Temperature	u02.nrt01	524.53	°F
Recirc Loop B Suction Temperature	u02.nrt02	524.17	°F
Core Plate D/P	u02.njp51	15.78	PSI
Indicated Steam Flow Line A	u02.nff01	3.77	M lbm/hr
Indicated Steam Flow Line B	u02.nff02	3.95	M lbm/hr
Indicated Steam Flow Line C	u02.nff03	3.85	M lbm/hr
Indicated Steam Flow Line D	u02.nff04	3.77	M lbm/hr
Indicated Total Steam Flow	u02.nff10	15.30	M lbm/hr
Indicated Feedwater Flow	u02.nff11	14.92	M lbm/hr
Feedwater Temperature Line A	u02.fpt01	395.62	°F
Feedwater Temperature Line B	u02.fpt02	393.97	°F
Feedwater Temperature Line C	u02.fpt03	391.22	°F
Rx Dome Pressure Narrow Range	u02.nfp01	1013.33	PSIG
Rx Dome Pressure Wide Range	u02.nfp02	1011.90	PSIG
Steam Dome Temperature	u02.nfa05	547.80	°F
Recirculation Pump A Speed	vm.2p401a/2a_rrp_tac	1474.00	RPM
Recirculation Pump B Speed	vm.2p401b/2b_rrp_tac	1459.00	RPM
Recirculation Pump A Power	u02.nrj51	3.99	MWe
Recirculation Pump B Power	u02.nrj52	3.86	MWe
CRD Cooling Header Flow	u02.nef03	62.22	GPM
CRD System Flow	u02.nef01	62.22	GPM
CRD System Temperature	u02.ndt05	137.87	°F
Bottom Head Drain Temp	u02.nlt01	528.37	°F
Reactor Water Level Narrow Range	u02.nff01	34.24	Inches H2O
Reactor Water Level Narrow Range	u02.nff02	36.58	Inches H2O
Reactor Water Level Narrow Range	u02.nff03	34.15	Inches H2O
Reactor Water Level Wide Range	u02.nbl02	28.53	Inches H2O
Recirculation Pump A Vane Passing Freq.	n/a	122.83	Hz
Recirculation Pump B Vane Passing Freq.	n/a	121.58	Hz
Recirculation Pump A Motor Frequency	n/a	49.63	Hz
Recirculation Pump B Motor Frequency	n/a	49.12	Hz

## **Enhanced Steam Flow Calculations**

Feed Flow Line A (LEFM)	u02.nff77	5.01	M lbm/hr
Feed Flow Line B (LEFM)	u02.nff78	4.98	M lbm/hr
Feed Flow Line C (LEFM)	u02.nff79	4.93	M lbm/hr
CRD Flow	u02.ndf01	0.03	M lbm/hr
Total Feedwater Flow	n/a	14.96	M lbm/hr
Steam Flow Line A	n/a	3.68	M lbm/hr
Steam Flow Line B	n/a	3.85	M lbm/hr
Steam Flow Line C	n/a	3.76	M lbm/hr
Steam Flow Line D	n/a	3.67	M lbm/hr
Total Steam Flow	n/a	14.96	M lbm/hr

# Steam Dryer Data Log Sheets Finish

Date/Time	5/29/2009 12:30	(Finish)	
	Computer ID	Value	Units
Thermal Power (Instantaneous)	u02.nba01	3609.65	MWth
Thermal Power (15 min Ave.)	u02.nba101	3610.47	MWth
Electrical Power	u02.gnj02	1177.00	Mwe
Total Core Flow	u02.nff12	99.42	M lbm/hr
Recirc Loop Flow A	u02.njf02	49.58	M lbm/hr
Recirc Loop Flow B	u02.njf03	49.75	M lbm/hr
Recirc Loop A Suction Temperature	u02.nrt01	524.53	°F
Recirc Loop B Suction Temperature	u02.nrt02	524.19	°F
Core Plate D/P	u02.njp51	15.77	PSI
Steam Flow Line A	u02.nff01	3.81	M lbm/hr
Steam Flow Line B	u02.nff02	3.95	M lbm/hr
Steam Flow Line C	u02.nff03	3.86	M lbm/hr
Steam Flow Line D	u02.nff04	3.78	M lbm/hr
Total Steam Flow	u02.nff10	15.35	M lbm/hr
Feedwater Flow	u02.nff11	14.93	M lbm/hr
Feedwater Temperature Line A	u02.fpt01	395.62	°F
Feedwater Temperature Line B	u02.fpt02	393.97	°F
Feedwater Temperature Line C	u02.fpt03	391.22	°F
Rx Dome Pressure Narrow Range	u02.nfp01	1013.25	PSIG
Rx Dome Pressure Wide Range	u02.nfp02	1011.49	PSIG
Steam Dome Temperature	u02.nfa05	547.81	°F
Recirculation Pump A Speed	vm.2p401a/2a_rrp_tac	1474.00	RPM
Recirculation Pump B Speed	vm.2p401b/2b_rrp_tac	1459.00	RPM
Recirculation Pump A Power	u02.nrj51	3.99	MWe
Recirculation Pump B Power	u02.nrj52	3.86	MWe
CRD Cooling Header Flow	u02.nef03	62.24	GPM
CRD System Flow	u02.nef01	62.22	GPM
CRD System Temperature	u02.ndt05	137.87	°F
Bottom Head Drain Temp	u02.nlt01	528.37	°F
Reactor Water Level Narrow Range	u02.nfl01	34.35	Inches H2O
Reactor Water Level Narrow Range	u02.nfl02	35.23	Inches H2O
Reactor Water Level Narrow Range	u02.nfl03	34.33	Inches H2O
Reactor Water Level Wide Range	u02.nbl02	28.53	Inches H2O
Recirculation Pump A Vane Passing Freq.	n/a	122.83	Hz
Recirculation Pump B Vane Passing Freq.	n/a	121.58	Hz
Recirculation Pump A Motor Frequency	n/a	49.63	Hz
Recirculation Pump B Motor Frequency	n/a	49.12	Hz

## Enhanced Steam Flow Calculations

Feed Flow Line A (LEFM)	u02.nff77	5.01	M lbm/hr
Feed Flow Line B (LEFM)	u02.nff78	4.98	M lbm/hr
Feed Flow Line C (LEFM)	u02.nff79	4.94	M lbm/hr
CRD Flow	u02.ndf01	0.03	M lbm/hr
Total Feedwater Flow	n/a	14.96	M lbm/hr
Steam Flow Line A	n/a	3.70	M lbm/hr
Steam Flow Line B	n/a	3.84	M lbm/hr
Steam Flow Line C	n/a	3.75	M lbm/hr
Steam Flow Line D	n/a	3.67	M lbm/hr
Total Steam Flow	n/a	14.96	M lbm/hr