

# Plant Application of On-Line Monitoring for Calibration Interval Extension of Safety-Related Instruments: Volume 2



Technical Report

# Plant Application of On-Line Monitoring for Calibration Interval Extension of Safety-Related Instruments: Volume 2

1013486

Final Report, December 2006

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This report describes research sponsored by EPRI and British Energy Group PLC.

The report is a corporate document that should be cited in the literature in the following manner:

*Plant Application of On-Line Monitoring for Calibration Interval Extension of Safety-Related Instruments: Volume 2.* EPRI, Palo Alto, CA, and British Energy Group PLC, Suffolk, UK: 2006. 1013486.

# **PRODUCT DESCRIPTION**

This is Volume 2 of a two-volume report that presents the data analysis details for a commercial implementation of on-line monitoring (OLM) technologies for instrument calibration interval extension in a nuclear power plant. This implementation was performed at British Energy's (BE's) Sizewell B nuclear power station.

The full implementation of OLM at Sizewell B for calibration interval extension of the plant's primary protection system (PPS) transmitters is scheduled over the course of three fuel outages, of which Cycle 7 was the first. This volume presents OLM analysis results for Sizewell B transmitters for Cycles 5, 6, and 7; the results provide the supporting information and analysis to validate the methodology applied in Cycles 5 and 6 and to extend calibration intervals during the refueling outage following Cycle 7.

### **Results and Findings**

During the first outage, the intervals of 70% of the transmitters that were candidates for calibration interval extension were in fact extended. During the initial implementation, an additional 10% of the candidate transmitters were scheduled for calibration as a conservative measure; however, these 10% could have been extended if desired. Overall, 80% of the transmitters evaluated during the first cycle of OLM for calibration interval extension at Sizewell B were found to be within calibration throughout the fuel cycle.

The savings from calibration interval extension and OLM are expected to amount to more than \$1 million per outage day avoided, or \$5 million per operating cycle by the time the project is completed. The demonstration will have covered 200 or more primary protection transmitters by 2008. Additional savings will result from reducing other direct and indirect costs, such as labor costs, radiation exposure, and calibration errors.

### **Challenges and Objectives**

This volume compiles the supporting data analysis for the Sizewell B OLM implementation.

### Applications, Value, and Use

This implementation of OLM for calibration interval extension of safety-related transmitters in a nuclear power plant is the first commercial implementation of this technology in more than a decade. The methodology applied will serve as a guide for other utilities that wish to pursue similar extension of calibration intervals. BE's goal is to expand the application of on-line calibration monitoring over time to nearly 2500 transmitters, including many in the secondary system (steam side) of the plant. This report will be supplemented with additional results through 2009 as available.

#### **EPRI** Perspective

EPRI's strategic role in OLM is to facilitate the implementation and use of OLM in numerous applications at power plants. OLM of instrument channels provides increased information about the condition of monitored channels through accurate, more frequent evaluation of each channel's performance over time. This type of performance monitoring offers an alternative approach to traditional time-directed calibration. EPRI remains committed to the development and implementation of OLM as a tool for extending calibration intervals and evaluating instrument performance.

### Approach

This volume presents the detailed supporting information for the OLM project performed at the Sizewell B nuclear power plant in the United Kingdom, the goal of which is to optimize the frequency of calibration of pressure, level, and flow transmitters in the primary and secondary protection systems of the plant.

### Keywords

On-line monitoring (OLM) Calibration monitoring Calibration interval extension

# ACKNOWLEDGMENTS

The preparation of this report would not have been possible without the assistance of Dave Lillis, Steve Orme, and Stuart Readitt of British Energy.

The staff of Analysis and Measurement Services Corporation was integral to the completion of this report—in particular, Brent Shumaker and Greg Morton.

Finally, EPRI acknowledges British Energy, the co-sponsor of this report. EPRI applauds their use of technology to improve the safety and economic performance of Sizewell B.

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# **1** INTRODUCTION

Together, the two volumes of this report document the implementation of on-line monitoring (OLM) for calibration interval extension of safety-related transmitters at British Energy's (BE's) Sizewell B nuclear power station. In Volume 1, the principles of OLM technologies were described along with the methodology used at Sizewell B. Whereas Volume 1 presented a summary OLM analysis for Sizewell B, this volume presents the full analysis results and provides the related supporting information.

Volume 2 compiles the supporting data for OLM implementation at the Sizewell B plant for operating Cycles 5–7. By October 2006, work was also completed for Cycle 8, and plans have been made for Cycle 9. As of this writing, BE and EPRI agree to have Analysis and Measurement Services Corporation (AMS) provide the results of Cycle 8 and Cycle 9 in two EPRI updates to this report. It is expected that after Cycle 9, the Sizewell B plant will take over the work from AMS and will continue to use this technology independently.

The following information is included in this report for the Sizewell transmitters that were analyzed by AMS using data from Cycles 5–7:

- Summary tables of the OLM analysis results that show which transmitters were good (that is, were in calibration) and which transmitters were bad (that is, were out of calibration)
- Cycle summary plots that contain five pieces of information per figure, including a table of monthly results, a plot of startup results versus operating range, a plot of startup results versus operating range, a plot of steady-state deviation over the cycle, and a plot of steady-state drift over the cycle
- Transient cycle drift analysis results (and plots) that quantify transmitter drift from the startup of a cycle to the subsequent shutdown

This report will serve as a reference by providing the supporting information for the on-line calibration monitoring results reported in Volume 1. As the first commercial implementation of OLM in a nuclear power plant, this application is still new, and a high level of conservatism and extra analysis have been undertaken to provide ample assurance of the quality and reliability of the results. Note that Electricité de France (EDF) has been applying a similar technique for more than a decade; however, no other applications of OLM are known to exist in nuclear power plants.

#### Introduction

This volume presents results for Cycles 5–7; however, a limited number of transmitters from Cycle 7 were actually approved for calibration interval extension. The Cycle 5 and 6 results were used to establish and validate the applied methodology. The full implementation of OLM at Sizewell for calibration interval extension of the plant's primary protection system (PPS) transmitters is scheduled to take place over the course of three fuel outages, of which Cycle 7 was the first. In accordance with the implementation plan, only one instrument train in a redundant set was a candidate for interval extension at the end of Cycle 7. This works out to roughly 25% of the PPS transmitters being candidates for calibration interval extension at the end of Cycle 7, 50% at the end of Cycle 8, and 75% at the end of Cycle 9. Additional supporting information regarding the Sizewell B implementation is available in Volume 1.

# **Organization of This Report**

Section 2 of this report explains the usefulness of the data analysis presented in the report's appendices as supporting information for BE's calibration interval extension program. The bulk of this report resides in three appendices, one for each of three fuel cycles (Cycles 5, 6, and 7).

# **2** PRESENTATION OF ON-LINE CALIBRATION MONITORING RESULTS

# **Overview of Analysis**

Three distinct periods of data are treated separately in the OLM analysis of Sizewell transmitters (see Figure 2-1). During startup, the transmitter's deviation from the parameter estimate is viewed as a function of time and compared to the OLM allowable limits and as a function of transmitter operating range. On a monthly basis over the steady-state period, transmitter deviations from the parameter estimate are analyzed as a function of time and compared to the OLM allowable limits. In addition, during the steady-state period, any initial zero bias is subtracted from all subsequent deviations, and the resultant deviations are compared to the manufacturer's drift specifications to identify sensor drifts over the course of the operating cycle. Analyses during shutdown are analogous to those for startup. In addition, a quantitative analysis—referred to as *transient cycle drift analysis*—is performed. This approach was devised to correlate with the Single Calibration Regression Methodology (SCRM) as defined by BE. In general, the transient cycle drift analysis compares deviations observed at the beginning and end of a fuel cycle to identify changes that have occurred over the course of the cycle.



Figure 2-1 Illustration of the Three Distinct Regions of a Typical Nuclear Plant Fuel Cycle

# **Presentation of Results**

Each of the three appendices provides the following sets of information:

- 1. OLM results for PPS transmitters. In this section, the overall classification of good (within calibration) and bad (out of calibration) is presented. These assessments are based on the OLM analysis during startup, steady state, and shutdown. Any deviations (between sensor measurements and the parameter estimate) that consistently exceed the specified OLM allowance criteria at any point in the fuel cycle will result in the corresponding transmitter being classified as bad. These classifications are used to determine which transmitter calibration intervals should be extended. There are 77 transmitters included in the analyses for Cycles 5 and 6 and 197 transmitters in the Cycle 7 analysis.
- 2. Summary plots. This section presents cycle summaries for each group of redundant transmitters. At the beginning of the summary plot section in each appendix is a table that lists services. These services are illustrated in a set of subsequent figures. Each summary figure consists of the following five separate pieces of information for each set of redundant transmitters:
  - a. A table showing results for startup, steady state on a monthly basis, shutdown, cycle drift, and the final result
  - b. A plot of startup results versus transmitter span
  - c. A plot of shutdown results versus transmitter span
  - d. A plot showing all redundant transmitter deviations versus time
  - e. A plot of transmitter drift versus time
- 3. Transient cycle drift analysis. This section presents the results of the OLM regression methodology for quantifying the zero and span changes that might occur during an operating cycle. At the beginning of this section in each of the three appendices is a table that summarizes the results for all of the transmitters included in the transient drift cycle analyses for the specified fuel cycle. The supporting data for the summary table are presented in subsequent plots of startup and shutdown drift versus operating range for each transmitter. Each transient cycle drift analysis figure consists of the following four separate pieces of information:
  - a. A plot of startup deviation versus span
  - b. A plot of shutdown deviation versus span
  - c. A plot of the differences between 1 and 2 in this list
  - d. A table of results for the group of redundant transmitters analyzed together

The results tables for the transient cycle drift analyses provide good/bad classification based on whether the line obtained as the difference between the shutdown results and startup results crosses the drift limits specified by the transmitter manufacturer. This classification is independent of the similar classification described in the sections "OLM Results for PPS Transmitters." Note that although the transient cycle drift analysis results can provide useful insight, transient cycle drift analysis is not a requirement in determining whether a transmitter's calibration should be postponed. For further details on how these results were obtained, refer to Volume 1.

## Plots of Deviation Versus Span

The presentation shown in Figure 2-2 consists of three plots: 1) the raw data from plant startup, 2) the deviation of each signal from the average of its peers (excluding any outliers), and 3) the deviation of each transmitter from the average of its peers plotted as a function of the transmitter's operating range. In the last two plots, the allowable deviation limits are also shown. Information on how these limits are established is presented in Volume 1.



Figure 2-2 Plots of Raw Data, Deviation Versus Time, and Deviation Versus Span (Startup)

## Plots of Deviation and Drift Versus Time

This presentation (see Figure 2-3) provides OLM results for each month of normal plant operation. Two plots, both representing the deviation of each transmitter from the average of its peers (less any outliers), are shown. The *deviation plot* shows the deviation of the transmitters, including any bias that might come from the differences in the manual calibration of the transmitters; process effects such as temperature effect or static pressure effect; and so on. In the second plot, which is referred to as a *drift plot*, the bias is removed from the deviation data by subtracting the first data point, thereby showing only the drift of the transmitters. The allowable limits for the deviation and drift are also shown in these plots. Information on how these limits are established is presented in Volume 1.

The plots in Figure 2-3 represent 11 months of data that were retrieved during periods of normal plant operation. Every month, 12 hours of data were retrieved from the plant computer and analyzed to produce a single point on the deviation versus span analysis. Each point in the data represents the result for a transmitter from analysis of a 12-hour data record. This 12-hour duration was established in a feasibility study that compared results from different sampling times.

## Table of Monthly Results

Table 2-1 shows an example of on-line calibration monitoring results for 16 PPS transmitters at Sizewell B from Cycle 7 startup data, 17 months of operating data, and Cycle 7 shutdown data. For each transmitter, an X is shown for each month that the transmitter exceeded its deviation limit. In addition, at the end of the 17-month monitoring period, the results were reviewed for any evidence of drift beyond acceptable limits. The drift here was identified by removing the first-month bias from the data so that only the drift remained. Any transmitter exceeding its drift limit is given an X under the drift column in Table 2-1. The final column is labeled "Check Calibration." In this column, *yes* indicates that the transmitter must be calibrated, and *no* indicates that the transmitter needs no calibration. When adequate data are not available to arrive at a *yes* or *no* for the last column of Table 2-1, the transmitter gets an *N/A*, meaning the data were not adequate to yield a definitive result. All transmitters marked *N/A* must therefore be calibrated.



Figure 2-3 Deviation and Drift Versus Time

Table 2-1		
Sample Results for	<b>PPS Transmitters</b>	(Cycle 7)

ltem	Tag	Туре	Startup	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04	May-04	Jun-04	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Shutdown	Drift	Check Calibration
1	1AB-P-0513-W	PPS									Х	Х	Х	Х	Х	Х	Х	Х	Х	Х			Yes
2	1AB-P-0514-W	PPS	Х																		Х		Yes
3	1AB-P-0515-W	PPS																					No
4	1AB-P-0516-W	PPS																					No
5	1AB-P-0523-W	PPS																					No
6	1AB-P-0524-W	PPS																					No
7	1AB-P-0525-W	PPS																					No
8	1AB-P-0526-W	PPS																					No
9	1AB-P-0533-W	PPS																					No
10	1AB-P-0534-W	PPS																					No
11	1AB-P-0535-W	PPS																					No
12	1AB-P-0536-W	PPS																					No
13	1AB-P-0543-W	PPS	Х	Х	Х	Х																	Yes
14	1AB-P-0544-W	PPS																					No
15	1AB-P-0545-W	PPS																					No
16	1AB-P-0546-W	PPS																					No

X = exceeded the acceptance limits

Of the 16 PPS transmitters listed, three are identified with a *yes*—they should be calibrated. Nearly 20% of transmitters received a yes, which does not match well with the expectation of 10% or less. The reason for this is that AMS is being very conservative in arriving at the final results. That is, for any indication of any issues in the data or results, AMS marks the transmitter *bad*. As more experience is accumulated, this level of excessive conservatism can be relaxed, which should improve the statistics.

Using the "Check Calibration" column in Table 2-1, a new table is produced (see Table 2-2) that lists the transmitter group name, tag name, and the calibration results. This is the table that is used by the plant personnel to schedule the transmitters that must be calibrated. In Table 2-2, *good* means that a calibration was not required, *bad* means that a calibration was necessary, and *N/A* means that adequate data were not available to make an assessment of the calibration status of the transmitter.

ltem	Group	Tag	Result
1	Main Steam Pressure Loop 1	1AB-P-0513-W	Bad
2	Main Steam Pressure Loop 1	1AB-P-0514-W	Bad
3	Main Steam Pressure Loop 1	1AB-P-0515-W	Good
4	Main Steam Pressure Loop 1	1AB-P-0516-W	Good
5	Main Steam Pressure Loop 2	1AB-P-0523-W	Good
6	Main Steam Pressure Loop 2	1AB-P-0524-W	Good
7	Main Steam Pressure Loop 2	1AB-P-0525-W	Good
8	Main Steam Pressure Loop 2	1AB-P-0526-W	Good
9	Main Steam Pressure Loop 3	1AB-P-0533-W	Good
10	Main Steam Pressure Loop 3	1AB-P-0534-W	Good
11	Main Steam Pressure Loop 3	1AB-P-0535-W	Good
12	Main Steam Pressure Loop 3	1AB-P-0536-W	Good
13	Main Steam Pressure Loop 4	1AB-P-0543-W	Bad
14	Main Steam Pressure Loop 4	1AB-P-0544-W	Good
15	Main Steam Pressure Loop 4	1AB-P-0545-W	Good
16	Main Steam Pressure Loop 4	1AB-P-0546-W	Good

Table 2-2Example of Final Results of On-Line Calibration Monitoring

### **Cycle Summaries**

After the startup data, steady-state data, and shutdown data have been analyzed, the results are presented for each service (or group of redundant transmitters) in a cycle summary (see Figure 2-4). This summary has a table at the top similar to Table 2-1, except that the last column is labeled "Final" and has an X to indicate whether the transmitter requires a calibration. On the left in Figure 2-4, below the table, are the deviation versus span plots for the startup data at the beginning of the cycle and the shutdown data at the end of the cycle. To the right below the table are the steady-state deviation and steady-state drift plots. Figure 2-4 has both PPS and secondary protection system (SPS) transmitters with different limits. When shown in a group as in Figure 2-4, the limit for the first sensor—a PPS sensor in this case—is displayed. Although the SPS sensors appear to pass the displayed PPS limits, the SPS limits are actually smaller. For example, if 1AB-P-0174-W were viewed alone, it would be evident that it exceeds its limits. The same is true for the deviation and drift plots.



Figure 2-4 Cycle Summary Plot for Main Steam Pressure Loop 1, Cycle 7

#### Presentation of On-Line Calibration Monitoring Results

The preceding information summarizes the state of the transmitter's calibration during the entire cycle. In some cases, a transmitter might be out during some months of the cycle but be within its acceptance limits toward the end of the cycle and during shutdown. In these cases, an evaluation is made to determine whether the transmitter's calibration should be declared good or bad. In particular, plant personnel are normally asked to review any work that might have been done on the transmitter or any disturbance that the transmitter might have experienced. This information is then used to determine whether the transmitter calibration should be declared good or bad.

# Presentation of OLM Results in Terms of Zero and/or Span Shift

To express the OLM results in terms of zero and/or span changes, the results of the startup analysis and shutdown data analysis are compared to determine the change in a transmitter's calibration over the period between plant startup and post-shutdown (that is, 18 months later). Three plots are shown in this presentation (an example is shown in Figure 2-5, which is based on Cycle 5 startup data and Cycle 5 shutdown data from Sizewell B). These three plots are 1) the deviation of a transmitter from the average of its peers plotted versus the transmitter's calibrated span over the Cycle 5 startup period, 2) the deviation of the same transmitter from the average of its peers plotted versus the transmitter from the startup and shutdown results (that is, the drift during the cycle plotted versus the transmitter's span).




Figure 2-5 Transient Cycle Drift Analysis Example

When data are available for both startup and shutdown periods for a transmitter, any significant change in the zero and span that might have occurred during the cycle can be calculated. The procedure is to subtract the startup data from the shutdown data. Specifically, to identify changes in the zero and span of a transmitter, a straight line is fit through the startup data, as shown in the top left plot of Figure 2-5. The same is done for the shutdown data (see Figure 2-5, top right). The shutdown line is then subtracted from the startup line (see Figure 2-5, bottom left). The zero and span changes of the transmitter are shown in the "Analysis Information" table for each transmitter in the group (see Figure 2-5, bottom right).

This procedure was used at Sizewell for comparison of OLM results with those of manual calibrations for the purpose of validating the OLM approach for calibration monitoring. This procedure is not usually used to identify a transmitter's calibration status.

# **A** SUPPORTING DATA FOR RESULTS OF CYCLE 5

Cycle 5 analyses were performed on the data from startup collected in October 2000, from steady-state operation data collected in November and December 2001 and February and March 2002, and from shutdown data collected in May 2002. This was the first cycle that AMS used to present results to Sizewell. Note that in this cycle, steady-state operation data were analyzed only at mid-cycle (November–December 2001) and near the end of the cycle (February–March 2002) instead of every month as in Cycles 6 and 7. Meaningful steady-state results were obtained from the Cycle 5 data; however, the monthly data in Cycles 6 and 7 give a more complete picture of the transmitters' calibration status over the cycle.

During the analysis of Cycle 5 data from Sizewell, a number of interesting and important observations were made. These observations include the following:

- The groups Main Feed Flow to SG A, Main Feed Flow to SG B, Main Feed Flow to SG C, and Main Feed Flow to SG D all had large zero and span errors for the low end of the calibration range, which caused many of these transmitters to fail the recalibration limits. This was likely the result of a bias in the differential pressure measurement that is magnified at the low end of the calibration range because the flow is calculated from the square root of the differential pressure measurement.
- Chemical Volume Control System (CVCS) Control Tank Level transmitters might always fail because they exceed the acceptance limits. This is known to be a problem with entrapped gas in the sensing lines that develops over time; it is not a transmitter calibration problem.
- Reactor Building Pressure does not vary and is very close to the low end of its calibrated range, making it not readily amenable to on-line calibration monitoring. At the request of BE, AMS is still providing OLM results for this service.
- Steam Generator (SG) Level Narrow-Range Transmitters have larger deviations during plant operation because of process noise. These deviations cause some of the transmitters to exceed the OLM acceptance limits during the cycle, though the transmitters are clearly in calibration as observed in their shutdown transients.
- It was difficult to obtain sufficient data for some transmitters during shutdown as a result of manual calibrations that were performed as the process transitioned through the transmitters' range. It would be better from an OLM perspective if manual calibrations were performed after the transmitters go off scale.
- Reactant coolant transmitters transition through only a small portion of their range, which could require that they be monitored at a single point.

## **Cycle 5 OLM Results for PPS Transmitters**

Table A-1 presents the results of Cycle 5 analysis of selected Sizewell B transmitters. In arriving at the final cycle results, AMS concentrated exclusively on those transmitters that are inside the containment of Sizewell B and were subjected to calibration at the end of Cycle 5 during the refueling outage (refueling outages are notated as *RF* plus the number of the operating cycle that the outage follows—RF05, for example). Note that in Table A-1, some results are accompanied by a letter designation in the "OLM Result" column. (The letter designations are explained in the notes that follow Table A-1.) In these cases, AMS did not use the default procedures for arriving at final results. Rather, collective information/engineering judgment was used to classify these 10 transmitters as good or bad.

Item #	Tag	Group	OLM Result
1	1AB-P-0513-W	Main Steam Pressure Loop 1	Good
2	1AB-P-0525-W	Main Steam Pressure Loop 2	Good
3	1AB-P-0536-W	Main Steam Pressure Loop 3	Good
4	1AB-P-0544-W	Main Steam Pressure Loop 4	Good
5	1AE-L-0501-W	SG A Level Wide-Range	Good
6	1AE-L-0505-W	SG A Level Wide-Range	Good
7	1AE-L-0502-W	SG B Level Wide-Range	Good
8	1AE-L-0506-W	SG B Level Wide-Range	Good
9	1AE-L-0503-W	SG C Level Wide-Range	Good
10	1AE-L-0507-W	SG C Level Wide-Range	Good
11	1AE-L-0504-W	SG D Level Wide-Range	Good
12	1AE-L-0508-W	SG D Level Wide-Range	Good
13	1AE-L-0517-W	SG A Level Narrow-Range	Good
14	1AE-L-0518-W	SG A Level Narrow-Range	Good
15	1AE-L-0519-W	SG A Level Narrow-Range	Good
16	1AE-L-0551-W	SG A Level Narrow-Range	Good
17	1AE-L-0527-W	SG B Level Narrow-Range	Good
18	1AE-L-0528-W	SG B Level Narrow-Range	Good
19	1AE-L-0529-W	SG B Level Narrow-Range	Good
20	1AE-L-0552-W	SG B Level Narrow-Range	Good <sup>A</sup>

 Table A-1

 OLM Analysis of Sizewell B Transmitters in Containment During RF05

Table A-1 (continued)	
OLM Analysis of Sizewell B Transmitters in Containment During RFOS	5

Item #	Tag	Group	OLM Result
21	1AE-L-0537-W	SG C Level Narrow-Range	Good
22	1AE-L-0538-W	SG C Level Narrow-Range	Good
23	1AE-L-0539-W	SG C Level Narrow-Range	Good
24	1AE-L-0553-W	SG C Level Narrow-Range	Good <sup>A</sup>
25	1AE-L-0547-W	SG D Level Narrow-Range	Good
26	1AE-L-0548-W	SG D Level Narrow-Range	Good
27	1AE-L-0549-W	SG D Level Narrow-Range	Good
28	1AE-L-0554-W	SG D Level Narrow-Range	Good <sup>A</sup>
29	1AE-F-0515B-W	Main Feed Flow to SG A	Bad <sup>B</sup>
30	1AE-F-0525B-W	Main Feed Flow to SG B	Bad
31	1AE-F-0535B-W	Main Feed Flow to SG C	Good
32	1AE-F-0545B-W	Main Feed Flow to SG D	Good
33	1BB-P-0455-W	Pressurizer Pressure	Good
34	1BB-P-0456-W	Pressurizer Pressure	Bad <sup>c</sup>
35	1BB-P-0457-W	Pressurizer Pressure	Good
36	1BB-P-0458-W	Pressurizer Pressure	Bad
37	1BB-L-0465-W	Pressurizer Level	Bad
38	1BB-L-0466-W	Pressurizer Level	Good <sup>D</sup>
39	1BB-L-0467-W	Pressurizer Level	Good
40	1BB-L-0468-W	Pressurizer Level	Good
41	1BB-P-0406-W	Reactor Coolant System (RCS) Pressure Narrow-Range PPS	Good
42	1BB-P-0407-W	RCS Pressure Narrow-Range PPS	Bad
43	1BB-P-0408-W	RCS Pressure Narrow-Range PPS	Bad <sup>E</sup>
44	1BB-P-0409-W	RCS Pressure Narrow-Range PPS	Good
45	1BB-P-0401-W	RCS Pressure Wide-Range PPS	Good
46	1BB-P-0402-W	RCS Pressure Wide-Range PPS	Good
47	1BB-P-0403-W	RCS Pressure Wide-Range PPS	Good
48	1BB-P-0404-W	RCS Pressure Wide-Range PPS	Bad <sup>F</sup>

## Table A-1 (continued)OLM Analysis of Sizewell B Transmitters in Containment During RF05

Item #	Tag	Group	OLM Result
49	1BB-F-0416-W	RCS Flow Loop 1	Good
50	1BB-F-0417-W	RCS Flow Loop 1	Good
51	1BB-F-0418-W	RCS Flow Loop 1	Good
52	1BB-F-0419=W	RCS Flow Loop 1	Good
53	1BB-F-0426-W	RCS Flow Loop 2	Good
54	1BB-F-0427-W	RCS Flow Loop 2	Good
55	1BB-F-0428-W	RCS Flow Loop 2	Good
56	1BB-F-0429-W	RCS Flow Loop 2	Good
57	1BB-F-0436-W	RCS Flow Loop 3	Good
58	1BB-F-0437-W	RCS Flow Loop 3	Good
59	1BB-F-0438-W	RCS Flow Loop 3	Good
60	1BB-F-0439-W	RCS Flow Loop 3	Bad
61	1BB-F-0446-W	RCS Flow Loop 4	Good
62	1BB-F-0447-W	RCS Flow Loop 4	Good
63	1BB-F-0448-W	RCS Flow Loop 4	Good
64	1BB-F-0449-W	RCS Flow Loop 4	Good
65	1BG-L-0142-W	CVCS Volume Control Tank Level	Bad
66	1BG-L-0143-W	CVCS Volume Control Tank Level	Bad
67	1BG-L-0144-W	CVCS Volume Control Tank Level	Bad
68	1BG-F-0145-W	CVCS Volume Control Tank Level	Bad
69	1BG-L-0149-W	CVCS Volume Control Tank Level	Bad
70	1GN-P-0934-W	Reactor Building Pressure	Good
71	1GN-P-0935-W	Reactor Building Pressure	Good
72	1GN-P-0936-W	Reactor Building Pressure	Good
73	1GN-P-0937-W	Reactor Building Pressure	Good <sup>G</sup>
74	1GN-P-0940-W	Reactor Building Pressure	Good
75	1GN-P-0941-W	Reactor Building Pressure	Bad <sup>H</sup>

## Table A-1 (continued)OLM Analysis of Sizewell B Transmitters in Containment During RF05

Item #	Tag	Group	OLM Result
76	1GN-P-0942-W	Reactor Building Pressure	Good
77	1GN-P-0943-W	Reactor Building Pressure	Good

Notes:

- A. These transmitters are good based on the shutdown data and should not have to be calibrated. However, it must be pointed out that these transmitters showed some deviations from process noise that caused them to exceed the allowable limits during the cycle.
- B. This transmitter was good everywhere except at the lower end of the range. This transmitter was marked as bad, but it could be considered good if its calibration is not important at the lower end of its range.
- C. This transmitter was good until April 29, 2002. The data show that something was done to the transmitter on April 29 that caused it to go off calibration. From that point forward, the transmitter became bad throughout its range.
- D. This transmitter was bad. However, it seems that the calibration of the transmitter was checked on April 29 and adjusted. As a result, the transmitter became good after April 29 and remained good until the end of the shutdown data.
- E. This transmitter was good until April 30. Then a sudden shift in its output on April 30 caused it to go out of calibration and remain out of calibration until the end of the shutdown data, which was only two hours later. Therefore, this transmitter was classified as bad.
- F. This transmitter was classified as bad. The transmitter deviations exceeded the acceptance limits for 10 hours on May 2.
- G. This transmitter was bad until May 4, on which date it appears to have been calibrated.
- H. This transmitter was good before April 30, on which date it exceeded its acceptance limits.

For the preceding results, the parity space averaging technique was used by default in the first round of analysis. Following discussions between AMS and BE in April 2002 regarding the method of analysis, a simple or band averaging technique was used instead of parity space when necessary to analyze the data in the second round of analysis.

## **Cycle 5 Summary Plots**

The services for which summary plots are provided in this section are listed in Table A-2. A summary plot is provided for each listed service in Figures A-1 through A-42, as indicated in Table A-2.

Table A-2			
List of Services Include	d in the RF05	Summary	Plots

Item #	Service	Summary Plot Figure Number
1	Main Steam Pressure Loop 1	A-1
2	Main Steam Pressure Loop 2	A-2
3	Main Steam Pressure Loop 3	A-3
4	Main Steam Pressure Loop 4	A-4
5	SG A Level Wide-Range	A-5
6	SG B Level Wide-Range	A-6
7	SG C Level Wide-Range	A-7
8	SG D Level Wide-Range	A-8
9	SG A Level Narrow-Range	A-9
10	SG B Level Narrow-Range	A-10
11	SG C Level Narrow-Range	A-11
12	SG D Level Narrow-Range	A-12
13	Main Feed Flow to SG A	A-13
14	Main Feed Flow to SG B	A-14
15	Main Feed Flow to SG C	A-15
16	Main Feed Flow to SG D	A-16
17	Pressurizer Pressure	A-17
18	Pressurizer Level	A-18
19	RCS Pressure Narrow-Range PPS	A-19
20	RCS Pressure Wide-Range PPS	A-20
21	RCS Flow Loop 1	A-21
22	RCS Flow Loop 2	A-22
23	RCS Flow Loop 3	A-23
24	RCS Flow Loop 4	A-24
25	RCS Pressure Wide-Range SPS	A-25
26	RCS Pressure Narrow-Range SPS	A-26
27	CVCS Volume Control Tank Level	A-27
28	Refueling Water Storage Tank (RWST) Level A	A-28
29	RWST Level B	A-29
30	Essential Service Water (ESW) Train A Flow	A-30
31	ESW Train B Flow	A-31

### Table A-2 (continued) List of Services Included in the RF05 Summary Plots

Item #	Service	Summary Plot Figure Number
32	Surge Tank Level in Component Cooling Water System (CCWS) Train B	A-32
33	Surge Tank Level in CCWS Train A	A-33
34	CCWS Flow to Train A Low-Temperature Loads	A-34
35	CCWS Flow to Train B Low-Temperature Loads	A-35
36	Component Cooling Water (CCW) Flow in Reactor Coolant Pump (RCP) Thermal Barrier Return	A-36
37	Reactor Building Pressure	A-37
38	Main Steamline 1 Flow	A-38
39	Main Steamline 2 Flow	A-39
40	Main Steamline 3 Flow	A-40
41	Main Steamline 4 Flow	A-41
42	RCP Seal Injection Flow	A-42



Figure A-1 Main Steam Pressure Loop 1 Summary Plot: Cycle 5





Figure A-2 Main Steam Pressure Loop 2 Summary Plot: Cycle 5



Figure A-3 Main Steam Pressure Loop 3 Summary Plot: Cycle 5





Figure A-4 Main Steam Pressure Loop 4 Summary Plot: Cycle 5



Figure A-5 SG A Level Wide-Range Summary Plot: Cycle 5





Figure A-6 SG B Level Wide-Range Summary Plot: Cycle 5



Figure A-7 SG C Level Wide-Range Summary Plot: Cycle 5





Figure A-8 SG D Level Wide-Range Summary Plot: Cycle 5



Figure A-9 SG A Level Narrow-Range Summary Plot: Cycle 5





Figure A-10 SG B Level Narrow-Range Summary Plot: Cycle 5







Figure A-11 SG C Level Narrow-Range Summary Plot: Cycle 5





Figure A-12 SG D Level Narrow-Range Summary Plot: Cycle 5



Figure A-13 Main Feed Flow to SG A Summary Plot: Cycle 5



Figure A-14 Main Feed Flow to SG B Summary Plot: Cycle 5



Figure A-15 Main Feed Flow to SG C Summary Plot: Cycle 5





Figure A-16 Main Feed Flow to SG D Summary Plot: Cycle 5



Figure A-17 Pressurizer Pressure Summary Plot: Cycle 5

**Cycle Summary** 



Figure A-18 Pressurizer Level Summary Plot: Cycle 5



Figure A-19 RCS Pressure Narrow-Range PPS Summary Plot: Cycle 5





Figure A-20 RCS Pressure Wide-Range PPS Summary Plot: Cycle 5



Figure A-21 RCS Flow Loop 1 Summary Plot: Cycle 5





Figure A-22 RCS Flow Loop 2 Summary Plot: Cycle 5



Figure A-23 RCS Flow Loop 3 Summary Plot: Cycle 5





Figure A-24 RCS Flow Loop 4 Summary Plot: Cycle 5



Figure A-25 RCS Pressure Wide-Range SPS Summary Plot: Cycle 5



Figure A-26 RCS Pressure Narrow-Range SPS Summary Plot: Cycle 5



Figure A-27 CVCS Volume Control Tank Level Summary Plot: Cycle 5


Figure A-28 RWST Level A Summary Plot: Cycle 5



Figure A-29 RWST Level B Summary Plot: Cycle 5





Figure A-30 ESW Train A Flow Summary Plot: Cycle 5



Figure A-31 ESW Train B Flow Summary Plot: Cycle 5





Figure A-32 Surge Tank Level in CCWS Train B Summary Plot: Cycle 5



Figure A-33 Surge Tank Level in CCWS Train A Summary Plot: Cycle 5





Figure A-34 CCWS Flow to Train A Low-Temperature Loads Summary Plot: Cycle 5



**Cycle Summary** 

Figure A-35 CCWS Flow to Train B Low-Temperature Loads Summary Plot: Cycle 5

A-42



Figure A-36 CCW Flow in RCP Thermal Barrier Return Summary Plot: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-37 Reactor Building Pressure Summary Plot: Cycle 5





Figure A-38 Main Steamline 1 Flow Summary Plot: Cycle 5



Figure A-39 Main Steamline 2 Flow Summary Plot: Cycle 5





Figure A-40 Main Steamline 3 Flow Summary Plot: Cycle 5



Figure A-41 Main Steamline 4 Flow Summary Plot: Cycle 5



Figure A-42 RCP Seal Injection Flow Summary Plot: Cycle 5

# **Cycle 5 Transient Cycle Drift Analysis**

The transient cycle drift analysis results are provided Table A-3. Figures A-43 through A-82 show summary plots for each listed service, as indicated in the "Figure Number" column of Table A-3.

Item #	Service	Tag ID	Zero Drift	Span Drift	Result	Figure Number
1	Main Steam Pressure Loop 1	1AB-P-0513-W	-0.30	-0.29	Good	A-43
2	Main Steam Pressure Loop 1	1AB-P-0514-W	-0.15	0.01	Good	A-44
3	Main Steam Pressure Loop 1	1AB-P-0515-W	-0.19	-0.34	Good	A-45
4	Main Steam Pressure Loop 1	1AB-P-0516-W	0.13	-0.32	Good	A-46
5	Main Steam Pressure Loop 1	1AB-P-0177-W	-0.09	-0.19	Good	A-47
6	Main Steam Pressure Loop 1	1AB-P-0174-W	0.14	0.15	Good	A-48
7	Main Steam Pressure Loop 1	1AB-P-0175-W	0.06	0.89	Bad	A-49
8	Main Steam Pressure Loop 1	1AB-P-0137-W	0.18	0.17	Good	A-50
9	Main Steam Pressure Loop 1	1AB-P-0138-W	0.46	-0.02	Bad	A-51
10	Main Steam Pressure Loop 2	1AB-P-0523-W	-0.11	-0.31	Good	A-52
11	Main Steam Pressure Loop 2	1AB-P-0524-W	-0.31	-0.36	Good	A-53
12	Main Steam Pressure Loop 2	1AB-P-0525-W	-0.22	-0.48	Good	A-54
13	Main Steam Pressure Loop 2	1AB-P-0526-W	0.09	0.17	Good	A-55
14	Main Steam Pressure Loop 2	1AB-P-0277-W	-0.07	-0.13	Good	A-56
15	Main Steam Pressure Loop 2	1AB-P-0275-W	-0.03	0.07	Good	A-57
16	Main Steam Pressure Loop 2	1AB-P-0274-W	0.81	3.21	Bad	A-58
17	Main Steam Pressure Loop 2	1AB-P-0237-W	0.04	0.20	Good	A-59
18	Main Steam Pressure Loop 2	1AB-P-0238-W	0.01	0.09	Good	A-60
19	Main Steam Pressure Loop 3	1AB-P-0533-W	-0.17	-0.60	Good	A-61
20	Main Steam Pressure Loop 3	1AB-P-0534-W	-0.72	-0.38	Good	A-62
21	Main Steam Pressure Loop 3	1AB-P-0535-W	-0.96	-0.91	Good	A-63
22	Main Steam Pressure Loop 3	1AB-P-0536-W	-0.15	-0.29	Good	A-64
23	Main Steam Pressure Loop 3	1AB-P-0377-W	0.12	-0.49	Good	A-65
24	Main Steam Pressure Loop 3	1AB-P-0337-W	-0.11	-0.23	Bad	A-66

# Table A-3 Cycle 5 Transient Drift Analysis Summary

# Table A-3 (continued) Cycle 5 Transient Drift Analysis Summary

Item #	Service	Tag ID	Zero Drift	Span Drift	Result	Figure Number
25	Main Steam Pressure Loop 3	1AB-P-0338-W	0.07	0.53	Bad	A-67
26	Main Steam Pressure Loop 3	1AB-P-0375-W	-0.15	-0.21	Bad	A-68
27	Main Steam Pressure Loop 3	1AB-P-0374-W	-0.10	-0.30	Bad	A-69
28	Main Steam Pressure Loop 4	1AB-P-0543-W	-0.44	-0.51	Good	A-70
29	Main Steam Pressure Loop 4	1AB-P-0544-W	-0.44	-0.29	Good	A-71
30	Main Steam Pressure Loop 4	1AB-P-0545-W	-0.13	-0.29	Good	A-72
31	Main Steam Pressure Loop 4	1AB-P-0546-W	-0.43	-0.08	Good	A-73
32	Main Steam Pressure Loop 4	1AB-P-0477-W	-0.45	0.51	Good	A-74
33	Main Steam Pressure Loop 4	1AB-P-0437-W	-0.06	-0.09	Good	A-75
34	Main Steam Pressure Loop 4	1AB-P-0438-W	0.30	0.66	Bad	A-76
35	Main Steam Pressure Loop 4	1AB-P-0474-W	-0.07	0.03	Good	A-77
36	Main Steam Pressure Loop 4	1AB-P-0475-W	-0.10	0.05	Good	A-78
37	Pressurizer Pressure	1BB-P-0455-W	-0.11	-0.19	Good	A-79
38	Pressurizer Pressure	1BB-P-0456-W	1.88	0.43	Bad	A-80
39	Pressurizer Pressure	1BB-P-0457-W	-0.09	-0.16	Good	A-81
40	Pressurizer Pressure	1BB-P-0458-W	-0.48	-0.60	Good	A-82
41	Pressurizer Level	1BB-L-0465-W	-3.11	-12.54	Bad	A-83
42	Pressurizer Level	1BB-L-0466-W	0.28	-0.04	Good	A-84
43	Pressurizer Level	1BB-L-0467-W	-0.22	-0.08	Good	A-85
44	Pressurizer Level	1BB-L-0468-W	0.05	-0.37	Good	A-86



**Transient Cycle Drift Analysis** 

Figure A-43 Main Steam Pressure Loop 1 (1AB-P-0513-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-44 Main Steam Pressure Loop 1 (1AB-P-0514-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-45 Main Steam Pressure Loop 1 (1AB-P-0515-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-46 Main Steam Pressure Loop 1 (1AB-P-0516-W) Transient Drift Analysis: Cycle 5



Figure A-47 Main Steam Pressure Loop 1 (1AB-P-0177-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-48 Main Steam Pressure Loop 1 (1AB-P-0174-W) Transient Drift Analysis: Cycle 5



Figure A-49 Main Steam Pressure Loop 1 (1AB-P-0175-W) Transient Drift Analysis: Cycle 5



Figure A-50 Main Steam Pressure Loop 1 (1AB-P-0137-W) Transient Drift Analysis: Cycle 5



Figure A-51 Main Steam Pressure Loop 1 (1AB-P-0138-W) Transient Drift Analysis: Cycle 5



Figure A-52 Main Steam Pressure Loop 2 (1AB-P-0523-W) Transient Drift Analysis: Cycle 5



Figure A-53 Main Steam Pressure Loop 2 (1AB-P-0524-W) Transient Drift Analysis: Cycle 5



Figure A-54 Main Steam Pressure Loop 2 (1AB-P-0525-W) Transient Drift Analysis: Cycle 5



Figure A-55 Main Steam Pressure Loop 2 (1AB-P-0526-W) Transient Drift Analysis: Cycle 5



Figure A-56 Main Steam Pressure Loop 2 (1AB-P-0277-W) Transient Drift Analysis: Cycle 5



Figure A-57 Main Steam Pressure Loop 2 (1AB-P-0275-W) Transient Drift Analysis: Cycle 5



Figure A-58 Main Steam Pressure Loop 2 (1AB-P-0274-W) Transient Drift Analysis: Cycle 5



Figure A-59 Main Steam Pressure Loop 2 (1AB-P-0237-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-60 Main Steam Pressure Loop 2 (1AB-P-0238-W) Transient Drift Analysis: Cycle 5



Figure A-61 Main Steam Pressure Loop 3 (1AB-P-0533-W) Transient Drift Analysis: Cycle 5


Figure A-62 Main Steam Pressure Loop 3 (1AB-P-0534-W) Transient Drift Analysis: Cycle 5



Figure A-63 Main Steam Pressure Loop 3 (1AB-P-0535-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-64 Main Steam Pressure Loop 3 (1AB-P-0536-W) Transient Drift Analysis: Cycle 5



Figure A-65 Main Steam Pressure Loop 3 (1AB-P-0377-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-66 Main Steam Pressure Loop 3 (1AB-P-0337-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-67 Main Steam Pressure Loop 3 (1AB-P-0338-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-68 Main Steam Pressure Loop 3 (1AB-P-0375-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-69 Main Steam Pressure Loop 3 (1AB-P-0374-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-70 Main Steam Pressure Loop 4 (1AB-P-0543-W) Transient Drift Analysis: Cycle 5



Figure A-71 Main Steam Pressure Loop 4 (1AB-P-0544-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-72 Main Steam Pressure Loop 4 (1AB-P-0545-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-73 Main Steam Pressure Loop 4 (1AB-P-0546-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-74 Main Steam Pressure Loop 4 (1AB-P-0477-W) Transient Drift Analysis: Cycle 5



Figure A-75 Main Steam Pressure Loop 4 (1AB-P-0437-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-76 Main Steam Pressure Loop 4 (1AB-P-0438-W) Transient Drift Analysis: Cycle 5



Figure A-77 Main Steam Pressure Loop 4 (1AB-P-0474-W) Transient Drift Analysis: Cycle 5



Figure A-78 Main Steam Pressure Loop 4 (1AB-P-0475-W) Transient Drift Analysis: Cycle 5



Figure A-79 Pressurizer Pressure (1BB-P-0455-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-80 Pressurizer Pressure (1BB-P-0456-W) Transient Drift Analysis: Cycle 5



Figure A-81 Pressurizer Pressure (1BB-P-0457-W) Transient Drift Analysis: Cycle 5



Figure A-82 Pressurizer Pressure (1BB-P-0458-W) Transient Drift Analysis: Cycle 5



Figure A-83 Pressurizer Level (1BB-L-0465-W) Transient Drift Analysis: Cycle 5



**Transient Cycle Drift Analysis** 

Figure A-84 Pressurizer Level (1BB-L-0466-W) Transient Drift Analysis: Cycle 5



Figure A-85 Pressurizer Level (1BB-L-0467-W) Transient Drift Analysis: Cycle 5



Figure A-86 Pressurizer Level (1BB-L-0468-W) Transient Drift Analysis: Cycle 5

# **B** SUPPORTING DATA FOR RESULTS OF CYCLE 6

Cycle 6 analysis was performed on the data collected from startup in May 2002, from data collected from steady-state operation each month from June 2002–September 2003, and from data collected during shutdown in October 2003. This was the first cycle in which steady-state data from each month were used to help determine the calibration status of the transmitters. At the beginning of the cycle, one week's worth of data were sent every month. Near the middle of the cycle, AMS engineers determined that Sizewell needed to send only 12 hours of data each month in order to get results equivalent to the one-week data. From then on, Sizewell sent 12 hours of data each month, which it continues to do as of this writing.

# **Cycle 6 OLM Results for PPS Transmitters**

Table B-1 presents the results of Cycle 6 analysis of selected Sizewell B transmitters. In arriving at the results for Cycle 6, again, AMS concentrated exclusively on those transmitters inside the containment of Sizewell B and subjected to calibration at the end of Cycle 6 during the refueling outage. Note that in Table B-1, eight transmitters are accompanied by a letter designation in the "OLM Result" column. (The letter designations are explained in the notes that follow Table B-1.) For these eight transmitters, AMS did not use the default procedures for arriving at final results. Rather, collective information/engineering judgment was used in marking them as good or bad.

Table B-1	
OLM Analysis of Sizewell B Transmitters in Containment During RF0	6

Item #	Tag	Group	OLM Result
1	1AB-P-0513-W	Main Steam Pressure Loop 1	Good
2	1AB-P-0525-W	Main Steam Pressure Loop 2	Good
3	1AB-P-0536-W	Main Steam Pressure Loop 3	Good
4	1AB-P-0544-W	Main Steam Pressure Loop 4	Good
5	1AE-L-0501-W	SG A Level Wide-Range	Good
6	1AE-L-0505-W	SG A Level Wide-Range	Good
7	1AE-L-0502-W	SG B Level Wide-Range	Good
8	1AE-L-0506-W	SG B Level Wide-Range	Good
9	1AE-L-0503-W	SG C Level Wide-Range	Good
10	1AE-L-0507-W	SG C Level Wide-Range	Good
11	1AE-L-0504-W	SG D Level Wide-Range	Good
12	1AE-L-0508-W	SG D Level Wide-Range	Good
13	1AE-L-0517-W	SG A Level Narrow-Range	Good
14	1AE-L-0518-W	SG A Level Narrow-Range	Good
15	1AE-L-0519-W	SG A Level Narrow-Range	Good
16	1AE-L-0551-W	SG A Level Narrow-Range	Good
17	1AE-L-0527-W	SG B Level Narrow-Range	Good
18	1AE-L-0528-W	SG B Level Narrow-Range	Good
19	1AE-L-0529-W	SG B Level Narrow-Range	Good
20	1AE-L-0552-W	SG B Level Narrow-Range	Good
21	1AE-L-0537-W	SG C Level Narrow-Range	Good
22	1AE-L-0538-W	SG C Level Narrow-Range	Good
23	1AE-L-0539-W	SG C Level Narrow-Range	Good
24	1AE-L-0553-W	SG C Level Narrow-Range	Good
25	1AE-L-0547-W	SG D Level Narrow-Range	Good
26	1AE-L-0548-W	SG D Level Narrow-Range	Good
27	1AE-L-0549-W	SG D Level Narrow-Range	Good
28	1AE-L-0554-W	SG D Level Narrow-Range	Good

Table B-1 (continued)	
OLM Analysis of Sizewell B Transmitters in Containment During RI	-06

Item #	Тад	Group	OLM Result
29	1AE-F-0515B-W	Main Feed Flow to SG A	Bad
30	1AE-F-0525B-W	Main Feed Flow to SG B	Bad
31	1AE-F-0535B-W	Main Feed Flow to SG C	Bad
32	1AE-F-0545B-W	Main Feed Flow to SG D	Bad
33	1BB-P-0455-W	Pressurizer Pressure	Good
34	1BB-P-0456-W	Pressurizer Pressure	Bad
35	1BB-P-0457-W	Pressurizer Pressure	Good
36	1BB-P-0458-W	Pressurizer Pressure	Good
37	1BB-L-0465-W	Pressurizer Level	Bad
38	1BB-L-0466-W	Pressurizer Level	Good
39	1BB-L-0467-W	Pressurizer Level	Good
40	1BB-L-0468-W	Pressurizer Level	Good
41	1BB-P-0406-W	RCS Pressure Narrow-Range PPS	Good
42	1BB-P-0407-W	RCS Pressure Narrow-Range PPS	Bad <sup>A</sup>
43	1BB-P-0408-W	RCS Pressure Narrow-Range PPS	Bad <sup>A</sup>
44	1BB-P-0409-W	RCS Pressure Narrow-Range PPS	Good
45	1BB-P-0401-W	RCS Pressure Wide-Range PPS	Good
46	1BB-P-0402-W	RCS Pressure Wide-Range PPS	Good <sup>A</sup>
47	1BB-P-0403-W	RCS Pressure Wide-Range PPS	Bad <sup>A</sup>
48	1BB-P-0404-W	RCS Pressure Wide-Range PPS	Good
49	1BB-F-0416-W	RCS Flow Loop 1	Bad <sup>B</sup>
50	1BB-F-0417-W	RCS Flow Loop 1	Bad <sup>B</sup>
51	1BB-F-0418-W	RCS Flow Loop 1	Good <sup>B</sup>
52	1BB-F-0419-W	RCS Flow Loop 1	Bad <sup>B</sup>
53	1BB-F-0426-W	RCS Flow Loop 2	Bad
54	1BB-F-0427-W	RCS Flow Loop 2	Good
55	1BB-F-0428-W	RCS Flow Loop 2	Good
56	1BB-F-0429-W	RCS Flow Loop 2	Bad

Table B-1 (continued)
OLM Analysis of Sizewell B Transmitters in Containment During RF06

Item #	Тад	Group	OLM Result
57	1BB-F-0436-W	RCS Flow Loop 3	Good
58	1BB-F-0437-W	RCS Flow Loop 3	Good
59	1BB-F-0438-W	RCS Flow Loop 3	Good
60	1BB-F-0439-W	RCS Flow Loop 3	Good
61	1BB-F-0446-W	RCS Flow Loop 4	Good
62	1BB-F-0447-W	RCS Flow Loop 4	Good
63	1BB-F-0448-W	RCS Flow Loop 4	Good
64	1BB-F-0449-W	RCS Flow Loop 4	Good
65	1BG-L-0142-W	CVCS Volume Control Tank Level	Bad
66	1BG-L-0143-W	CVCS Volume Control Tank Level	Bad
67	1BG-L-0144-W	CVCS Volume Control Tank Level	Bad
68	1BG-F-0145-W	CVCS Volume Control Tank Level	Bad
69	1BG-L-0149-W	CVCS Volume Control Tank Level	Bad
70	1GN-P-0934-W	Reactor Building Pressure	Good
71	1GN-P-0935-W	Reactor Building Pressure	Good
72	1GN-P-0936-W	Reactor Building Pressure	Good
73	1GN-P-0937-W	Reactor Building Pressure	Good
74	1GN-P-0940-W	Reactor Building Pressure	Good
75	1GN-P-0941-W	Reactor Building Pressure	Bad
76	1GN-P-0942-W	Reactor Building Pressure	Good
77	1GN-P-0943-W	Reactor Building Pressure	Good

Notes:

A. These transmitters had a pressure bias in loops 2 and 3 during shutdown when the RCPs in those loops were shut off. This resulted in the process being different between the loops for these pressures. Because of this, the biased pressure data were not used to evaluate the status of these transmitters when the pumps were shut off.

B. Two of the four transmitters in this group were out of calibration at the lower end of the range. This was likely due to a bias in the differential pressure measurement that is magnified at the low end of the calibration range because the flow is calculated from the square root of the differential pressure measurement. Also, 1BB-F-0419-W was only marginally out at one calibration point in the middle of the calibration range. As such, this transmitter was not removed from the average but was flagged as bad to be conservative. This allowed 1-BB-F-0418-W to be classified as good in this service.

For the preceding results, the parity space averaging technique was used by default. In a few cases, a simple average was used instead of parity space because it was determined that simple averaging was better for these cases.

# **Cycle 6 Summary Plots**

The services for which summary plots are provided in this section are listed in Table B-2. Figures B-1 through B-41 show summary plots for each listed service, as indicated in the "Figure Number" column of Table B-2.

## Table B-2

## List of Services Included in the RF06 Summary Plots

Item #	Service	Figure Number
1	Main Steam Pressure Loop 1	B-1
2	Main Steam Pressure Loop 2	B-2
3	Main Steam Pressure Loop 3	B-3
4	Main Steam Pressure Loop 4	B-4
5	SG A Level Wide-Range	B-5
6	SG B Level Wide-Range	B-6
7	SG C Level Wide-Range	B-7
8	SG D Level Wide-Range	B-8
9	SG A Level Narrow-Range	B-9
10	SG B Level Narrow-Range	B-10
11	SG C Level Narrow-Range	B-11
12	SG D Level Narrow-Range	B-12
13	Main Feed Flow to SG A	B-13
14	Main Feed Flow to SG B	B-14
15	Main Feed Flow to SG C	B-15
16	Main Feed Flow to SG D	B-16
17	Pressurizer Pressure	B-17
18	Pressurizer Level	B-18
19	RCS Pressure Narrow-Range PPS	B-19
20	RCS Pressure Wide-Range PPS	B-20
21	RCS Flow Loop 1	B-21
22	RCS Flow Loop 2	B-22
23	RCS Flow Loop 3	B-23
24	RCS Flow Loop 4	B-24

# Table B-2 (continued)List of Services Included in the RF06 Summary Plots

Item #	Service	Figure Number
25	RCS Pressure Wide-Range SPS	B-25
26	RCS Pressure Narrow-Range SPS	B-26
27	CVCS Volume Control Tank Level	B-27
28	RWST Level A	B-28
29	RWST Level B	B-29
30	ESW Train A Flow	B-30
31	ESW Train B Flow	B-31
32	Surge Tank Level in CCWS Train B	B-32
33	Surge Tank Level in CCWS Train A	B-33
34	CCWS Flow to Train A Low-Temperature Loads	B-34
35	CCWS Flow to Train B Low-Temperature Loads	B-35
36	CCW Flow in RCP Thermal Barrier Return	B-36
37	Reactor Building Pressure	B-37
38	Main Steamline 1 Flow	B-38
39	Main Steamline 2 Flow	B-39
40	Main Steamline 3 Flow	B-40
41	Main Steamline 4 Flow	B-41



Figure B-1 Main Steam Pressure Loop 1 Summary Plot: Cycle 6



Figure B-2 Main Steam Pressure Loop 2 Summary Plot: Cycle 6



Figure B-3 Main Steam Pressure Loop 3 Summary Plot: Cycle 6



Figure B-4 Main Steam Pressure Loop 4 Summary Plot: Cycle 6


Figure B-5 SG A Level Wide-Range Summary Plot: Cycle 6



Figure B-6 SG B Level Wide-Range Summary Plot: Cycle 6



Figure B-7 SG C Level Wide-Range Summary Plot: Cycle 6



Figure B-8 SG D Level Wide-Range Summary Plot: Cycle 6



Figure B-9 SG A Level Narrow-Range Summary Plot: Cycle 6



Figure B-10 SG B Level Narrow-Range Summary Plot: Cycle 6



Figure B-11 SG C Level Narrow-Range Summary Plot: Cycle 6



Figure B-12 SG D Level Narrow-Range Summary Plot: Cycle 6



Figure B-13 Main Feed Flow to SG A Summary Plot: Cycle 6



Figure B-14 Main Feed Flow to SG B Summary Plot: Cycle 6



Figure B-15 Main Feed Flow to SG C Summary Plot: Cycle 6



Figure B-16 Main Feed Flow to SG D Summary Plot: Cycle 6



Figure B-17 Pressurizer Pressure Summary Plot: Cycle 6



Figure B-18 Pressurizer Level Summary Plot: Cycle 6



Figure B-19 RCS Pressure Narrow-Range PPS Summary Plot: Cycle 6



Figure B-20 RCS Pressure Wide-Range PPS Summary Plot: Cycle 6



Figure B-21 RCS Flow Loop 1 Summary Plot: Cycle 6



Figure B-22 RCS Flow Loop 2 Summary Plot: Cycle 6



Figure B-23 RCS Flow Loop 3 Summary Plot: Cycle 6



Figure B-24 RCS Flow Loop 4 Summary Plot: Cycle 6



Figure B-25 RCS Pressure Wide-Range SPS Summary Plot: Cycle 6



Figure B-26 RCS Pressure Narrow-Range SPS Summary Plot: Cycle 6



Figure B-27 CVCS Volume Control Tank Level Summary Plot: Cycle 6



Figure B-28 RWST Level A Summary Plot: Cycle 6



Figure B-29 RWST Level B Summary Plot: Cycle 6



Figure B-30 ESW Train A Flow Summary Plot: Cycle 6



Figure B-31 ESW Train B Flow Summary Plot: Cycle 6



Figure B-32 Surge Tank Level in CCWS Train B Summary Plot: Cycle 6



Figure B-33 Surge Tank Level in CCWS Train A Summary Plot: Cycle 6



Figure B-34 CCWS Flow to Train A Low-Temperature Loads Summary Plot: Cycle 6

**B-40** 



Figure B-35 CCWS Flow to Train B Low-Temperature Loads Summary Plot: Cycle 6



Figure B-36 CCW Flow in RCP Thermal Barrier Return Summary Plot: Cycle 6



Figure B-37 Reactor Building Pressure Summary Plot: Cycle 6



Figure B-38 Main Steamline 1 Flow Summary Plot: Cycle 6



Figure B-39 Main Steamline 2 Flow Summary Plot: Cycle 6



Figure B-40 Main Steamline 3 Flow Summary Plot: Cycle 6
## **Cycle Summary**



Figure B-41 Main Steamline 4 Flow Summary Plot: Cycle 6

# Cycle 6 Transient Cycle Drift Analysis

The transient cycle drift analysis results are shown in Table B-3. Figures B-42 through B-85 provide summary plots for each service listed, as indicated in the "Figure Number" column of Table B-3.

Item #	Service	Tag	Zero Drift	Span Drift	Result	Figure Number
1	Main Steam Pressure Loop 1	1AB-P-0513-W	-0.14	-0.47	Good	B-42
2	Main Steam Pressure Loop 1	1AB-P-0514-W	-0.09	-0.13	Good	B-43
3	Main Steam Pressure Loop 1	1AB-P-0515-W	-0.10	-0.35	Good	B-44
4	Main Steam Pressure Loop 1	1AB-P-0516-W	-0.07	-0.40	Good	B-45
5	Main Steam Pressure Loop 1	1AB-P-0177-W	-0.41	-0.53	Good	B-46
6	Main Steam Pressure Loop 1	1AB-P-0174-W	0.09	0.27	Bad	B-47
7	Main Steam Pressure Loop 1	1AB-P-0175-W	0.16	0.45	Bad	B-48
8	Main Steam Pressure Loop 1	1AB-P-0137-W	0.09	0.26	Bad	B-49
9	Main Steam Pressure Loop 1	1AB-P-0138-W	0.01	0.28	Bad	B-50
10	Main Steam Pressure Loop 2	1AB-P-0523-W	0.03	-0.22	Good	B-51
11	Main Steam Pressure Loop 2	1AB-P-0524-W	0.38	0.35	Good	B-52
12	Main Steam Pressure Loop 2	1AB-P-0525-W	0.00	-0.38	Good	B-53
13	Main Steam Pressure Loop 2	1AB-P-0526-W	0.53	0.32	Good	B-54
14	Main Steam Pressure Loop 2	1AB-P-0277-W	-1.08	-1.67	Bad	B-55
15	Main Steam Pressure Loop 2	1AB-P-0275-W	-0.03	0.15	Good	B-56
16	Main Steam Pressure Loop 2	1AB-P-0274-W	-0.28	-0.48	Bad	B-57
17	Main Steam Pressure Loop 2	1AB-P-0237-W	0.02	0.20	Good	B-58
18	Main Steam Pressure Loop 2	1AB-P-0238-W	0.12	0.30	Bad	B-59
19	Main Steam Pressure Loop 3	1AB-P-0533-W	-0.06	-0.46	Good	B-60
20	Main Steam Pressure Loop 3	1AB-P-0534-W	-0.64	-0.87	Good	B-61
21	Main Steam Pressure Loop 3	1AB-P-0535-W	-0.04	-0.23	Good	B-62
22	Main Steam Pressure Loop 3	1AB-P-0536-W	-0.05	-0.04	Good	B-63
23	Main Steam Pressure Loop 3	1AB-P-0377-W	0.14	-0.22	Good	B-64

Table B-3 Cycle 6 Transient Drift Analysis Summary

## Table B-3 (continued) Cycle 6 Transient Drift Analysis Summary

Item #	Service	Tag	Zero Drift	Span Drift	Result	Figure Number
24	Main Steam Pressure Loop 3	1AB-P-0337-W	0.00	-0.06	Good	B-65
25	Main Steam Pressure Loop 3	1AB-P-0338-W	0.00	-0.02	Good	B-66
26	Main Steam Pressure Loop 3	1AB-P-0375-W	-0.04	0.02	Good	B-67
27	Main Steam Pressure Loop 3	1AB-P-0374-W	0.05	0.14	Good	B-68
28	Main Steam Pressure Loop 4	1AB-P-0543-W	-1.31	-2.61	Bad	B-69
29	Main Steam Pressure Loop 4	1AB-P-0544-W	0.13	-0.23	Good	B-70
30	Main Steam Pressure Loop 4	1AB-P-0545-W	-0.10	0.03	Good	B-71
31	Main Steam Pressure Loop 4	1AB-P-0546-W	0.90	0.24	Good	B-72
32	Main Steam Pressure Loop 4	1AB-P-0477-W	-0.15	0.18	Good	B-73
33	Main Steam Pressure Loop 4	1AB-P-0437-W	0.04	0.21	Bad	B-74
34	Main Steam Pressure Loop 4	1AB-P-0438-W	0.26	0.13	Bad	B-75
35	Main Steam Pressure Loop 4	1AB-P-0474-W	0.11	0.31	Bad	B-76
36	Main Steam Pressure Loop 4	1AB-P-0475-W	-0.07	-0.06	Good	B-77
37	Pressurizer Pressure	1BB-P-0455-W	0.14	0.09	Good	B-78
38	Pressurizer Pressure	1BB-P-0456-W	1.38	-0.04	Bad	B-79
39	Pressurizer Pressure	1BB-P-0457-W	-0.21	-0.18	Good	B-80
40	Pressurizer Pressure	1BB-P-0458-W	-0.04	-0.09	Good	B-81
41	Pressurizer Level	1BB-L-0465-W	-0.64	8.76	Bad	B-82
42	Pressurizer Level	1BB-L-0466-W	-0.23	-0.26	Good	B-83
43	Pressurizer Level	1BB-L-0467-W	0.52	0.43	Good	B-84
44	Pressurizer Level	1BB-L-0468-W	-0.27	0.02	Good	B-85



Figure B-42 Main Steam Pressure Loop 1 (1AB-P-0513-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-43 Main Steam Pressure Loop 1 (1AB-P-0514-W) Transient Drift Analysis: Cycle 6



Figure B-44 Main Steam Pressure Loop 1 (1AB-P-0515-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-45 Main Steam Pressure Loop 1 (1AB-P-0516-W) Transient Drift Analysis: Cycle 6



Figure B-46 Main Steam Pressure Loop 1 (1AB-P-0177-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-47 Main Steam Pressure Loop 1 (1AB-P-0174-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-48 Main Steam Pressure Loop 1 (1AB-P-0175-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-49 Main Steam Pressure Loop 1 (1AB-P-0137-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-50 Main Steam Pressure Loop 1 (1AB-P-0138-W) Transient Drift Analysis: Cycle 6



Figure B-51 Main Steam Pressure Loop 2 (1AB-P-0523-W) Transient Drift Analysis: Cycle 6



Figure B-52 Main Steam Pressure Loop 2 (1AB-P-0524-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-53 Main Steam Pressure Loop 2 (1AB-P-0525-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-54 Main Steam Pressure Loop 2 (1AB-P-0526-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-55 Main Steam Pressure Loop 2 (1AB-P-0277-W) Transient Drift Analysis: Cycle 6



Figure B-56 Main Steam Pressure Loop 2 (1AB-P-0275-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-57 Main Steam Pressure Loop 2 (1AB-P-0274-W) Transient Drift Analysis: Cycle 6



Figure B-58 Main Steam Pressure Loop 2 (1AB-P-0237-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-59 Main Steam Pressure Loop 2 (1AB-P-0238-W) Transient Drift Analysis: Cycle 6



Figure B-60 Main Steam Pressure Loop 3 (1AB-P-0533-W) Transient Drift Analysis: Cycle 6



Figure B-61 Main Steam Pressure Loop 3 (1AB-P-0534-W) Transient Drift Analysis: Cycle 6



Figure B-62 Main Steam Pressure Loop 3 (1AB-P-0535-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-63 Main Steam Pressure Loop 3 (1AB-P-0536-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-64 Main Steam Pressure Loop 3 (1AB-P-0377-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-65 Main Steam Pressure Loop 3 (1AB-P-0337-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-66 Main Steam Pressure Loop 3 (1AB-P-0338-W) Transient Drift Analysis: Cycle 6



Figure B-67 Main Steam Pressure Loop 3 (1AB-P-0375-W) Transient Drift Analysis: Cycle 6



Figure B-68 Main Steam Pressure Loop 3 (1AB-P-0374-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-69 Main Steam Pressure Loop 4 (1AB-P-0543-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-70 Main Steam Pressure Loop 4 (1AB-P-0544-W) Transient Drift Analysis: Cycle 6



Figure B-71 Main Steam Pressure Loop 4 (1AB-P-0545-W) Transient Drift Analysis: Cycle 6



Figure B-72 Main Steam Pressure Loop 4 (1AB-P-0546-W) Transient Drift Analysis: Cycle 6



Figure B-73 Main Steam Pressure Loop 4 (1AB-P-0477-W) Transient Drift Analysis: Cycle 6



Figure B-74 Main Steam Pressure Loop 4 (1AB-P-0437-W) Transient Drift Analysis: Cycle 6


Figure B-75 Main Steam Pressure Loop 4 (1AB-P-0438-W) Transient Drift Analysis: Cycle 6



Figure B-76 Main Steam Pressure Loop 4 (1AB-P-0474-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-77 Main Steam Pressure Loop 4 (1AB-P-0475-W) Transient Drift Analysis: Cycle 6



Figure B-78 Pressurizer Pressure (1BB-P-0455-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-79 Pressurizer Pressure (1BB-P-0456-W) Transient Drift Analysis: Cycle 6



Figure B-80 Pressurizer Pressure (1BB-P-0457-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-81 Pressurizer Pressure (1BB-P-0458-W) Transient Drift Analysis: Cycle 6



Figure B-82 Pressurizer Level (1BB-L-0465-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-83 Pressurizer Level (1BB-L-0466-W) Transient Drift Analysis: Cycle 6



Figure B-84 Pressurizer Level (1BB-L-0467-W) Transient Drift Analysis: Cycle 6



**Transient Cycle Drift Analysis** 

Figure B-85 Pressurizer Level (1BB-L-0468-W) Transient Drift Analysis: Cycle 6

# **C** SUPPORTING DATA FOR RESULTS OF CYCLE 7

Cycle 7 analysis was performed on the data collected from startup in November 2003, the data collected during steady-state operation each month from December 2003–March 2005, and the data collected during shutdown in March 2005. This was the first cycle for which the calibration assessment of 197 transmitters, including PPS and SPS transmitters, was reported. During this cycle, the steady-state data consisted of 12 hours each month, and this has continued to the present. At the end of Cycle 7, calibration extension was granted for the Sizewell transmitters in PPS Separation Group 2.

### Cycle 7 OLM Results for PPS and SPS Transmitters

Table C-1 presents the results of Cycle 7 analysis for 197 Sizewell B transmitters.

Table C-1OLM Analysis of Sizewell B Transmitters in Containment During RF07

Item #	Тад	Group	Result
1	1AB-P-0513-W	Main Steam Pressure Loop 1	Bad
2	1AB-P-0514-W	Main Steam Pressure Loop 1	Bad
3	1AB-P-0515-W	Main Steam Pressure Loop 1	Good
4	1AB-P-0516-W	Main Steam Pressure Loop 1	Good
5	1AB-P-0177-W	Main Steam Pressure Loop 1	Good
6	1AB-P-0174-W	Main Steam Pressure Loop 1	Good
7	1AB-P-0175-W	Main Steam Pressure Loop 1	Bad
8	1AB-P-0137-W	Main Steam Pressure Loop 1	Bad
9	1AB-P-0138-W	Main Steam Pressure Loop 1	Bad
10	1AB-P-0523-W	Main Steam Pressure Loop 2	Good
11	1AB-P-0524-W	Main Steam Pressure Loop 2	Good
12	1AB-P-0525-W	Main Steam Pressure Loop 2	Good
13	1AB-P-0526-W	Main Steam Pressure Loop 2	Good
14	1AB-P-0277-W	Main Steam Pressure Loop 2	Bad
15	1AB-P-0275-W	Main Steam Pressure Loop 2	Good
16	1AB-P-0274-W	Main Steam Pressure Loop 2	Bad
17	1AB-P-0237-W	Main Steam Pressure Loop 2	Bad
18	1AB-P-0238-W	Main Steam Pressure Loop 2	Good
19	1AB-P-0533-W	Main Steam Pressure Loop 3	Good
20	1AB-P-0534-W	Main Steam Pressure Loop 3	Good
21	1AB-P-0535-W	Main Steam Pressure Loop 3	Good
22	1AB-P-0536-W	Main Steam Pressure Loop 3	Good
23	1AB-P-0377-W	Main Steam Pressure Loop 3	Good
24	1AB-P-0337-W	Main Steam Pressure Loop 3	Good
25	1AB-P-0338-W	Main Steam Pressure Loop 3	Good
26	1AB-P-0375-W	Main Steam Pressure Loop 3	Good
27	1AB-P-0374-W	Main Steam Pressure Loop 3	Good
28	1AB-P-0543-W	Main Steam Pressure Loop 4	Good
29	1AB-P-0544-W	Main Steam Pressure Loop 4	Good
30	1AB-P-0545-W	Main Steam Pressure Loop 4	Good
31	1AB-P-0546-W	Main Steam Pressure Loop 4	Good
32	1AB-P-0477-W	Main Steam Pressure Loop 4	Good
33	1AB-P-0437-W	Main Steam Pressure Loop 4	Bad
34	1AB-P-0438-W	Main Steam Pressure Loop 4	Good
35	1AB-P-0474-W	Main Steam Pressure Loop 4	Good
36	1AB-P-0475-W	Main Steam Pressure Loop 4	Good

Table C-1 (continued)	
OLM Analysis of Sizewell B Transmitters in Containment During RF	:07

Item #	Tag	Group	Result
37	1AE-L-0501-W	SG A Level Wide-Range	Good
38	1AE-L-0505-W	SG A Level Wide-Range	Good
39	1AE-L-0502-W	SG B Level Wide-Range	Bad
40	1AE-L-0506-W	SG B Level Wide-Range	Bad
41	1AE-L-0503-W	SG C Level Wide-Range	Good
42	1AE-L-0507-W	SG C Level Wide-Range	Good
43	1AE-L-0504-W	SG D Level Wide-Range	Good
44	1AE-L-0508-W	SG D Level Wide-Range	Good
45	1AE-L-0517-W	SG A Level Narrow-Range	Good
46	1AE-L-0518-W	SG A Level Narrow-Range	Good
47	1AE-L-0519-W	SG A Level Narrow-Range	Good
48	1AE-L-0551-W	SG A Level Narrow-Range	Good
49	1AE-L-0011-W	SG A Level Narrow-Range	Good
50	1AE-L-0012-W	SG A Level Narrow-Range	Good
51	1AE-L-0013-W	SG A Level Narrow-Range	Good
52	1AE-L-0014-W	SG A Level Narrow-Range	Good
53	1AE-L-0527-W	SG B Level Narrow-Range	Good
54	1AE-L-0528-W	SG B Level Narrow-Range	Good
55	1AE-L-0529-W	SG B Level Narrow-Range	Good
56	1AE-L-0552-W	SG B Level Narrow-Range	Bad
57	1AE-L-0021-W	SG B Level Narrow-Range	Good
58	1AE-L-0022-W	SG B Level Narrow-Range	Good
59	1AE-L-0023-W	SG B Level Narrow-Range	Good
60	1AE-L-0024-W	SG B Level Narrow-Range	Good
61	1AE-L-0537-W	SG C Level Narrow-Range	Good
62	1AE-L-0538-W	SG C Level Narrow-Range	Good
63	1AE-L-0539-W	SG C Level Narrow-Range	Good
64	1AE-L-0553-W	SG C Level Narrow-Range	Good
65	1AE-L-0031-W	SG C Level Narrow-Range	Good
66	1AE-L-0032-W	SG C Level Narrow-Range	Good
67	1AE-L-0033-W	SG C Level Narrow-Range	Good
68	1AE-L-0034-W	SG C Level Narrow-Range	Good

## Table C-1 (continued)OLM Analysis of Sizewell B Transmitters in Containment During RF07

Item #	Tag	Group	Result
69	1AE-L-0547-W	SG D Level Narrow-Range	Good
70	1AE-L-0548-W	SG D Level Narrow-Range	Good
71	1AE-L-0549-W	SG D Level Narrow-Range	Good
72	1AE-L-0554-W	SG D Level Narrow-Range	Good
73	1AE-L-0041-W	SG D Level Narrow-Range	Good
74	1AE-L-0042-W	SG D Level Narrow-Range	Good
75	1AE-L-0043-W	SG D Level Narrow-Range	Good
76	1AE-L-0044-W	SG D Level Narrow-Range	Good
77	1AE-F-0515A-W	Main Feed Flow to SG A	Good
78	1AE-F-0515B-W	Main Feed Flow to SG A	Good
79	1AE-F-0515C-W	Main Feed Flow to SG A	Bad
80	1AE-F-0515D-W	Main Feed Flow to SG A	Good
81	1AE-F-0525A-W	Main Feed Flow to SG B	N/A
82	1AE-F-0525B-W	Main Feed Flow to SG B	N/A
83	1AE-F-0525C-W	Main Feed Flow to SG B	N/A
84	1AE-F-0525D-W	Main Feed Flow to SG B	N/A
85	1AE-F-0535A-W	Main Feed Flow to SG C	Good
86	1AE-F-0535B-W	Main Feed Flow to SG C	Good
87	1AE-F-0535C-W	Main Feed Flow to SG C	Good
88	1AE-F-0535D-W	Main Feed Flow to SG C	Bad
89	1AE-F-0545A-W	Main Feed Flow to SG D	Good
90	1AE-F-0545B-W	Main Feed Flow to SG D	Bad
91	1AE-F-0545C-W	Main Feed Flow to SG D	Good
92	1AE-F-0545D-W	Main Feed Flow to SG D	Bad
93	1BB-P-0455-W	Pressurizer Pressure	Good
94	1BB-P-0456-W	Pressurizer Pressure	Good
95	1BB-P-0457-W	Pressurizer Pressure	Good
96	1BB-P-0458-W	Pressurizer Pressure	Good
97	1BB-L-0465-W	Pressurizer Level	Bad
98	1BB-L-0466-W	Pressurizer Level	Good
99	1BB-L-0467-W	Pressurizer Level	Good
100	1BB-L-0468-W	Pressurizer Level	Good

Table C-1 (continued)	
OLM Analysis of Sizewell B Transmitters in Containment During F	<b>?F07</b>

Item #	Тад	Group	Result
101	1BB-P-0406-W	RCS Pressure Narrow-Range PPS	Good
102	1BB-P-0407-W	RCS Pressure Narrow-Range PPS	Good
103	1BB-P-0408-W	RCS Pressure Narrow-Range PPS	Good
104	1BB-P-0409-W	RCS Pressure Narrow-Range PPS	Good
105	1BB-P-0401-W	RCS Pressure Wide-Range PPS	Good
106	1BB-P-0402-W	RCS Pressure Wide-Range PPS	Good
107	1BB-P-0403-W	RCS Pressure Wide-Range PPS	Good
108	1BB-P-0404-W	RCS Pressure Wide-Range PPS	Good
109	1BB-F-0416-W	RCS Flow Loop 1	Good
110	1BB-F-0417-W	RCS Flow Loop 1	Good
111	1BB-F-0418-W	RCS Flow Loop 1	Good
112	1BB-F-0419-W	RCS Flow Loop 1	Good
113	1BB-F-0426-W	RCS Flow Loop 2	Good
114	1BB-F-0427-W	RCS Flow Loop 2	Good
115	1BB-F-0428-W	RCS Flow Loop 2	Good
116	1BB-F-0429-W	RCS Flow Loop 2	Good
117	1BB-F-0436-W	RCS Flow Loop 3	Good
118	1BB-F-0437-W	RCS Flow Loop 3	Good
119	1BB-F-0438-W	RCS Flow Loop 3	Good
120	1BB-F-0439-W	RCS Flow Loop 3	Good
121	1BB-F-0446-W	RCS Flow Loop 4	Good
122	1BB-F-0447-W	RCS Flow Loop 4	Good
123	1BB-F-0448-W	RCS Flow Loop 4	Good
124	1BB-F-0449-W	RCS Flow Loop 4	Good
125	1BB-P-0411-W	RCS Pressure Wide-Range SPS	Good
126	1BB-P-0421-W	RCS Pressure Wide-Range SPS	Good
127	1BB-P-0431-W	RCS Pressure Wide-Range SPS	Good
128	1BB-P-0441-W	RCS Pressure Wide-Range SPS	Good
129	1BB-P-0412-W	RCS Pressure Narrow-Range SPS	Good
130	1BB-P-0422-W	RCS Pressure Narrow-Range SPS	Good
131	1BB-P-0432-W	RCS Pressure Narrow-Range SPS	Good
132	1BB-P-0442-W	RCS Pressure Narrow-Range SPS	Good

## Table C-1 (continued)OLM Analysis of Sizewell B Transmitters in Containment During RF07

Item #	Тад	Group	Result
133	1BG-L-0142-W	CVCS Volume Control Tank Level	N/A
134	1BG-L-0143-W	CVCS Volume Control Tank Level	N/A
135	1BG-L-0144-W	CVCS Volume Control Tank Level	N/A
136	1BG-L-0145-W	CVCS Volume Control Tank Level	N/A
137	1BG-L-0149A-W	CVCS Volume Control Tank Level	N/A
138	1BN-L-0930-W	RWST Level A	Good
139	1BN-L-0931-W	RWST Level A	Bad
140	1BN-L-0932-W	RWST Level A	Bad
141	1BN-L-0933-W	RWST Level A	Good
142	1BN-L-0940-W	RWST Level B	Good
143	1BN-L-0941-W	RWST Level B	Good
144	1BN-L-0942-W	RWST Level B	Bad
145	1BN-L-0943-W	RWST Level B	Good
146	1EF-F-0186A-W	ESW Train A Flow	Good
147	1EF-F-0186B-W	ESW Train A Flow	Good
148	1EF-F-0186C-W	ESW Train A Flow	Good
149	1EF-F-0186D-W	ESW Train A Flow	Good
150	1EF-F-0187A-W	ESW Train B Flow	Good
151	1EF-F-0187B-W	ESW Train B Flow	Good
152	1EF-F-0187C-W	ESW Train B Flow	Good
153	1EF-F-0187D-W	ESW Train B Flow	Good
154	1EG-L-0311-W	Surge Tank Level in CCWS Train B	Good
155	1EG-L-0312-W	Surge Tank Level in CCWS Train B	Bad
156	1EG-L-0313-W	Surge Tank Level in CCWS Train B	Good
157	1EG-L-0314-W	Surge Tank Level in CCWS Train B	Good
158	1EG-L-0321-W	Surge Tank Level in CCWS Train A	Good
159	1EG-L-0322-W	Surge Tank Level in CCWS Train A	Good
160	1EG-L-0323-W	Surge Tank Level in CCWS Train A	Good
161	1EG-L-0324-W	Surge Tank Level in CCWS Train A	Good
162	1EG-F-0247A-W	CCWS Flow to Train A Low-Temperature Loads	N/A
163	1EG-F-0247B-W	CCWS Flow to Train A Low-Temperature Loads	N/A
164	1EG-F-0247C-W	CCWS Flow to Train A Low-Temperature Loads	N/A
165	1EG-F-0247D-W	CCWS Flow to Train A Low-Temperature Loads	N/A

Table C-1 (continued)	
OLM Analysis of Sizewell B Transmitters in Containment During RFC	)7

Item #	Tag	Group	Result
166	1EG-F-0248A-W	CCWS Flow to Train B Low-Temperature Loads	Good
167	1EG-F-0248B-W	CCWS Flow to Train B Low-Temperature Loads	Bad
168	1EG-F-0248C-W	CCWS Flow to Train B Low-Temperature Loads	Good
169	1EG-F-0248D-W	CCWS Flow to Train B Low-Temperature Loads	Good
170	1EG-F-0250A-W	CCW Flow in RCP Thermal Barrier Return	Good
171	1EG-F-0250B-W	CCW Flow in RCP Thermal Barrier Return	Good
172	1EG-F-0250C-W	CCW Flow in RCP Thermal Barrier Return	Good
173	1EG-F-0250D-W	CCW Flow in RCP Thermal Barrier Return	Good
174	1GN-P-0937-W	Reactor Building Pressure	Good
175	1GN-P-0936-W	Reactor Building Pressure	Good
176	1GN-P-0935-W	Reactor Building Pressure	Good
177	1GN-P-0934-W	Reactor Building Pressure	Good
178	1GN-P-0940-W	Reactor Building Pressure	Good
179	1GN-P-0941-W	Reactor Building Pressure	Bad
180	1GN-P-0942-W	Reactor Building Pressure	Good
181	1GN-P-0943-W	Reactor Building Pressure	Good
182	1AB-F-0170-W	Main Steamline 1 Flow	Good
183	1AB-F-0171-W	Main Steamline 1 Flow	Good
184	1AB-F-0172-W	Main Steamline 1 Flow	Good
185	1AB-F-0270-W	Main Steamline 2 Flow	Good
186	1AB-F-0271-W	Main Steamline 2 Flow	Good
187	1AB-F-0272-W	Main Steamline 2 Flow	Bad
188	1AB-F-0370-W	Main Steamline 3 Flow	Good
189	1AB-F-0371-W	Main Steamline 3 Flow	Good
190	1AB-F-0372-W	Main Steamline 3 Flow	Good
191	1AB-F-0470-W	Main Steamline 4 Flow	N/A
192	1AB-F-0471-W	Main Steamline 4 Flow	N/A
193	1AB-F-0472-W	Main Steamline 4 Flow	Bad
194	1BB-F-0601-W	RCP Seal Injection Flow	Good
195	1BB-F-0602-W	RCP Seal Injection Flow	Good
196	1BB-F-0603-W	RCP Seal Injection Flow	Bad
197	1BB-F-0604-W	RCP Seal Injection Flow	Good

### Cycle 7 Summary Plots

The services for which summary plots are provided in this section are listed in Table C-2. A summary plot is provided for each listed service in Figures C-1 through C-42 as indicated in Table C-2.

Item #	Service	Summary Plot Figure Number
1	Main Steam Pressure Loop 1	C-1
2	Main Steam Pressure Loop 2	C-2
3	Main Steam Pressure Loop 3	C-3
4	Main Steam Pressure Loop 4	C-4
5	SG A Level Wide-Range	C-5
6	SG B Level Wide-Range	C-6
7	SG C Level Wide-Range	C-7
8	SG D Level Wide-Range	C-8
9	SG A Level Narrow-Range	C-9
10	SG B Level Narrow-Range	C-10
11	SG C Level Narrow-Range	C-11
12	SG D Level Narrow-Range	C-12
13	Main Feed Flow to SG A	C-13
14	Main Feed Flow to SG B	C-14
15	Main Feed Flow to SG C	C-15
16	Main Feed Flow to SG D	C-16
17	Pressurizer Pressure	C-17
18	Pressurizer Level	C-18
19	RCS Pressure Narrow-Range PPS	C-19
20	RCS Pressure Wide-Range PPS	C-20
21	RCS Flow Loop 1	C-21
22	RCS Flow Loop 2	C-22
23	RCS Flow Loop 3	C-23
24	RCS Flow Loop 4	C-24

Table C-2List of Services Included in the RFO7 Summary Plots

#### Table C-2 (continued) List of Services Included in the RFO7 Summary Plots

Item #	Service	Summary Plot Figure Number
25	RCS Pressure Wide-Range SPS	C-25
26	RCS Pressure Narrow-Range SPS	C-26
27	CVCS Volume Control Tank Level	C-27
28	RWST Level A	C-28
29	RWST Level B	C-29
30	ESW Train A Flow	C-30
31	ESW Train B Flow	C-31
32	Surge Tank Level in CCWS Train B	C-32
33	Surge Tank Level in CCWS Train A	C-33
34	CCWS Flow to Train A Low-Temperature Loads	C-34
35	CCWS Flow to Train B Low-Temperature Loads	C-35
36	CCW Flow in RCP Thermal Barrier Return	C-36
37	Reactor Building Pressure	C-37
38	Main Steamline 1 Flow	C-38
39	Main Steamline 2 Flow	C-39
40	Main Steamline 3 Flow	C-40
41	Main Steamline 4 Flow	C-41
42	RCP Seal Injection Flow	C-42



Figure C-1 Main Steam Pressure Loop 1 Summary Plot: Cycle 7



Figure C-2 Main Steam Pressure Loop 2 Summary Plot: Cycle 7



Figure C-3 Main Steam Pressure Loop 3 Summary Plot: Cycle 7



Figure C-4 Main Steam Pressure Loop 4 Summary Plot: Cycle 7



Figure C-5 SG A Level Wide-Range Summary Plot: Cycle 7



Figure C-6 SG B Level Wide-Range Summary Plot: Cycle 7



Figure C-7 SG C Level Wide-Range Summary Plot: Cycle 7



Figure C-8 SG D Level Wide-Range Summary Plot: Cycle 7



Figure C-9 SG A Level Narrow-Range Summary Plot: Cycle 7



Figure C-10 SG B Level Narrow-Range Summary Plot: Cycle 7



Figure C-11 SG C Level Narrow-Range Summary Plot: Cycle 7



Figure C-12 SG D Level Narrow-Range Summary Plot: Cycle 7



Figure C-13 Main Feed Flow to SG A Summary Plot: Cycle 7



Figure C-14 Main Feed Flow to SG B Summary Plot: Cycle 7



Figure C-15 Main Feed Flow to SG C Summary Plot: Cycle 7


Figure C-16 Main Feed Flow to SG D Summary Plot: Cycle 7



Figure C-17 Pressurizer Pressure Summary Plot: Cycle 7



Figure C-18 Pressurizer Level Summary Plot: Cycle 7



Figure C-19 RCS Pressure Narrow-Range PPS Summary Plot: Cycle 7



Figure C-20 RCS Pressure Wide-Range PPS Summary Plot: Cycle 7



Figure C-21 RCS Flow Loop 1 Summary Plot: Cycle 7



Figure C-22 RCS Flow Loop 2 Summary Plot: Cycle 7



Figure C-23 RCS Flow Loop 3 Summary Plot: Cycle 7



Figure C-24 RCS Flow Loop 4 Summary Plot: Cycle 7



Figure C-25 RCS Pressure Wide-Range SPS Summary Plot: Cycle 7



Figure C-26 RCS Pressure Narrow-Range SPS Summary Plot: Cycle 7



Figure C-27 CVCS Volume Control Tank Level Summary Plot: Cycle 7



Figure C-28 RWST Level A Summary Plot: Cycle 7



Figure C-29 RWST Level B Summary Plot: Cycle 7



Figure C-30 ESW Train A Flow Summary Plot: Cycle 7



Figure C-31 ESW Train B Flow Summary Plot: Cycle 7

# **Cycle Summary**



Figure C-32 Surge Tank Level in CCWS Train B Summary Plot: Cycle 7

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Figure C-33 Surge Tank Level in CCWS Train A Summary Plot: Cycle 7



Figure C-34 CCWS Flow to Train A Low-Temperature Loads Summary Plot: Cycle 7

#### **Cycle Summary**



Figure C-35 CCWS Flow to Train B Low-Temperature Loads Summary Plot: Cycle 7

C-44



Figure C-36 CCW Flow in RCP Thermal Barrier Return Summary Plot: Cycle 7



Figure C-37 Reactor Building Pressure Summary Plot: Cycle 7



Figure C-38 Main Steamline 1 Flow Summary Plot: Cycle 7



Figure C-39 Main Steamline 2 Flow Summary Plot: Cycle 7



Figure C-40 Main Steamline 3 Flow Summary Plot: Cycle 7



Figure C-41 Main Steamline 4 Flow Summary Plot: Cycle 7



Figure C-42 RCP Seal Injection Flow Summary Plot: Cycle 7

# Cycle 7 Transient Cycle Drift Analysis

The transient cycle drift analysis results are provided Table C-3. A summary plot is provided for each listed service in Figures C-43 through C-86 as indicated in Table C-3.

Item #	Service	Tag	Zero Drift	Span Drift	Result	Figure Number
1	Main Steam Pressure Loop 1	1AB-P-0513-W	-0.06	-0.38	Good	C-43
2	Main Steam Pressure Loop 1	1AB-P-0514-W	3.34	-2.27	Bad	C-44
3	Main Steam Pressure Loop 1	1AB-P-0515-W	-0.14	-0.30	Good	C-45
4	Main Steam Pressure Loop 1	1AB-P-0516-W	-0.19	-0.26	Good	C-46
5	Main Steam Pressure Loop 1	1AB-P-0177-W	0.91	0.86	Good	C-47
6	Main Steam Pressure Loop 1	1AB-P-0174-W	N/A	N/A	N/A	C-48
7	Main Steam Pressure Loop 1	1AB-P-0175-W	0.17	0.26	Bad	C-49
8	Main Steam Pressure Loop 1	1AB-P-0137-W	0.11	0.16	Good	C-50
9	Main Steam Pressure Loop 1	1AB-P-0138-W	0.02	-0.12	Good	C-51
10	Main Steam Pressure Loop 2	1AB-P-0523-W	0.11	-0.19	Good	C-52
11	Main Steam Pressure Loop 2	1AB-P-0524-W	-0.26	-0.19	Good	C-53
12	Main Steam Pressure Loop 2	1AB-P-0525-W	0.12	-0.37	Good	C-54
13	Main Steam Pressure Loop 2	1AB-P-0526-W	-0.30	0.27	Good	C-55
14	Main Steam Pressure Loop 2	1AB-P-0277-W	0.52	-0.21	Good	C-56
15	Main Steam Pressure Loop 2	1AB-P-0275-W	0.09	0.12	Good	C-57
16	Main Steam Pressure Loop 2	1AB-P-0274-W	0.07	0.32	Bad	C-58
17	Main Steam Pressure Loop 2	1AB-P-0237-W	0.13	0.08	Good	C-59
18	Main Steam Pressure Loop 2	1AB-P-0238-W	0.17	-0.10	Good	C-60
19	Main Steam Pressure Loop 3	1AB-P-0533-W	0.02	-0.05	Good	C-61
20	Main Steam Pressure Loop 3	1AB-P-0534-W	-0.55	0.37	Good	C-62
21	Main Steam Pressure Loop 3	1AB-P-0535-W	-0.23	-0.45	Good	C-63
22	Main Steam Pressure Loop 3	1AB-P-0536-W	-0.25	0.36	Good	C-64
23	Main Steam Pressure Loop 3	1AB-P-0377-W	0.49	-0.57	Good	C-65
24	Main Steam Pressure Loop 3	1AB-P-0337-W	0.17	0.06	Good	C-66
25	Main Steam Pressure Loop 3	1AB-P-0338-W	0.15	0.20	Good	C-67

Table C-3Cycle 7 Transient Cycle Drift Analysis Summary

## Table C-3 (continued) Cycle 7 Transient Cycle Drift Analysis Summary

Item #	Service	Tag	Zero Drift	Span Drift	Result	Figure Number
26	Main Steam Pressure Loop 3	1AB-P-0375-W	0.12	0.21	Bad	C-68
27	Main Steam Pressure Loop 3	1AB-P-0374-W	0.15	-0.09	Good	C-69
28	Main Steam Pressure Loop 4	1AB-P-0543-W	0.34	0.92	Good	C-70
29	Main Steam Pressure Loop 4	1AB-P-0544-W	-0.33	-0.22	Good	C-71
30	Main Steam Pressure Loop 4	1AB-P-0545-W	-0.35	-0.41	Good	C-72
31	Main Steam Pressure Loop 4	1AB-P-0546-W	0.20	0.19	Good	C-73
32	Main Steam Pressure Loop 4	1AB-P-0477-W	-0.31	0.35	Good	C-74
33	Main Steam Pressure Loop 4	1AB-P-0437-W	0.13	0.27	Bad	C-75
34	Main Steam Pressure Loop 4	1AB-P-0438-W	0.24	0.23	Bad	C-76
35	Main Steam Pressure Loop 4	1AB-P-0474-W	0.14	0.13	Good	C-77
36	Main Steam Pressure Loop 4	1AB-P-0475-W	-0.02	0.11	Good	C-78
37	Pressurizer Pressure	1BB-P-0455-W	-0.03	0.03	Good	C-79
38	Pressurizer Pressure	1BB-P-0456-W	1.52	0.04	Bad	C-80
39	Pressurizer Pressure	1BB-P-0457-W	-0.11	-0.10	Good	C-81
40	Pressurizer Pressure	1BB-P-0458-W	0.03	0.02	Good	C-82
41	Pressurizer Level	1BB-L-0465-W	0.13	-0.40	Good	C-83
42	Pressurizer Level	1BB-L-0466-W	-0.08	0.26	Good	C-84
43	Pressurizer Level	1BB-L-0467-W	0.13	-0.39	Good	C-85
44	Pressurizer Level	1BB-L-0468-W	0.07	-0.07	Good	C-86



**Transient Cycle Drift Analysis** 

Figure C-43 Main Steam Pressure Loop 1 (1AB-P-0513-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-44 Main Steam Pressure Loop 1 (1AB-P-0514-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-45 Main Steam Pressure Loop 1 (1AB-P-0515-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-46 Main Steam Pressure Loop 1 (1AB-P-0516-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-47 Main Steam Pressure Loop 1 (1AB-P-0177-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-48 Main Steam Pressure Loop 1 (1AB-P-0174-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-49 Main Steam Pressure Loop 1 (1AB-P-0175-W) Transient Drift Analysis: Cycle 7


Figure C-50 Main Steam Pressure Loop 1 (1AB-P-0137-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-51 Main Steam Pressure Loop 1 (1AB-P-0138-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-52 Main Steam Pressure Loop 2 (1AB-P-0523-W) Transient Drift Analysis: Cycle 7



Figure C-53 Main Steam Pressure Loop 2 (1AB-P-0524-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-54 Main Steam Pressure Loop 2 (1AB-P-0525-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-55 Main Steam Pressure Loop 2 (1AB-P-0526-W) Transient Drift Analysis: Cycle 7



Figure C-56 Main Steam Pressure Loop 2 (1AB-P-0277-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-57 Main Steam Pressure Loop 2 (1AB-P-0275-W) Transient Drift Analysis: Cycle 7



Figure C-58 Main Steam Pressure Loop 2 (1AB-P-0274-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-59 Main Steam Pressure Loop 2 (1AB-P-0237-W) Transient Drift Analysis: Cycle 7

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Figure C-60 Main Steam Pressure Loop 2 (1AB-P-0238-W) Transient Drift Analysis: Cycle 7



Figure C-61 Main Steam Pressure Loop 3 (1AB-P-0533-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-62 Main Steam Pressure Loop 3 (1AB-P-0534-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-63 Main Steam Pressure Loop 3 (1AB-P-0535-W) Transient Drift Analysis: Cycle 7



Figure C-64 Main Steam Pressure Loop 3 (1AB-P-0536-W) Transient Drift Analysis: Cycle 7



Figure C-65 Main Steam Pressure Loop 3 (1AB-P-0377-W) Transient Drift Analysis: Cycle 7

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**Transient Cycle Drift Analysis** 

Figure C-66 Main Steam Pressure Loop 3 (1AB-P-0337-W) Transient Drift Analysis: Cycle 7



Figure C-67 Main Steam Pressure Loop 3 (1AB-P-0338-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-68 Main Steam Pressure Loop 3 (1AB-P-0375-W) Transient Drift Analysis: Cycle 7



Figure C-69 Main Steam Pressure Loop 3 (1AB-P-0374-W) Transient Drift Analysis: Cycle 7



Figure C-70 Main Steam Pressure Loop 4 (1AB-P-0543-W) Transient Drift Analysis: Cycle 7



Figure C-71 Main Steam Pressure Loop 4 (1AB-P-0544-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-72 Main Steam Pressure Loop 4 (1AB-P-0545-W) Transient Drift Analysis: Cycle 7



Figure C-73 Main Steam Pressure Loop 4 (1AB-P-0546-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-74 Main Steam Pressure Loop 4 (1AB-P-0477-W) Transient Drift Analysis: Cycle 7



Figure C-75 Main Steam Pressure Loop 4 (1AB-P-0437-W) Transient Drift Analysis: Cycle 7



Figure C-76 Main Steam Pressure Loop 4 (1AB-P-0438-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-77 Main Steam Pressure Loop 4 (1AB-P-0474-W) Transient Drift Analysis: Cycle 7



Figure C-78 Main Steam Pressure Loop 4 (1AB-P-0475-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-79 Pressurizer Pressure (1BB-P-0455-W) Transient Drift Analysis: Cycle 7



Figure C-80 Pressurizer Pressure (1BB-P-0456-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-81 Pressurizer Pressure (1BB-P-0457-W) Transient Drift Analysis: Cycle 7

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Figure C-82 Pressurizer Pressure (1BB-P-0458-W) Transient Drift Analysis: Cycle 7



Figure C-83 Pressurizer Level (1BB-L-0465-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-84 Pressurizer Level (1BB-L-0466-W) Transient Drift Analysis: Cycle 7



**Transient Cycle Drift Analysis** 

Figure C-85 Pressurizer Level (1BB-L-0467-W) Transient Drift Analysis: Cycle 7


**Transient Cycle Drift Analysis** 

Figure C-86 Pressurizer Level (1BB-L-0468-W) Transient Drift Analysis: Cycle 7

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