PROPRIETARY INFORMATION

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IP3

Instrument Drift Analysis for RPS
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Instrument Drift Analysis

Summary

This report provides the results of an Instrument Drift Analysis performed for Indian Point 3 (IP3) Nuclear Power Plant's Reactor Protection System (RPS). The Instrument Drift Analysis is divided into two parts. Part one assesses the actual past instrument drift, in order to comply with item one of Enclosure 2 of the NRC's Generic Letter (91-04). Part two assesses the predicted future instrument drift, in order to comply with items two, three and four. The scope of this report covers all the components in the RPS system that are calibrated once every 18 months. The methods used to predict instrument drift for 30 months are documented. The purpose of this Instrument Drift Analysis is to assess the acceptability of extending the calibration interval for instrumentation addressed in the RPS system from 18 to a maximum of 30 months. This analysis can be used as a basis to determine whether the calibration intervals for RPS can be extended to support the 24 month operating cycle.

Instrument Drift Analysis

Introduction

According to the NRC, licensees should address the issue of instrumentation errors caused by drift. This should be done in order to justify an increase in surveillance intervals to accommodate a 24 month operating cycle. This report addresses the following issues discussed in Enclosure 2 of the NRC's Generic Letter (91-04):

1. Confirm that instrument drift as determined by As-Found and As-Left calibration data from surveillance and maintenance records has not, except on rare occasions, exceeded acceptable limits for a calibration interval.
2. Confirm that the values of drift for each type (make, model, range) and application have been determined with a high probability and a high degree of confidence.
3. Confirm that the magnitude of the instrument drift has been determined with a high probability and a high degree of confidence for a bounding calibration interval of 30 months for each instrument type (make, model number and range) and application that performs a safety function. Provide a list of the channels by TS section that identifies these instrument applications.
4. Confirm that a comparison of the projected instrument drift errors has been made with the values of drift used in the setpoint analysis. If this results in revised setpoints to accommodate larger drift errors, provide proposed TS changes to update trip setpoints. If the drift errors result in a revised safety analysis to support existing setpoints, than a summary of the updated analysis conclusions to confirm that safety limits and a safety analysis assumptions are not exceeded must be provided.

The purpose of this report is to provide an Instrument Drift Analysis, along with the methodology and assumptions used to determine instrument drift for Indian Point 3 (IP3) Nuclear Power Plant's Reactor Protection System (RPS). The above four issues will be the basis used to determine if the results of this Instrument Drift Analysis will support an increase to a 24 month operating cycle.

Instrument drift for the RPS system was determined for components that require calibrations every 18 months, based upon historical plant calibration data. The following is a list of affected calibration procedures in the RPS system:

3PC-R1A:	Reactor Coolant Loop Narrow Range Temperature Instrumentation Calibration
3PC-R1B:	Reactor Coolant Loop RTD Calibration - ΔT
3PC-R2:	Reactor Coolant Loop Flow Calibration
3PC-R3:	Pressurizer Level Calibration
3PC-R3A:	Pressurizer Level Transmitters' Check and Calibration
3PC-R4:	Pressurizer Pressure Calibration
3PC-R4A:	Pressurizer Pressure Control System Transmitters' Check and Calibration

3PC-R4B:	Pressurizer Pressure Control System Analog Components' Check and Calibration
3PC-R5A:	6.9KV Undervoltage Relay Calibration and Agastat Time Response
3PC-R5B:	6.9KV Underfrequency Relay Calibration and Response Time Test
3PC-R7:	Steam Generator Level Transmitter Calibration
3PC-R7A:	Steam Generator Level Control System Transmitters Check and Calibration, Channel 1
3PC-R7B:	Steam Generator Level Control System Transmitters Check and Calibration, Channel 2
3PC-R7C:	Steam Generator Level Control System Transmitters Check and Calibration, Channel 3
3PC-R7D:	Steam Generator Level Control System Transmitters Check and Calibration, Channel 4

A complete list of components evaluated in the Instrument Drift Analysis for the RPS system is included in Table 1 of this report. Calibration data was also extracted as necessary from work requests. Any calibration procedure that had a work request associated with it was documented on the data sheets under the section labeled "Notes".

An example of a typical calibration for a level transmitter is as follows:

1. Close both of the high and low side isolation valves.
2. Open the equalizing valve.
3. Slowly open the high and low side vent.
4. Slowly open the high and low side test connection.
5. Remove drain plugs from both high and low sides. Remove all water.
6. Install the low side drain plug and close its vent.
7. Close the equalizing valve.
8. Connect a pressure gauge at the input of the transmitter.
9. Connect a digital voltmeter (DVM) across a test resistor at the output of the transmitter.
10. Exercise the transmitter using the calibration setpoint to obtain a maximum and minimum pressure reading.
11. Adjust the input pressure to the transmitter at 5 discrete points across the full span in both directions.

Instrument Drift Analysis

12. Record the As-Found output reading from the DVM for each design input pressure reading.

13. If any of the As-Found output reading readings are not within their calibration tolerance, adjust the zero and/or span adjustment screw until the desired output DVM reading is reached.

14. Record the As-Left output readings.

15. If the transmitter needs no adjustment, then the As-Left values shall be the same as the As-Found values.

Part one of this Instrument Drift Analysis assesses actual past instrument drift. Actual past instrument drift for a given period was compared to a Vendor Drift Allowance (VDA) for a period of similar length or the Calibration Tolerance (CT). This analysis determined whether each individual instrument drift value was within acceptable limits for that calibration interval. Appendix A and B of this report provide the results of this analysis, and Table 2 and 3 provide a summary.

The second part of this Instrument Drift Analysis assesses the predicted future instrument drift. A Maximum Expected Drift for 30 months (MED30) was determined from the average and standard deviation of actual field calibration data statistically extrapolated to a 30 month period. Data from components within the same calibration procedure, having the same model number, manufacturer, calibration span and application were combined, when appropriate. MED30 is expressed as a percent of the calibration span (%CAL-SPAN). Only drift values with calibration intervals between 100 and 675 days were included in the database, unless otherwise stated.

Once the Maximum Expected Drift for 30 months (MED30) was calculated, it was compared to the Vendor Drift Allowance extrapolated to 30 months (VDA30) or the calibration tolerance (CT). MED30 is a statistical limit derived from past calibration data. Appendix C and D of this report provide the results of this analysis and Table 4 and 5 provide a summary.

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TABLE 1

List of Components Requiring Technical Specification Refueling Calibrations for the RPS System

TAG NUMBER	MANUFACTURER	MODEL NUMBER	CALIBRATION SPAN		PROCEDURE
			INPUT	OUTPUT	
TT-411B,411A1, TT-411A2,411A3, TT-421B,421A1, TT-421A2,421A3, TT-431B,431A1, TT-431A2,431A3, TT-441B,441A1, TT-441A2,441A3	FOXBORO	N-2AI-P2V	105 °F	10 V	3PC-R1A
TY-411B,411A1, TY-4112A,411A3, TY-411A2-1,421B, TY-421A1,421A2A, TY-421A3,421A2-1, TY-431B,431A1, TY-431A2A,431A3, TY-431A2-1,441B, TY-441A1,441A2A, TY-441A3,441A2-1	FOXBORO	N-2A0-VAI	10 V	8 V	3PC-R1A
TM-412R,422R, TM-432R,442R	FOXBORO	66RC-OLA	75 °F	400 mV	3PC-R1B
TM-411F,421F, TM-431F,441F	FOXBORO	66RC-OL	75 °F	8 V	3PC-R1B
FT-414,415,416, FT-424,425,426, FT-434,435,436, FT-444,445,446	FOXBORO	E13DH-SAH1	120% FLOW	400 mV	3PC-R2

TABLE 1 (cont.)

TAG NUMBER	MANUFACTURER	MODEL NUMBER	CALIBRATION SPAN		PROCEDURE
			INPUT	OUTPUT	
LT-459,460, LT-461,462	FOXBORO	N-E13DH-HIH1-BEK	100% Level or 263.7 "H_2O	400 mV	3PC-R3,3A
PT-455,456, PT-457,474	FOXBORO	N-E11GM-HIE1-BEL	800 PSIG	400 mV	3PC-R4,4A
PM-455B,456B, PM-457B,474B	FOXBORO	66RC-OLA	*9 SEC (LEAD TIME) *0.2 SEC (LAG TIME)		3PC-R4,4B
27-1A,2A,3A,4A	WESTINGHOUSE	TYPE SV	*86.25 Vac		3PC-R5A
27-1-62A, 27-2-62A 27-3-62A, 27-4-62A	AMERACE	2122DH39YB	*500 mS		3PC-R5A
81-1,2,3,4	WESTINGHOUSE	TYPE KF	*57.5 Hz *0.016 SEC		3PC-R5B
LT-417A,B,C; LT-427A,B,C; LT-437A,B,C; LT-447A,B,C	FOXBORO	N-E13DH-HIM1-BEK	98 "H_2O	400 mV	3PC-R7,7A-7D

NOTE: [* = CALIBRATION SETTING]

TABLE 2

Analysis of Actual Past Instrument Drift (MAXIMUM DRIFT POINT)

TAG NUMBER	PROCEDURE	TITLE	TNDP	TNDP ≤ VDA
TT-411B,411A1, TT-411A2,411A3, TT-421B,421A1, TT-421A2,421A3, TT-431B,431A1, TT-431A2,431A3, TT-441B,441A1, TT-441A2,441A3	3PC-R1A	Rx Coolant Loop Temp. Inst. Cal. (Narrow Range)	16	100%
TY-411B,411A1, TY-4112A,411A3, TY-411A2-1,421B, TY-421A1,421A2A, TY-421A3,421A2-1, TY-431B,431A1, TY-431A2A,431A3, TY-431A2-1,441B, TY-441A1,441A2A, TY-441A3,441A2-1	3PC-R1A	Rx Coolant Loop Temp. Inst. Cal. (Narrow Range)	20	100%
TM-412R,422R, TM-432R,442R	3PC-R1B	Rx Coolant Loop RTD Cal.-Tavg	8	100%
TM-411F,421F, TM-431F,441F	3PC-R1B	Rx Coolant Loop RTD Cal.-ΔT	8	87.50%
FT-414,415,416, FT-424,425,426, FT-434,435,436, FT-444,445,446	3PC-R2	Rx Coolant Loop Flow Cal.	77	77.92% (SEE TABLE 3)

TABLE 2 (cont.)

TAG NUMBER	PROCEDURE	TITLE	TNDP	TNDP ≤ VDA
LT-459,460, LT-461,462	3PC-R3,3A	Pressurizer Level Cal.	6	16.67% (SEE TABLE 3)
PT-455,456, PT-457,474	3PC-R4,4A	Pressurizer Pressure Cal.	12	25%
PM-455B,456B, PM-457B,474B	3PC-R4,4B	Pressurizer Pressure Cal. (LEAD TIME)	12	91.67%
PM-455B,456B, PM-457B,474B	3PC-R4,4B	Pressurizer Pressure Cal. (LAG TIME)	12	*100%
27-1A,2A,3A,4A	3PC-R5A	6.9KV Undervoltage Relay Cal. & Agastat Time Response	9	*22.22%
27-1-62A, 27-2-62A 27-3-62A, 27-4-62A	3PC-R5A	6.9KV Undervoltage Relay Cal. & Agastat Time Response	8	100%
81-1,2,3,4	3PC-R5B	6.9KV Underfrequency Relay Cal. & Response Time Test (RELAY TRIP FREQUENCY)	8	*87.5%
81-1,2,3,4	3PC-R5B	6.9KV Underfrequency Relay Cal. & Response Time Test (TIME DELAY)	8	*100%

TABLE 2 (cont.)

TAG NUMBER	PROCEDURE	TITLE	TNDP	TNDP ≤ VDA
LT-417A,B,C; LT-427A,B,C; LT-437A,B,C; LT-447A,B,C	3PC-R7,7A-7D	Steam Generator Level Transmitter Cal.	36	55.55% (SEE TABLE 3)

NOTE: [* = CALIBRATION TOLERANCE]

TABLE 3

Analysis of Actual Past Instrument Drift (ACTUATION POINT)

TAG NUMBER	PROCEDURE	TITLE	TNDP	TNDP ≤ VDA
FT-414,415,416, FT-424,425,426, FT-434,435,436, FT-444,445,446	3PC-R2	Rx Coolant Loop Flow Cal. (LOW FLOW Rx TRIP = 93% FLOW)	76	96.05%
LT-459,460, LT-461,462	3PC-R3,3A	Pressurizer Level Cal. (HIGH LEVEL Rx TRIP = 460 mV)	6	33.33%
LT-417A,B,C; LT-427A,B,C; LT-437A,B,C; LT-447A,B,C	3PC-R7,7A-7D	Steam Generator Level Transmitter Cal. (LOW LVL TRIP & MISMATCH = 132 mV)	36	66.67%

TABLE 4

Analysis of Predicted Future Instrument Drift (MAXIMUM DRIFT POINT)

TAG NUMBER	PROCEDURE	TITLE	MED30 %CAL-SPAN	VDA30 %CAL-SPAN
TT-411B,411A1, TT-411A2,411A3, TT-421B,421A1, TT-421A2,421A3, TT-431B,431A1, TT-431A2,431A3, TT-441B,441A1, TT-441A2,441A3	3PC-R1A	Rx Coolant Loop Temp. Inst. Cal. (Narrow Range)	0.4054	0.5161
TY-411B,411A1, TY-4112A,411A3, TY-411A2-1,421B, TY-421A1,421A2A, TY-421A3,421A2-1, TY-431B,431A1, TY-431A2A,431A3, TY-431A2-1,441B, TY-441A1,441A2A, TY-441A3,441A2-1	3PC-R1A	Rx Coolant Loop Temp. Inst. Cal. (Narrow Range)	0.2468	0.5179
TM-412R,422R, TM-432R,442R	3PC-R1B	Rx Coolant Loop RTD Cal.-Tavg	0.6538	1.3859
TM-411F,421F, TM-431F,441F	3PC-R1B	Rx Coolant Loop RTD Cal.-ΔT	10.9310	1.4200

TABLE 4 (cont.)

TAG NUMBER	PROCEDURE	TITLE	MED30 %CAL-SPAN	VDA30 %CAL-SPAN
FT-414,415,416, FT-424,425,426, FT-434,435,436, FT-444,445,446	3PC-R2	Rx Coolant Loop Flow Cal.	3.1627	1.9188 (SEE TABLE 5)
LT-459,460, LT-461,462	3PC-R3,3A	Pressurizer Level Cal.	15.0403	0.9041 (SEE TABLE 5)
PT-455,456, PT-457,474	3PC-R4,4A	Pressurizer Pressure Cal.	6.3215	1.0775
PM-455B,456B, PM-457B,474B	3PC-R4,4B	Pressurizer Pressure Cal. (LEAD TIME)	3.1 Sec	1 Sec
PM-455B,456B, PM-457B,474B	3PC-R4,4B	Pressurizer Pressure Cal. (LAG TIME)	0.2 Sec	*0.2 Sec
27-1A,2A,3A,4A	3PC-R5A	6.9KV Undervoltage Relay Cal. & Agastat Time Response	**44.5420	***3.4783
27-1-62A, 27-2-62A 27-3-62A, 27-4-62A	3PC-R5A	6.9KV Undervoltage Relay Cal. & Agastat Time Response	**6.2093	**7
81-1,2,3,4	3PC-R5B	6.9KV Underfrequency Relay Cal. & Response Time Test (RELAY TRIP FREQUENCY)	**0.4508	***0.1739

TABLE 4 (cont.)

TAG NUMBER	PROCEDURE	TITLE	MED30 %CAL-SPAN	VDA30 %CAL-SPAN
81-1,2,3,4	3PC-R5B	6.9KV Underfrequency Relay Cal. & Response Time Test (TIME DELAY)	**19.3159	***16
LT-417A,B,C; LT-427A,B,C; LT-437A,B,C; LT-447A,B,C	3PC-R7,7A-7D	Steam Generator Level Transmitter Cal.	4.4925	1.5256 (SEE TABLE 5)

NOTES:

*** = Calibration Tolerance in %Setting
** = %Setting
* = Calibration Tolerance

TABLE 5

Analysis of Predicted Future Instrument Drift (ACTUATION POINT)

TAG NUMBER	PROCEDURE	TITLE	MED30 %CAL-SPAN	VDA30 %CAL-SPAN
FT-414,415,416, FT-424,425,426, FT-434,435,436, FT-444,445,446	3PC-R2	Rx Coolant Loop Flow Cal. (LOW FLOW Rx TRIP = 93% FLOW)	1.8413	1.9188
LT-459,460, LT-461,462	3PC-R3,3A	Pressurizer Level Cal. (HIGH LEVEL Rx TRIP = 460 mV)	15.7086	0.9041
LT-417A,B,C; LT-427A,B,C; LT-437A,B,C; LT-447A,B,C	3PC-R7,7A-7D	Steam Generator Level Transmitter Cal. (LO LVL TRIP & MISMATCH =132mV)	4.3328	1.5256

Instrument Drift Analysis

Results

I. Past Drift

An assessment of actual past instrument drift was performed (Appendix A and B) to determine whether individual drift values for a given calibration interval are within acceptable limits. Instruments having 80% or more of their past drift values within VDA_n (Appendix E) or the CT are considered to have an acceptable performance record. The results of this assessment are summarized on Tables 2 and 3.

A. The results of this analysis show the following instruments have an acceptable performance record:

Transmitters

FT-414, 415, 416 FT-424, 425, 426 FT-434, 435, 436 FT-444, 445, 446	Rx Coolant Loop Flow (Actuation Point)

Lead/Lag Units

PM-455B, 456B PM-457B, 474B	Pressurizer Pressure (Lead and Lag Time)

R/E Converters

TT-411B, 411A1, 411A2 TT-411A3, 421B, 421A1 TT-421A2, 421A3, 431B TT-431A1, 431A2, 431A3 TT-441B, 441A1, 441A2, 441A3	Rx Coolant Loop Temp. Inst. (Narrow Range)

Voltage Isolation Devices

TY-411B, 411A1, 411A2A, 411A3 TY-411A2-1, 421B, 421A1, 421A2A TY-421A3, 421A2-1, 431B, 431A1 TY-431A2A, 431A3, 431A2-1, 441B TY-441A1, 441A2A, 441A3, 441A2-1	Rx Coolant Loop Temp. Inst. (Narrow Range)

E/I Converters (Dynamic Compensators)

TM-412R, 422R TM-432R, 442R	Rx Coolant Loop RTD-Tavg

Special Lag Units

TM-411F, 421F TM-431F, 441F	Rx Coolant Loop RTD-ΔT

Agastat Relays

27-1-62A 27-2-62A 27-3-62A 27-4-62A	6.9KV Undervoltage Relays Agastat Time Response

Underfrequency Relays

81-1,2,3,4	6.9KV Underfrequency Relays (Relay Trip and Time Delay)

B. This analysis also showed that the following components exceeded their acceptable limits for a calibration interval on more than rare occasions.

Transmitters

1. PT-455, 456 PT-457, 474	Pressurizer Pressure
2. LT-417A,B,C LT-427A,B,C LT-437A,B,C LT-447A,B,C	Steam Generator Level
3. LT-459, 460 LT-461, 462	Pressurizer Level

Undervoltage Relays

4. 27-1A 27-2A 27-3A 27-4A	6.9KV Undervoltage Relays

1. Pressurizer Pressure Transmitters (PT-455, 456, 457, 474) exceeded acceptable limits 9 out of 12 times. This was attributed to faulty zero suppression kits, which were replaced on December 4, 1990. After installing the new zero suppression kits, As-Left calibration data was within the Calibration Tolerance (CT).

2. Steam Generator Level Transmitters (LT-417A, B, C; LT-427A, B, C; LT-437A, B, C; LT-447A, B, C) exceeded acceptable limits 19 out of 36 times for the Maximum Drift point data sheet. Since these values exceeded acceptable limits, an Actuation

Point data sheet was constructed. This data sheet showed that 12 out of 36 data points exceeded acceptable limits. However, the increase in acceptable data points was still insufficient to conclude that these transmitters were within acceptable limits on more than rare occasions.

3. Pressurizer Level Transmitters (LT-459, 460, 461, 462) exceeded acceptable limits 5 out of 6 times for the Maximum Drift Point datasheet. Since these values exceeded acceptable limits, an Actuation Point data sheet was constructed. Again, these transmitters exceeded acceptable limits; 4 out of 6 times for High Level Reactor Trip at 460 mV.

4. Undervoltage Relays (27-1A, 2A, 3A, 4A) exceeded the CT 7 out of 9 times.

II. Future Drift

The assessment of predicted future instrument drift was performed (Appendix C and D) to determine whether predicted future drift values are within (VDA30) (Appendix F) or the (CT). The results of this assessment are summarized on Tables 4 and 5:

A. Components which were within (VDA30) or the (CT):

TT-411B, 411A1, 411A2 TT-411A3, 421B, 421A1 TT-421A2, 421A3, 431B TT-431A1, 431A2, 431A3 TT-441B, 441A1, 441A2 TT-441A3	Rx Coolant Loop Temp. Inst. (Narrow Range)
TY-411B, 411A1, 411A2A TY-411A3, 411A2-1, 421B TY-421A1, 421A2A, 421A3 TY-421A2-1, 431B, 431A1 TY-431A2A, 431A3, 431A2-1 TY-441B, 441A1, 441A2A TY-441A3, 441A2-1	Rx Coolant Loop Temp. Inst. (Narrow Range)
TM-412R, 422R TM-432R, 442R	Rx Coolant Loop RTD
FT-414, 415, 416 FT-424, 425, 426 FT-434, 435, 436 FT-444, 445, 446	Rx Coolant Loop Flow (Actuation Point)
PM-455B, 456B PM-457B, 474B	Pressurizer Pressure (Lag Time)

27-1-62A 27-2-62A 27-3-62A 27-4-62A	6.9KV Undervoltage Agastat Time Response

Since future drift values for the above components are expected to be within calculated vendor allowances, their calibration interval can be extended to a maximum of 30 months.

B. Components which exceeded VDA30 or CT:

1. LT-417A,B,C LT-427A,B,C LT-437A,B,C LT-447A,B,C	Steam Generator Level Transmitters
2. PT-455, 456 PT-457, 474	Pressurizer Pressure
3. LT-459, 460 LT-461, 462	Pressurizer Level Transmitters (Safety Injection & Hi Level Rx Trip)
4. PM-455B, 456B PM-457B, 474B	Pressurizer Pressure (Lead Time)
5. TM-411F, 421F TM-431F, 441F	Rx Coolant Loop RTD-ΔT
6. 27-1A 27-2A 27-3A 27-4A	6.9KV Undervoltage Relays
7. 81-1,2,3,4	6.9KV Underfrequency Relays (Relay Trip and Time Delay)

1. Since most of the past As-Found values were out of tolerance for the Steam Generator Level transmitters, MED30 for the Maximum Drift Point and Actuation Point data sheets exceeded VDA30. In discussions with plant personnel, poor instrument performance was attributed to Steam Generator cleaning methods. The cleaning process permitted particulate matter from the steam generator tubes to enter the reference legs and cause contamination of the level transmitters. The Steam Generators have been replaced and the reference legs are now isolated prior to any Steam Generator cleaning work. Due to these changes, future drift values are expected to be within VDA30. A review of 1992 calibration data (see appendix B&D, pages 12-14) confirms that future drift values were within VDA. Therefore, the calibration interval

for these transmitters can be extended to a maximum of 30 months. Future As-Found conditions should be within 1.5256% of the calibration span (VDA30).

2. As expected, MED30 for the Pressurizer Pressure transmitters was well above VDA30 due to poor past performance of these transmitters. Since new zero suppression kits were installed future drift values are expected to be within the VDA30 of 1.0775 percent of the calibration span. However, a review of 1992 calibration results shows improper test equipment was used and confirmation that transmitter performance will be within vendor allowances could not be validated. Therefore, the calibration interval for PT-455, 456, 457, 474 cannot be extended.

3. MED30 for the Pressurizer Level transmitters was above VDA30 by over 14% of the calibration span for the Maximum Drift Point and Actuation Point data sheets. One reason for this large difference was due to the lack of data points used to calculate MED30, which increased the K factor. However, since past performance of these transmitters routinely exceeded allowable limits and a large calibration uncertainty is predicted for future performance, the calibration interval should not be extended.

4. MED30 for the Pressurizer Pressure Lead/Lag Units (Lead Time) was above VDA30 by over 2% of the calibration span. The reason for this difference was due to one data point, which was so large that it could be considered to be caused by calibration error. Therefore, the calibration interval for these components can be extended to a maximum of 30 months. Future As-Found conditions should be within 3.1 sec. (MED30) 95% of the time.

5. MED30 for the Reactor Coolant Loop RTD-ΔT Special Lag Units was above VDA30 by over 9% of the calibration span. One reason for this large difference was due to the lack of data points used to calculate MED30, which increased the K factor. Also, one data point was so large that it could be considered to be caused by calibration error. By removing this drift value from the database, and using a smaller K factor, MED30 would be within VDA30. With one exception, past performance of these components was consistently within allowable limits (VDA), future As-Found conditions should be within 1.42% of the calibration span (VDA30). Therefore, the calibration interval for these Special Lag Units can be extended to a maximum of 30 months.

6. MED30 for the 6.9KV Undervoltage Relays exceeded the CT by over 40% of the calibration setting. Two reasons for this large difference are: 1) the increased K factor associated with limited data, and 2) the 27-3A relay exhibited significantly greater drift than the other relays.

   Since past performance of these relays routinely exceeded the CT and the predicted calibration uncertainty is too large (Reference 13), the calibration interval should not be extended.

7. MED30 for the 6.9KV Underfrequency Relays exceeded the CT for both Relay Trip and Time Delay. Two reasons for this large difference are: 1) the increased K factor associated with limited data, and 2) the extrapolation of field data which results in unrealistic drift values.

Instrument Drift Analysis

However, since past performance of these relays are consistently within the CT for both Relay Trip and Time Delay, the calibration interval can be extended to a maximum 30 months. Future As-Found conditions should be within 0.4508% (MED30) of the calibration setting for the Relay Trip portion and 19.3159% (MED30) of the calibration setting for the Time Delay portion.

Instrument Drift Analysis

Conclusion

The preceding sections of this report provide the results of an Instrument Drift Analysis. A list of components for the RPS system covered in this analysis is in Table 1 of this report.

Past Drift

An assessment of actual past instrument drift was performed in order to determine whether individual instrument drift values were within vendor allowances calculated for that calibration interval. Appendix A and B provide the results and Table 2 and 3 provide a summary of this analysis.

Overall, past instrument drift for the majority of the RPS components did not, except on rare occasions, exceed acceptable limits for a calibration interval. Devices which were exceeding acceptable limits were previously replaced, repaired or otherwise modified to preclude recurrence.

Future Drift

MED30 was calculated and compared to VDA30 or the CT. MED30 was compared to the CT only when information regarding vendor specifications was not available. A summary of this comparison is provided in Table 2 and 3 of this report. For cases where MED30 was less than or equal to VDA30 or the CT, future instrument drift will be within acceptable limits for a maximum calibration interval of 30 months. However, for cases where MED30 was greater than VDA30 or the CT, credit was taken, for instrument repairs and extrapolation of field data which results in unrealistic drift values, to justify the longer calibration interval.

Overall,the differences in As-Found and As-Left calibration readings were assumed to be entirely due to drift, instrument accuracy, and measuring and test equipment uncertainties; even though other factors such as calibration uncertainties and technician errors were present. This analysis provides a conservative assessment of RPS instrument performance.

Future drift is predictable and can be used as a basis to extend the calibration interval for components in the RPS system from 18 to a maximum of 30 months.

There are three notable exceptions:

1) Pressurizer Pressure Transmitters (PT-455, PT-456, PT-457 and PT-474).

2) Pressurizer Level Transmitters (LT-459, LT-460, LT-461 and LT-462).

3) 6.9KV Undervoltage Relays (27-1A, 27-2A, 27-3A and 27-4A).

The above components have experienced unpredictable high drift and a lack of acceptable past performance. Therefore, the calibration interval for these components should not be extended until a pattern of acceptable drift values can be established.

Instrument Drift Analysis

1992 field calibration data was reviewed in order to ensure that the assumptions and conclusions of this report were not invalidated.

INFORMATION
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PAGES -32- to -33-

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EBASCO SERVICES INC.

Instrument Drift Analysis

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   Revision 6, July 18, 1987.
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H. Pressurizer Pressure Control System Transmitter Check and Calibration (3PC-R4A).
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No. 9321-H-39923-0 Sheet 85, 90, Rev. 0.
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MOD 88-03-101-RCS

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DATE: 10-30-92

PROCEDURE: (see Table 1)

SYSTEM: RPS

TITLE: Instrument Drift Analysis for the RPS System

PREPARED BY: Dominick Lerce

DATE: 10-30-92

REVEIWED BY: Danny Chin

DATE: 10-30-92

Instrument Drift Analysis

Appendix A

Analysis of Actual Past Instrument Drift for RPS
(Maximum Drift Point)

PROCEDURE: 3PC-R1A REACTOR COOLANT LOOP NARROW RANGE TEMP. INSTRUMENTATION CAL. SYSTEM: RPC

COMPONENT: R/E CONVERTERS MANUFACTURER: FOXBORO MODEL NUMBER: N-2AI-P2V

VDA6 = 0.5161 (100 - 270) DAYS	VDA12 = 0.5161 (271 - 450) DAYS	VDA18 = 0.5161 (451 - 630) DAYS	VDA24 = 0.5161 (631 - 810) DAYS
NDP = 0	NDP = 0	NDP = 16	NDP = 0
NDP < VDA6 = N/A	NDP < VDA12 = N/A	NDP < VDA18 = 16	NDP < VDA24 = N/A
% < VDA6 = N/A	% < VDA12 = N/A	% < VDA18 = 100	% < VDA24 = N/A

TNDP = 16
% TNDP < VDA = 100

MAXIMUM DRIFT POINT

NOTES: 1) THIS DATA SHEET INCLUDES: TT-411B, TT-411A1, TT-411A2, TT-411A3, TT-421B, TT-421A1, TT-421A2 TT-421A3, TT-431B, TT-431A1, TT-431A2, TT-431A3, TT-441B, TT-441A1, TT-441A2, TT-441A3

2) CALIBRATION SPAN: 105 (DEG-F) ~ 10 (v)
3) BOTH THE HOT LEG AND COLD LEG HAVE THE SAME CALIBRATION SPAN.
4) ALL COMPONENTS WERE REPLACED IN 1988; SEE (MOD 88-03-101-RCS).

TAG/DATE	DAYS	AS FOUND (v)	AS LEFT (v)	DRIFT(v)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
TT-411B						
17-MAY-1989	497	5.017	5.017	-0.017	0.17	YES
26-SEP-1990		5	5			
TT-411A1						
17-MAY-1989	497	9.996	9.996	-0.026	0.26	YES
26-SEP-1990		9.97	9.97			
TT-411A2						
17-MAY-1989	497	9.978	9.978	0.012	0.12	YES
26-SEP-1990		9.99	9.99			

TAG/DATE	DAYS	AS FOUND (v)	AS LEFT	DRIFT(v)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
PT-411A3						
17-MAY-1989	497	7.498	7.498	-0.028	0.28	YES
26-SEP-1990		7.47	7.47			
PT-421B						
17-MAY-1989	497	0.011	0.011	-0.011	0.11	YES
26-SEP-1990		0	0			
PT-421A1						
17-MAY-1989	497	5.008	5.008	-0.008	0.08	YES
26-SEP-1990		5	5			
PT-421A2						
17-MAY-1989	497	7.523	7.509	0.011	0.11	YES
26-SEP-1990		7.52	7.52			
PT-421A3						
17-MAY-1989	497	2.506	2.506	-0.016	0.16	YES
26-SEP-1990		2.49	2.49			
PT-431B						
17-MAY-1989	497	2.5104	2.521	-0.011	0.11	YES
26-SEP-1990		2.51	2.51			
PT-431A1						
17-MAY-1989	497	7.488	7.501	0.009	0.09	YES
26-SEP-1990		7.51	7.51			
PT-431A2						
17-MAY-1989	497	4.996	5.004	0.006	0.06	YES
26-SEP-1990		5.01	5.01			

DATE	DAYS	AS FOUND (v)	AS LEFT (v)	DRIFT(v)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
31A3						
AY-1989	497	7.5	7.5	-0.01	0.1	YES
EP-1990		7.49	7.49			
41B						
AY-1989	497	10	10	0.01	0.1	YES
EP-1990		10.01	10.01			
41A1						
AY-1989	497	9.965	10.003	0.017	0.17	YES
EP-1990		10.02	10.02			
41A2						
AY-1989	497	9.996	9.996	0.014	0.14	YES
EP-1990		10.01	10.01			
41A3						
AY-1989	497	-0.0074	-0.0074	0.0074	0.074	YES
EP-1990		0	0			

OCEDURE: 3PC-R1A REACTOR COOLANT LOOP NARROW RANGE TEMP. INSTRUMENTATION CAL. SYSTEM: RPC

MPONENT: VOLTAGE ISOLATION DEVICES MANUFACTURER: FOXBORO MODEL NUMBER: N-2AO-VAI

VDA6 = 0.5179 (100 - 270) DAYS	VDA12 = 0.5179 (271 - 450) DAYS	VDA18 = 0.5179 (451 - 630) DAYS	VDA24 = 0.5179 (631 - 810) DAYS
NDP = 0	NDP = 0	NDP = 20	NDP = 0
NDP < VDA6 = N/A	NDP < VDA12 = N/A	NDP < VDA18 = 20	NDP < VDA24 = N/A
% < VDA6 = N/A	% < VDA12 = N/A	% < VDA18 = 100	% < VDA24 = N/A

IDP = 20
TNDP < VDA = 100

MAXIMUM DRIFT POINT

OTES: 1) THIS DATA SHEET INCLUDES: TY-411B, TY-411A1, TY-411A2A, TY-411A3, TY-411A2-1, TY-421B, TY-421A1, TY-421A2A, TY-421A3, TY-421A2-1, TY-431B, TY-431A1 TY-431A2A, TY-431A3, TY-431A2-1, TY-441B, TY-441A1, TY-441A2A TY-441A3, TY-441A2-1

2) CALIBRATION SPAN: INPUT(10 v) ~ OUTPTUT(8 v)

3) ALL COMPONENTS WERE REPLACED IN 1988; SEE (MOD 88-03-101-RCS).

AG/DATE	DAYS	AS FOUND (v)	AS LEFT (v)	DRIFT(v)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
Y-411B						
7-MAY-1989	497	2.185	2.008	-0.008	0.1	YES
6-SEP-1990		2	2			
Y-411A1						
7-MAY-1989	497	8.016	8.016	0.014	0.175	YES
6-SEP-1990		8.03	8.01			
Y-411A2A						
7-MAY-1989	497	10.001	10.001	-0.001	0.0125	YES
6-SEP-1990		10	10			

DATE	DAYS	AS FOUND (v)	AS LEFT (v)	DRIFT(v)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
11A3						
IAY-1989	497	8.007	8.007	-0.007	0.0875	YES
EP-1990		8	8			
11A2 THLavg						
IAY-1989	497	9.994	10	0.01	0.125	YES
EP-1990		10.01	10.01			
21B						
IAY-1989	497	10.852	10.0026	0.0074	0.0925	YES
EP-1990		10.01	10.01			
21A1						
IAY-1989	497	8.007	8.007	-0.007	0.0875	YES
EP-1990		8	8			
21A2A						
IAY-1989	497	9.999	9.999	0.001	0.0125	YES
EP-1990		10	10			
421A3						
IAY-1989	497	4.005	4.005	-0.005	0.0625	YES
EP-1990		4	4			
421A2 THLavg						
MAY-1989	497	8.265	8.005	0.005	0.0625	YES
SEP-1990		8.01	8.01			

/DATE	DAYS	AS FOUND (v)	AS LEFT (v)	DRIFT(v)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
431B						
MAY-1989	497	7.832	8.016	0.004	0.05	YES
SEP-1990		8.02	8.02			
431A1						
MAY-1989	497	9.999	9.999	0.001	0.0125	YES
SEP-1990		10	10			
431A2A						
MAY-1989	497	2.002	2.002	-0.002	0.025	YES
SEP-1990		2	2			
431A3						
MAY-1989	497	1.999	1.999	0.001	0.0125	YES
SEP-1990		2	2			
431A2 THLavg						
MAY-1989	497	9.735	10.006	-0.006	0.075	YES
SEP-1990		10	10			
441B						
MAY-1989	497	5.885	6.017	-0.007	0.0875	YES
SEP-1990		6.01	6.01			
441A1						
MAY-1989	497	10.005	10.005	0.005	0.0625	YES
SEP-1990		10.01	10.01			

G/DATE	DAYS	AS FOUND (v)	AS LEFT (v)	DRIFT(v)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
-441A2A						
-MAY-1989	497	4.002	4.002	0.008	0.1	YES
-SEP-1990		4.01	4.01			
-441A3						
-MAY-1989	497	10.018	10	0.01	0.125	YES
-SEP-1990		10.01	10.01			
-441A2 THLavg						
-MAY-1989	497	5.865	6.015	-0.005	0.0625	YES
-SEP-1990		6.01	6.01			

:OCEDURE: 3PC-R1B REACTOR COOLANT LOOP RTD CALIBRATION-Tavg SYSTEM: RPC

›MPONENT: E/I CONVERTER (DYNAMIC COMPENSATOR) MANUFACTURER: FOXBORO MODEL NUMBER: 66RC-OLA

VDA6 = 1.3859 (100 - 270) DAYS	VDA12 = 1.3859 (271 - 450) DAYS	VDA18 = 1.3859 (451 - 630) DAYS	VDA24 = 1.3859 (631 - 810) DAYS
NDP = 0	NDP = 0	NDP = 4	NDP = 4
NDP < VDA6 = N/A	NDP < VDA12 = N/A	NDP < VDA18 = 4	NDP < VDA24 = 4
% < VDA6 = N/A	% < VDA12 = N/A	% < VDA18 = 100	% < VDA24 = 100

IDP = 8
TNDP < VDA = 100

MAXIMUM DRIFT POINT [CALIBRATION SPAN: 75(DEG-F) ~ 400 mV]

›G/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
1-412R							
3-MAY-1987	675	220.75	220.75	-1.23	0.3075		YES
3-MAR-1989	72	219.52	300.33	-1.8	0.45	*	N/A
1-MAY-1989	532	298.53	498.63	1.03	0.2575		YES
7-NOV-1990		499.66	499.66				
1-422R							
3-MAY-1987	675	498.3	498.7	-0.52	0.13		YES
3-MAR-1989	72	498.18	100.54	-1.54	0.385	*	N/A
4-MAY-1989	532	99	498.63	1.37	0.3425		YES
7-NOV-1990		500	500				
M-432R							
8-MAY-1987	675	499	499	-0.54	0.135		YES
3-MAR-1989	72	498.46	219.55	1.57	0.3925	*	N/A
4-MAY-1989	532	221.12	221.12	-1.12	0.28		YES
7-NOV-1990		220	220				
M-442R							
8-MAY-1987	675	500.5	500.5	-1.29	0.3225		YES
3-MAR-1989	72	499.21	101.82	-2	0.5	*	N/A
4-MAY-1989	532	99.82	500.84	-0.84	0.21		YES
7-NOV-1990		500	500				

CEDURE: 3PC-R1B REACTOR COOLANT LOOP RTD CALIBRATION - DELTA T SYSTEM: RPC

IPONENT: SPECIAL LAG UNITS MANUFACTURER: FOXBORO MODEL NUMBER: 66RC-OL

VDA6 = 1.42	VDA12 = 1.42	VDA18 = 1.42	VDA24 = 1.42
(100 - 270) DAYS	(271 - 450) DAYS	(451 - 630) DAYS	(631 - 810) DAYS
NDP = 0	NDP = 0	NDP = 4	NDP = 4
NDP < VDA6 = N/A	NDP < VDA12 = N/A	NDP < VDA18 = 3	NDP < VDA24 = 4
% < VDA6 = N/A	% < VDA12 = N/A	% < VDA18 = 75	% < VDA24 = 100

)P = 8
'NDP < VDA = 87.50 MAXIMUM DRIFT POINT

\ VALUES ARE IN (%CAL-SPAN)

'ES: 1) TAG NUMBERS: TM-411F, TM-421F, TM-431F, TM-441F.
2) CALIBRATION SPAN: 75 (DEG-F) ~ 8 (V)
3) TM-421F WAS REPLACED ON 5-24-89, DATA FROM OLD TM-421F WAS PROCESSED DUE TO SIMILARITY (SEE WR# I-10640).

;/DATE	DAYS	AS FOUND (V)	AS LEFT (V)	DRIFT(V)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
-411F							
-MAY-1987	675	6.393	6.393	-0.01	0.125		YES
-MAR-1989	72	6.383	0	-0.5	6.25	*	N/A
-MAY-1989	532	-0.5	-0.5	0.5	6.25		NO
-NOV-1990		0	0				
-421F							
-MAY-1987	675	0.008	0.008	-0.008	0.1		YES
-MAR-1989	72	0	0	0.09	1.125	*	N/A
-MAY-1989	532	0.09	-0.03	0.023	0.2875		YES
-NOV-1990		-0.007	-0.007				

AG/DATE	DAYS	AS FOUND (V)	AS LEFT (V)	DRIFT(V)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
M-431F							
8-MAY-1987	675	6.397	6.397	0.003	0.0375		YES
3-MAR-1989	72	6.4	0.001	-0.061	0.7625	*	N/A
4-MAY-1989	532	-0.06	-0.061	0.059	0.7375		YES
7-NOV-1990		-0.002	-0.002				
M-441F							
8-MAY-1987	675	1.601	1.601	-0.002	0.025		YES
3-MAR-1989	72	1.599	4.8	-0.012	0.15	*	N/A
4-MAY-1989	532	4.788	1.6	0.007	0.0875		YES
7-NOV-1990		1.607	1.607				

ROCEDURE: 3PC-R2 TITLE: REACTOR COOLANT LOOP FLOW CALIBRATION SYSTEM: RPC

OMPONENT: FLOW TRANSMITTERS MANUFACTURER: FOXBORO MODEL NUMBER: E13DH-SAH1

VDA6 = 0.8953	VDA12 = 1.3717	VDA18 = 1.5047	VDA24 = 1.8253
(100 - 270)DAYS	(271 - 450)DAYS	(451 - 630)DAYS	(631 - 810)DAYS
NDP = 11	NDP = 11	NDP = 32	NDP = 23
NDP < VDA6 = 5	NDP < VDA12 = 11	NDP < VDA18 = 29	NDP < VDA24 = 15
% < VDA6 = 45.45	% < VDA12 = 100	% < VDA18 = 90.63	% < VDA24 = 65.22

'NDP = 77
TNDP < VDA = 77.92

MAXIMUM DRIFT POINT

'DA VALUES ARE IN (%CAL-SPAN)

IOTES: 1) INCLUDED IN THIS DATA SHEET: FT-414, FT-415, FT-416, FT-424, FT-425, FT-426, FT-434, FT-435, FT-436, FT-444, FT-445, FT-446

2) CALIBRATION SPAN: 120% FLOW ~ 400 mV
3) DATA FOR JUNE 20, 1989 WAS EXTRACTED FROM (ENG-359, REV 0).
4) ** = (FT-425) WAS REPAIRED, MAINTENANCE WORK REQUEST WRITTEN; SEE 3PC-R2 ,REV.2, PG. 32 OF 32 DATED 5-7-82.
5) ** = (FT-426) - AMPLIFIER REPLACED, SEE 3PC-R2, REV.3, PG. 32 OF 32, DATED 1-12-84.

:AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
:T-414							
12-NOV-1980	541	380.05	377.85	3.2	0.8		YES
07-MAY-1982	287	381.05	301.5	1.55	0.3875		YES
18-FEB-1983	104	303.05	OK	N/A	N/A		N/A
02-JUN-1983	224	N/A	499.45	5.05	1.2625		NO
12-JAN-1984	581	504.5	326	-4.165	1.04125		YES
15-AUG-1985	644	321.835	378.65	3	0.75		YES
21-MAY-1987	58	381.65	OK	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	498.45	8.35	2.0875		NO
14-APR-1989	3	506.8	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	301.7	1.95	0.4875		YES
07-DEC-1990		303.65	OK				

AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
T-415							
2-NOV-1980	541	508	499.3	14.95	3.7375	***	N/A
7-MAY-1982	287	514.25	378.7	1.8	0.45		YES
8-FEB-1983	104	380.5	OK	N/A	N/A		N/A
2-JUN-1983	224	N/A	201.4	-3.9	0.975		NO
2-JAN-1984	581	197.5	99.05	3.3	0.825		YES
5-AUG-1985	644	102.35	500.7	3.5	0.875		YES
1-MAY-1987	58	504.2	OK	N/A	N/A	*	N/A
8-JUL-1987	636	N/A	500.4	1.8	0.45		YES
4-APR-1989	3	502.2	N/A	N/A	N/A	*	N/A
7-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
0-JUN-1989	535	N/A	500.85	5.35	1.3375		YES
7-DEC-1990		506.2	OK				
T-416							
2-NOV-1980	541	502.2	500.7	2.75	0.6875		YES
7-MAY-1982	287	503.45	300.9	-0.47	0.1175		YES
8-FEB-1983	104	300.43	OK	N/A	N/A		N/A
2-JUN-1983	224	N/A	99	-4.4	1.1		NO
2-JAN-1984	581	94.6	400.5	-2	0.5		YES
5-AUG-1985	644	398.5	401	3.45	0.8625		YES
1-MAY-1987	58	404.45	OK	N/A	N/A	*	N/A
8-JUL-1987	636	N/A	499.9	8	2		NO
4-APR-1989	3	507.9	N/A	N/A	N/A	*	N/A
7-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
0-JUN-1989	535	N/A	500.15	3.95	0.9875		YES
7-DEC-1990		504.1	OK				

AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
T-424							
2-NOV-1980	541	99.5	99.5	-2.8	0.7		YES
7-MAY-1982	287	96.7	378.65	1.65	0.4125		YES
8-FEB-1983	104	380.3	OK	N/A	N/A		N/A
2-JUN-1983	224	N/A	100.45	-5.1	1.275		NO
2-JAN-1984	581	95.35	499.7	-2.5	0.625		YES
5-AUG-1985	644	497.2	500.05	10.95	2.7375		NO
1-MAY-1987	58	511	OK	N/A	N/A	*	N/A
8-JUL-1987	636	N/A	201	-14.75	3.6875		NO
4-APR-1989	3	186.25	N/A	N/A	N/A	*	N/A
7-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
0-JUN-1989	535	N/A	500.05	2.75	0.6875		YES
7-DEC-1990		502.8	OK				
T-425							
2-NOV-1980	541	483.7	498.6	-105.6	26.4	**	N/A
7-MAY-1982	287	393	99.2	-2	0.5		YES
8-FEB-1983	104	97.2	OK	N/A	N/A		N/A
2-JUN-1983	224	N/A	400.2	1.75	0.4375		YES
2-JAN-1984	581	401.95	301.4	-0.76	0.19		YES
5-AUG-1985	644	300.64	300.005	2.045	0.51125		YES
1-MAY-1987	58	302.05	OK	N/A	N/A	*	N/A
8-JUL-1987	636	N/A	99.2	-17.95	4.4875	***	N/A
4-APR-1989	3	81.25	N/A	N/A	N/A	*	N/A
7-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
0-JUN-1989	535	N/A	499.4	-3.6	0.9		YES
7-DEC-1990		495.8	OK				

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-426							
12-NOV-1980	541	90.2	99.5	2.7	0.675	**	N/A
07-MAY-1982	287	102.2	500.6	-4.1	1.025	**	N/A
18-FEB-1983	104	496.5	OK	N/A	N/A	**	N/A
02-JUN-1983	224	N/A	OK	N/A	N/A	**	N/A
12-JAN-1984	581	N/A	400.85	-4	1		YES
15-AUG-1985	644	396.85	499.9	3.3	0.825		YES
21-MAY-1987	58	503.2	OK	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	98.4	-15.15	3.7875		NO
14-APR-1989	3	83.25	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	500.4	3.1	0.775		YES
07-DEC-1990		503.5	OK				
FT-434							
12-NOV-1980	541	100.2	100.9	-2.6	0.65		YES
07-MAY-1982	287	98.3	499	-1.3	0.325		YES
18-FEB-1983	104	497.7	OK	N/A	N/A		N/A
02-JUN-1983	224	N/A	500.2	2.8	0.7		YES
12-JAN-1984	581	503	301.5	-2.05	0.5125		YES
15-AUG-1985	644	299.45	99.21	-7.56	1.89		NO
21-MAY-1987	58	91.65	OK	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	500	3.6	0.9		YES
14-APR-1989	3	503.6	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	100	-4.55	1.1375		YES
07-DEC-1990		95.45	OK				

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-435							
12-NOV-1980	541	328.3	325.55	1.15	0.2875		YES
07-MAY-1982	287	326.7	401.5	3.55	0.8875		YES
18-FEB-1983	104	405.05	OK	N/A	N/A		N/A
02-JUN-1983	224	N/A	498.4	3	0.75		YES
12-JAN-1984	581	501.4	301.6	-2.4	0.6		YES
15-AUG-1985	644	299.2	99.9	-12.5	3.125		NO
21-MAY-1987	58	87.4	OK	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	499.65	4.15	1.0375		YES
14-APR-1989	3	503.8	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	500.7	5.6	1.4		YES
07-DEC-1990		506.3	OK				
FT-436							
12-NOV-1980	541	379.35	377.75	1.25	0.3125		YES
07-MAY-1982	287	379	501	-1.705	0.42625		YES
18-FEB-1983	104	499.295	OK	N/A	N/A		N/A
02-JUN-1983	224	N/A	201.15	-2.05	0.5125		YES
12-JAN-1984	581	199.1	301.4	-3.95	0.9875		YES
15-AUG-1985	644	297.45	400.45	8.4	2.1		NO
21-MAY-1987	58	408.85	OK	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	400.95	4.3	1.075		YES
14-APR-1989	3	405.25	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	499.3	3.2	0.8		YES
07-DEC-1990		502.5	OK				

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-444							
12-NOV-1980	541	OK	OK	N/A	N/A		N/A
07-MAY-1982	287	N/A	499.8	2.4	0.6		YES
18-FEB-1983	104	502.2	OK	N/A	N/A		N/A
02-JUN-1983	224	N/A	99	-3.8	0.95		NO
12-JAN-1984	581	95.2	400.25	6.55	1.6375		NO
15-AUG-1985	644	406.8	99.55	-3.85	0.9625		YES
21-MAY-1987	58	95.7	OK	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	500.1	-2.2	0.55		YES
14-APR-1989	3	497.9	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	401.85	7.85	1.9625		NO
07-DEC-1990		409.7	OK				
FT-445							
12-NOV-1980	541	381.15	377.65	3.15	0.7875		YES
07-MAY-1982	287	380.8	200.3	-1.6	0.4		YES
18-FEB-1983	104	198.7	OK	N/A	N/A		N/A
02-JUN-1983	224	N/A	99.35	-2.35	0.5875		YES
12-JAN-1984	581	97	401.35	-1.35	0.3375		YES
15-AUG-1985	644	400	498	4.8	1.2		YES
21-MAY-1987	58	502.8	OK	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	99.05	-3.95	0.9875		YES
14-APR-1989	3	95.1	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	100	-1.95	0.4875		YES
07-DEC-1990		98.05	OK				

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-446							
12-NOV-1980	541	405.5	400.55	2.15	0.5375		YES
07-MAY-1982	287	402.7	499.6	1.65	0.4125		YES
18-FEB-1983	104	501.25	OK	N/A	N/A		N/A
02-JUN-1983	224	N/A	400.55	3.75	0.9375		NO
12-JAN-1984	581	404.3	499.3	-12	3		NO
15-AUG-1985	644	487.3	400	4.1	1.025		YES
21-MAY-1987	58	404.1	OK	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	498.6	6.7	1.675		YES
14-APR-1989	3	505.3	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	OK	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	323.5	4.65	1.1625		YES
07-DEC-1990		328.15	OK				

PROCEDURE: 3PC-R3,3A TITLE: PRESSURIZER LEVEL CALIBRATION SYSTEM: RCS

COMPONENT: LEVEL TRANSMITTERS MANUFACTURER: FOXBORO MODEL NUMBER: N-E13DH-HIH1-BEK

VDA6 = 1.0799 (100 - 270) DAYS	VDA12 = 1.1014 (271 - 450) DAYS	VDA18 = 1.1085 (451 - 630) DAYS	VDA24 = 1.1294 (631 - 810) DAYS
NDP = 1	NDP = 0	NDP = 3	NDP = 2
NDP < VDA6 = 0	NDP < VDA12 = N/A	NDP < VDA18 = 1	NDP < VDA24 = 0
% < VDA6 = 0	% < VDA12 = N/A	% < VDA18 = 33.33	% < VDA24 = 0

TNDP = 6
% TNDP < VDA = 16.67 [MAXIMUM DRIFT POINT] VDA VALUES ARE IN (%CAL-SPAN)

NOTES:
1) THIS DATA SHEET INCLUDES: LT-459, LT-460, LT-461, LT-462
2) CALIBRATION SPAN: 100% LEVEL ~ 263.7 "H2O ~ 400 mV
3) DATA FOR OCTOBER 22, 1988 WAS EXTRACTED FROM (WR# I-9248).
4) SINCE LT-462 HAS A DIFFERENT CALIBRATION SPAN AND WAS NOT CALIBRATED UNTIL 1990, IT WAS NOT INCLUDED IN THIS ANALYSIS.
5) ** = SEE (WR# I-9248).

TAG/DATE	DAYS	AS FOUND (mVdc)	AS LEFT (mVdc)	DRIFT(mVdc)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
LT-459							
20-JUL-1987	460	500.6	499.9	-27.2	6.8	**	N/A
22-OCT-1988	198	472.7	502	16.2	4.05		NO
08-MAY-1989	512	518.2	200.15	-5.7	1.425		NO
02-OCT-1990		194.45	198.5				
LT-460							
20-JUL-1987	658	498.8	498.8	10.8	2.7		NO
08-MAY-1989	512	509.6	299.2	-6.3	1.575		NO
02-OCT-1990		292.9	299.05				
LT-461							
20-JUL-1987	658	488.6	498.55	14.95	3.7375		NO
08-MAY-1989	512	513.5	501.6	-3.9	0.975		YES
02-OCT-1990		497.7	499.9				
LT-462 (WR)	SEE NOTE 4						

PROCEDURE: 3PC-R4,4A TITLE: PRESSURIZER PRESSURE CALIBRATION SYSTEM: RPC

COMPONENT: PRESSURE TRANSMITTERS MANUFACTURER: FOXBORO MODEL NUMBER: N-E11GM-HIE1-BEL

VDA6 = 0.9171 (100 - 270) DAYS	VDA12 = 0.9803 (271 - 450) DAYS	VDA18 = 1.0005 (451 - 630) DAYS	VDA24 = 1.0588 (631 - 810) DAYS
NDP = 0	NDP = 0	NDP = 4	NDP = 8
NDP < VDA6 = N/A	NDP < VDA12 = N/A	NDP < VDA18 = 0	NDP < VDA24 = 3
% < VDA6 = N/A	% < VDA12 = N/A	% < VDA18 = 0	% < VDA24 = 37.5

TNDP = 12
% TNDP < VDA = 25

MAXIMUM DRIFT POINT

NOTES:
1) INCLUDED IN THIS DATA SHEET: PT-455, PT-456, PT-457, PT-474
2) CALIBRATED SPAN: 800 psig 400 mv
3) REPLACED ZERO SUPPRESSION KIT FOR ALL ABOVE TRANSMITTERS ON DECEMBER 4, 1990, (SEE I&C WR#'s: 25770,25694,25771,25769).
4) THEREFORE THIS DATA CAN NOT BE USED TO SUPPORT THE INSTRUMENT DRIFT, SINCE NO DATA WAS RECOVERED AFTER THE INSTALLATION OF THE ZERO SUPPRESSION KITS.

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mV)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
PT-455						
06-AUG-1985	672	95.45	100.3	3.3	0.825	YES
09-JUN-1987	682	103.6	500.1	10.75	2.6875	NO
21-APR-1989	532	510.85	499.1	-13.7	3.425	NO
05-OCT-1990	60	485.4	OK	N/A	N/A	N/A
04-DEC-1990		N/A	OK			
PT-456						
06-AUG-1985	672	89.9	99.5	2.75	0.6875	YES
09-JUN-1987	682	102.25	499.9	5.8	1.45	NO
21-APR-1989	532	505.7	501.15	-14.95	3.7375	NO
05-OCT-1990	60	486.2	OK	N/A	N/A	N/A
04-DEC-1990		N/A	OK			

AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mV)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
T-457						
6-AUG-1985	672	503	499.9	-1.9	0.475	YES
9-JUN-1987	682	498	99.85	-5.5	1.375	NO
1-APR-1989	532	94.35	301.1	-10.65	2.6625	NO
5-OCT-1990	60	290.45	OK	N/A	N/A	N/A
4-DEC-1990		N/A	OK			
T-474						
6-AUG-1985	672	97.1	100.05	5.25	1.3125	NO
9-JUN-1987	682	105.3	500	9.1	2.275	NO
1-APR-1989	532	509.1	400.5	-5.5	1.375	NO
5-OCT-1990	60	395	OK	N/A	N/A	N/A
4-DEC-1990		N/A	OK			

PROCEDURE: 3PC-R4,B TITLE: PRESSURIZER PRESSURE CALIBRATION SYSTEM: RPC

COMPONENT: LEAD/LAG UNITS MANUFACTURER: FOXBORO MODEL NUMBER: 66RC-OLA

VDA6 = 1.0225 Sec (100 - 270) DAYS	VDA12 = 1.0225 Sec (271 - 450) DAYS	VDA18 = 1.0225 Sec (451 - 630) DAYS	VDA24 = 1.0225 Sec (631 - 810) DAYS
NDP = 0	NDP = 0	NDP = 4	NDP = 8
NDP < VDA6 = N/A	NDP < VDA12 = N/A	NDP < VDA18 = 4	NDP < VDA24 = 7
% < VDA6 = N/A	% < VDA12 = N/A	% < VDA18 = 100	% < VDA24 = 87.5

TNDP = 12
% TNDP < VDA = 91.67

NOTES: 1) TAG NUMBERS: PM-455B, PM-456B, PM-457B, PM-474B.
2) CALIBRATION SETTING: 9 Sec
3) DAIL SETTINGS DO NOT HAVE TO BE EVALUATED.

TAG/DATE	DAYS	AS FOUND (Sec)	AS LEFT (Sec)	DRIFT (Sec)	DRIFT < VDA (YES OR NO)
PM-455B (LEAD TIME)					
06-AUG-1985	672	9	9	0	YES
09-JUN-1987	692	9	9	0	YES
01-MAY-1989	540	9	9	0.4	YES
23-OCT-1990		9.4	9.4		
PM-456B					
06-AUG-1985	672	9	9	-0.6	YES
09-JUN-1987	692	8.4	9	0	YES
01-MAY-1989	540	9	9	0	YES
23-OCT-1990		9	9		
PM-457B					
06-AUG-1985	672	9	9	-2.8	NO
09-JUN-1987	692	6.2	9	-0.4	YES
01-MAY-1989	540	8.6	8.9	-0.9	YES
23-OCT-1990		8	9		

TAG/DATE	DAYS	AS FOUND (Sec)	AS LEFT (Sec)	DRIFT (Sec)	DRIFT < VDA (YES OR NO)
PM-474B					
06-AUG-1985	672	9	9	-0.6	YES
09-JUN-1987	692	8.4	9	-0.3	YES
01-MAY-1989	540	8.7	8.9	-0.9	YES
23-OCT-1990		8	9		

ROCEDURE: 3PC-R4,B TITLE: PRESSURIZER PRESSURE CALIBRATION SYSTEM: RPC

OMPONENT: LEAD/LAG UNITS MANUFACTURER: FOXBORO MODEL NUMBER: 66RC-OLA

NDP = 12
TNDP < CT = 100
T = 0.2 Sec

OTES: 1) TAG NUMBERS: PM-455B, PM-456B, PM-457B, PM-474B.
2) CALIBRATION SETTING: 1 Sec
3) DAIL SETTINGS DO NOT HAVE TO BE EVALUATED.

'AG/DATE	DAYS	AS FOUND (Sec)	AS LEFT (Sec)	DRIFT (Sec)	DRIFT < CT (YES OR NO)
'M-455B (LAG TIME)					
)6-AUG-1985	672	0.01	1	0	YES
)9-JUN-1987	692	1	1	0	YES
)1-MAY-1989	540	1	1	0	YES
23-OCT-1990		1	1		
'M-456B					
)6-AUG-1985	672	N/A	1	0.1	YES
)9-JUN-1987	692	1.1	1.1	0	YES
)1-MAY-1989	540	1.1	1.1	-0.05	YES
23-OCT-1990		1.05	1.05		
PM-457B					
)6-AUG-1985	672	0.01	1	0	YES
09-JUN-1987	692	1	1	0.1	YES
01-MAY-1989	540	1.1	1.1	-0.12	YES
23-OCT-1990		0.98	0.98		
PM-474B					
06-AUG-1985	672	0.012	1	0	YES
09-JUN-1987	692	1	1	0	YES
01-MAY-1989	540	1	1	0.05	YES
23-OCT-1990		1.05	1.05		

OCEDURE: 3PC-R5A TITLE: 6.9KV UNDERVOLTAGE RELAY CAL. & AGASTST TIME RESPONSE SYSTEM: ED

MPONENTS: RELAYS MANUFACTURER: WESTINGHOUSE MODEL NUMBER: TYPE SV

DP = 9
TNDP < CT = 22.22
= 3.4783 (%SETTING) SEE NOTE 4

OTES:
1) INCLUDED IN THIS DATA SHEET: 27-1A, 27-2A, 27-3A, 27-4A.
2) CALIBRATION SETTING: 86.25 Vac
3) DATA FOR APRIL 23, 1991 WAS EXTRACTED FROM (WR# I-28552).
4) CALIBRATION TOLERANCE: +3 Vac

AG/DATE	DAYS	AS FOUND (Vac)	AS LEFT (Vac)	DRIFT (Vac)	DRIFT (%SETTING)	DRIFT < CT (YES OR NO)
7-1A DROP OUT VOLTAGE						
9-MAY-1987	643	93.75	87.96	0.04	0.04638	YES
0-FEB-1989	592	88	88	-4.5	5.21739	NO
5-SEP-1990		83.5	87.1			
7-2A						
9-MAY-1987	643	91.35	87.22	-4.22	4.89275	NO
0-FEB-1989	592	83	89.2	-3.4	3.94203	NO
5-SEP-1990	210	85.8	88.12	0.88	1.02029	YES
3-APR-1991		89	88			
7-3A						
9-MAY-1987	643	87.08	87.08	19.92	23.0957	NO
0-FEB-1989	592	107	88.9	-21.4	24.8116	NO
5-SEP-1990		67.5	86.5			
7-4A						
9-MAY-1987	643	88.5	88.02	-4.52	5.24058	NO
0-FEB-1989	592	83.5	89.1	-5.1	5.91304	NO
5-SEP-1990		84	87.8			

ROCEDURE: 3PC-R5A TITLE: 6.9KV UNDERVOLTAGE RELAY CAL. & AGASTST TIME RESPONSE SYSTEM: ED

OMPONENTS: AGASTAT RELAYS MANUFACTURER: AMERACE MODEL NUMBER: 2122DH39YB

VDA6 = 7 (100 - 270) DAYS	VDA12 = 7 (271 - 450) DAYS	VDA18 = 7 (451 - 630) DAYS	VDA24 = 7 (631 - 810) DAYS
NDP = 0	NDP = 0	NDP = 4	NDP = 4
NDP < VDA6 = N/A	NDP < VDA12 = N/A	NDP < VDA18 = 4	NDP < VDA24 = 4
% < VDA6 = N/A	% < VDA12 = N/A	% < VDA18 = 100	% < VDA24 = 100

NDP = 8
TNDP < VDA = 100

DA VALUES ARE IN (%SETTING)

OTES: 1) INCLUDED IN THIS DATA SHEET: 27-1-62A, 27-2-62A, 27-3-62A, 27-4-62A.
2) CALIBRATION SETTING: 500 ms

AG/DATE	DAYS	AS FOUND (ms)	AS LEFT (ms)	DRIFT (ms)	DRIFT (%SETTING)	DRIFT < VDA30 (YES OR NO)
27-1-62A AGASTAT TIME RESPONSE						
09-MAY-1987	643	470	470	13.14	2.628	YES
10-FEB-1989	592	483.14	483.14	-16.47	3.294	YES
25-SEP-1990		466.67	491.67			
27-2-62A						
09-MAY-1987	643	490	490	-6.86	1.372	YES
10-FEB-1989	592	483.14	483.14	-4.81	0.962	YES
25-SEP-1990		478.33	478.33			
27-3-62A						
09-MAY-1987	643	475	475	8.14	1.628	YES
10-FEB-1989	592	483.14	483.14	0.19	0.038	YES
25-SEP-1990		483.33	483.33			
27-4-62A						
09-MAY-1987	643	482.5	482.5	0.64	0.128	YES
10-FEB-1989	592	483.14	483.14	-6.47	1.294	YES
25-SEP-1990		476.67	476.67			

ROCEDURE: 3PC-R5B TITLE: 6.9KV UNDERFREQUENCY RELAY CAL. & RESPONSE TIME TEST SYSTEM: ED

OMPONENT: RELAYS MANUFACTURER: WESTINGHOUSE MODEL NUMBER: TYPE KF

NDP = 8
TNDP < CT = 87.5
T = 0.1739 (%SETTING) SEE NOTE 3

OTES:
1) INCLUDED IN THIS DATA SHEET: 81-1, 81-2, 81-3, 81-4.
2) CALIBRATION SETTING: 57.5 HZ
3) CALIBRATION TOLERANCE: + 0.1 HZ
4) DATA FOR FEBRUARY 14, 1989 WAS EXTRACTED FROM (WR# I-10046).

AG/DATE	DAYS	AS FOUND (HZ)	AS LEFT (HZ)	DRIFT (HZ)	DRIFT (%SETTING)		DRIFT < CT (YES OR NO)
1-1 RELAY TRIP FREQUENCY							
9-MAY-1987	643	57.65	57.58	0.02	0.03478		YES
0-FEB-1989	4	57.6	57.6	0	0	*	N/A
4-FEB-1989	588	57.6	57.6	-0.09	0.15652		YES
5-SEP-1990		57.51	57.51				
1-2							
9-MAY-1987	643	57.58	57.58	0.02	0.03478		YES
0-FEB-1989	4	57.6	57.6	0	0	*	N/A
4-FEB-1989	588	57.6	57.6	-0.12	0.2087		NO
5-SEP-1990		57.48	57.54				
1-3							
9-MAY-1987	643	57.63	57.57	-0.04	0.06957		YES
0-FEB-1989	4	57.53	57.53	0	0	*	N/A
4-FEB-1989	588	57.53	57.53	-0.1	0.17391		YES
5-SEP-1990		57.43	57.53				
1-4							
9-MAY-1987	643	57.68	57.55	0	0		YES
0-FEB-1989	4	57.55	57.56	-0.01	0.01739	*	N/A
4-FEB-1989	588	57.55	57.55	-0.09	0.15652		YES
5-SEP-1990		57.46	57.54				

PROCEDURE: 3PC-R5B TITLE: 6.9KV UNDERFREQUENCY RELAY CAL. & RESPONSE TIME TEST SYSTEM: ED

COMPONENT: RELAYS MANUFACTURER: WESTINGHOUSE MODEL NUMBER: TYPE KF

TNDP = 8
% TNDP < CT = 100
CT = 16 (%SETTING) SEE NOTE 3

NOTES:
1) INCLUDED IN THIS DATA SHEET: 81-1, 81-2, 81-3, 81-4.
2) CALIBRATION SETTING: 0.1 SEC
3) CALIBRATION TOLERANCE: - 0.016 SEC
4) DATA FOR FEBRUARY 14, 1989 WAS EXTRACTED FROM (WR# I-10046).

TAG/DATE	DAYS	AS FOUND (SEC)	AS LEFT (SEC)	DRIFT (SEC)	DRIFT (%SETTING)		DRIFT < CT (YES OR NO)
81-1 TIME DELAY							
09-MAY-1987	643	0.09	0.09	0.0099	9.9		YES
10-FEB-1989	4	0.0999	0.0999	0	0	*	N/A
14-FEB-1989	588	0.0999	0.0999	0.0101	10.1		YES
25-SEP-1990		0.11	0.092				
81-2							
09-MAY-1987	643	0.09	0.09	0.0099	9.9		YES
10-FEB-1989	4	0.0999	0.0999	0	0	*	N/A
14-FEB-1989	588	0.0999	0.0999	-0.0069	6.9		YES
25-SEP-1990		0.093	0.093				
81-3							
09-MAY-1987	643	0.085	0.085	0.0066	6.6		YES
10-FEB-1989	4	0.0916	0.0916	0	0	*	N/A
14-FEB-1989	588	0.0916	0.0916	-0.0036	3.6		YES
25-SEP-1990		0.088	0.088				
81-4							
09-MAY-1987	643	0.09	0.093	0.0028	2.8		YES
10-FEB-1989	4	0.0958	0.0958	0	0	*	N/A
14-FEB-1989	588	0.0958	0.0958	-0.0058	5.8		YES
25-SEP-1990		0.09	0.09				

'ROCEDURE: 3PC-R7,7A-7D TITLE: STEAM GENERATOR LEVEL TRANSMITTER CALIBRATION SYSTEM: FW

:OMPONENT: LEVEL TRANSMITTERS MANUFACTURER: FOXBORO MODEL NUMBER: N-E13DH-HIM1-BEK

VDA6 = 1.4840 (100 - 270) DAYS	VDA12 = 1.4997 (271 - 450) DAYS	VDA18 = 1.5049 (451 - 630) DAYS	VDA24 = 1.5204 (631 - 810) DAYS
NDP = 1	NDP = 1	NDP = 11	NDP = 24
NDP < VDA6 = 1	NDP < VDA12 = 0	NDP < VDA18 = 10	NDP < VDA24 = 9
% < VDA6 = 100	% < VDA12 = 0	% < VDA18 = 90.91	% < VDA24 = 37.50

:NDP = 36
; TNDP < VDA = 55.55 MAXIMUM DRIFT POINT

NOTES:
1) INCLUDED IN THIS DATA SHEET: LT-417A,B,C; LT-427A,B,C; LT-437A,B,C; LT-447A,B,C
2) CALIBRATION SPAN: 98 "H2O ~ 400 mv
3) DATA FOR 3-9-90 WAS EXTRACTED FROM (WR-12317).

TAG/DATE	DAYS	AS-FOUND (mv)	AS-LEFT (mv)	DRIFT(mV)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
LT-417A						
22-AUG-1985	655	101.55	100	-15.8	3.95	NO
08-JUN-1987	690	84.2	99.45	7.15	1.7875	NO
28-APR-1989	517	106.6	500.9	2.2	0.55	YES
27-SEP-1990		503.1	501.9			
LT-427A						
22-AUG-1985	655	97.45	100.2	-14.65	3.6625	NO
08-JUN-1987	690	85.55	99.7	10.2	2.55	NO
28-APR-1989	517	109.9	99.7	-4.45	1.1125	YES
27-SEP-1990		95.25	99.55			
LT-437A						
22-AUG-1985	655	99.4	100.1	-12.25	3.0625	NO
08-JUN-1987	690	87.85	500.6	4	1	YES
28-APR-1989	315	504.6	500.2	8.5	2.125	NO
09-MAR-1990	202	508.7	99.4	-1.15	0.2875	YES
27-SEP-1990		98.25	98.25			

AG/DATE	DAYS	AS-FOUND (mv)	AS-LEFT (mv)	DRIFT(mV)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
Γ-447A						
2-AUG-1985	655	104.25	100.3	-6.4	1.6	NO
8-JUN-1987	690	93.9	500.65	6.05	1.5125	YES
8-APR-1989	517	506.7	99.85	-5.2	1.3	YES
7-SEP-1990		94.65	99.4			
T-417B						
2-AUG-1985	655	101.2	100	-4.3	1.075	YES
8-JUN-1987	690	95.7	200	9.55	2.3875	NO
8-APR-1989	516	209.55	500.7	5.4	1.35	YES
6-SEP-1990		506.1	501.5			
T-427B						
2-AUG-1985	655	100.7	100.6	-3.2	0.8	YES
8-JUN-1987	690	97.4	500.95	-5.45	1.3625	YES
8-APR-1989	516	495.5	401.65	1.3	0.325	YES
6-SEP-1990		402.95	401.65			
,T-437B						
2-AUG-1985	655	103	99.5	-9.85	2.4625	NO
8-JUN-1987	690	89.65	99.35	8.95	2.2375	NO
8-APR-1989	516	108.3	99.5	-5.1	1.275	YES
6-SEP-1990		94.4	98.4			
,T-447B						
2-AUG-1985	655	499	500.95	6.25	1.5625	NO
8-JUN-1987	690	507.2	99.5	1.85	0.4625	YES
8-APR-1989	516	101.35	400.1	2.75	0.6875	YES
6-SEP-1990		402.85	400.15			

'AG/DATE	DAYS	AS-FOUND (mv)	AS-LEFT (mv)	DRIFT(mV)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
;T-417C							
:2-AUG-1985	655	104	99.85	-12.35	3.0875		NO
)8-JUN-1987	690	87.5	300.55	11.25	2.8125		NO
:8-APR-1989	512	311.8	300.7	-0.75	0.1875		YES
:2-SEP-1990		299.95	299.95				
;T-427C							
:2-AUG-1985	655	493	500.05	-4.35	1.0875		YES
)8-JUN-1987	690	495.7	400.6	-15.35	3.8375		NO
:8-APR-1989	509	385.25	301.3	-6.6	1.65		NO
19-SEP-1990		294.7	300.85				
LT-437C							
:2-AUG-1985	655	503	500.3	-3.75	0.9375		YES
08-JUN-1987	690	496.55	500.5	-4.2	1.05		YES
:8-APR-1989	509	496.3	100.3	-3.45	0.8625		YES
19-SEP-1990		96.85	99.2				
LT-447C							
22-AUG-1985	655	98.5	100	-22.45	5.6125	***	N/A
08-JUN-1987	690	77.55	500.5	-6.9	1.725		NO
28-APR-1989	512	493.6	399.75	3.95	0.9875		YES
22-SEP-1990		403.7	401.3				

Instrument Drift Analysis

Appendix B

Analysis of Actual Past Instrument Drift for RPS
(Actuation Point)

PROCEDURE: 3PC-R2 TITLE: REACTOR COOLANT LOOP FLOW CALIBRATION SYSTEM: RPC

COMPONENT: FLOW TRANSMITTERS MANUFACTURER: FOXBORO MODEL NUMBER: E13DH-SAH1

VDA6 = 0.8953 (100 - 270) DAYS	VDA12 = 1.3717 (271 - 450) DAYS	VDA18 = 1.5047 (451 - 630) DAYS	VDA24 = 1.8253 (631 - 810) DAYS
NDP = 11	NDP = 11	NDP = 33	NDP = 21
NDP < VDA6 = 11	NDP < VDA12 = 11	NDP < VDA18 = 32	NDP < VDA24 = 19
% < VDA6 = 100	% < VDA12 = 100	% < VDA18 = 96.97	% < VDA24 = 90.48

TNDP = 76
% TNDP < VDA = 96.05

ACTUATION POINT: LOW FLOW REACTOR TRIP = 90% FLOW.

VDA VALUES ARE IN (%CAL-SPAN)

NOTES: 1) INCLUDED IN THIS DATA SHEET: FT-414, FT-415, FT-416, FT-424, FT-425, FT-426, FT-434, FT-435, FT-436, FT-444, FT-445, FT-446

2) CALIBRATION SPAN: 120% FLOW ~ 400 mV
3) DATA FOR JUNE 20, 1989 WAS EXTRACTED FROM (ENG-359, REV 0).
4) ** = (FT-425) WAS REPAIRED, MAINTENANCE WORK REQUEST WRITTEN; SEE 3PC-R2 ,REV.2, PG. 32 OF 32 DATED 5-7-82.
5) ** = (FT-426) - AMPLIFIER REPLACED, SEE 3PC-R2, REV.3, PG. 32 OF 32, DATED 1-12-84.

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-414							
12-NOV-1980	541	327.95	325.8	1.5	0.375		YES
07-MAY-1982	287	327.3	326.2	0	0		YES
18-FEB-1983	104	326.2	325.15	N/A	N/A		N/A
02-JUN-1983	224	N/A	325.55	2.05	0.5125		YES
12-JAN-1984	581	327.6	326	-4.165	1.04125		YES
15-AUG-1985	644	321.835	325.95	2.15	0.5375		YES
21-MAY-1987	58	328.1	326.4	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	325.6	5.95	1.4875		YES
14-APR-1989	3	331.55	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	326.4	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	327	0.5	0.125		YES
07-DEC-1990		327.5	325.65				

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-415							
12-NOV-1980	541	330.25	325.25	13.25	3.3125	***	N/A
07-MAY-1982	287	338.5	326.2	1.3	0.325		YES
18-FEB-1983	104	327.5	325.85	N/A	N/A		N/A
02-JUN-1983	224	N/A	326.15	-1.75	0.4375		YES
12-JAN-1984	581	324.4	325.25	-1.5	0.375		YES
15-AUG-1985	644	323.75	325.6	1.95	0.4875		YES
21-MAY-1987	58	327.55	326.2	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	326.35	1.05	0.2625		YES
14-APR-1989	3	327.4	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	325.45	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	326.55	3.6	0.9		YES
07-DEC-1990		330.15	325.15				
FT-416							
12-NOV-1980	541	326.5	324.7	2.6	0.65		YES
07-MAY-1982	287	327.3	325.3	0.175	0.04375		YES
18-FEB-1983	104	325.475	325.375	N/A	N/A		N/A
02-JUN-1983	224	N/A	324.8	-2.8	0.7		YES
12-JAN-1984	581	322	326	-1.15	0.2875		YES
15-AUG-1985	644	324.85	325.7	1.4	0.35		YES
21-MAY-1987	58	327.1	325.3	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	324.8	5.3	1.325		YES
14-APR-1989	3	330.1	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	326.15	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	325.5	2.65	0.6625		YES
07-DEC-1990		328.15	325.05				

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-424							
12-NOV-1980	541	328.95	325.95	0.25	0.0625		YES
07-MAY-1982	287	326.2	326.6	0.85	0.2125		YES
18-FEB-1983	104	327.45	325.7	N/A	N/A		N/A
02-JUN-1983	224	N/A	325.6	-0.25	0.0625		YES
12-JAN-1984	581	325.35	325.65	-0.76	0.19		YES
15-AUG-1985	644	324.89	325.75	5.85	1.4625		YES
21-MAY-1987	58	331.6	325.6	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	325.6	-13.45	3.3625	***	N/A
14-APR-1989	3	312.15	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	326.25	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	325.85	1	0.25		YES
07-DEC-1990		326.85	325.1				
FT-425							
12-NOV-1980	541	306.35	324.55	-47.65	11.9125	**	N/A
07-MAY-1982	287	276.9	326.2	-1.2	0.3		YES
18-FEB-1983	104	325	324.75	N/A	N/A		N/A
02-JUN-1983	224	N/A	325.65	1.15	0.2875		YES
12-JAN-1984	581	326.8	325.7	-0.55	0.1375		YES
15-AUG-1985	644	325.15	325.005	0.795	0.19875		YES
21-MAY-1987	58	325.8	326	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	326.3	-13.5	3.375	***	N/A
14-APR-1989	3	312.8	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	326.2	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	325.85	-2.6	0.65		YES
07-DEC-1990		323.25	325.75				

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-426							
12-NOV-1980	541	321.65	325.05	2.25	0.5625	**	N/A
07-MAY-1982	287	327.3	325.7	-2.5	0.625	**	N/A
18-FEB-1983	104	323.2	325.1	N/A	N/A	**	N/A
02-JUN-1983	224	N/A	325.85	N/A	N/A	**	N/A
12-JAN-1984	581	N/A	325.95	-2.9	0.725		YES
15-AUG-1985	644	323.05	325.75	3	0.75		YES
21-MAY-1987	58	328.75	325.9	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	325.55	-10	2.5		NO
14-APR-1989	3	315.55	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	326.5	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	325.85	2.6	0.65		YES
07-DEC-1990		328.45	326.4				
FT-434							
12-NOV-1980	541	327.9	326.2	-1	0.25		YES
07-MAY-1982	287	325.2	325.2	-0.75	0.1875		YES
18-FEB-1983	104	324.45	325.3	N/A	N/A		N/A
02-JUN-1983	224	N/A	326	1.35	0.3375		YES
12-JAN-1984	581	327.35	325.9	-1.45	0.3625		YES
15-AUG-1985	644	324.45	325.05	-6.65	1.6625		YES
21-MAY-1987	58	318.4	325.6	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	325.3	2	0.5		YES
14-APR-1989	3	327.3	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	324.4	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	325.2	-0.35	0.0875		YES
07-DEC-1990		324.85	325.5				

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
FT-435							
12-NOV-1980	541	328.3	325.55	1.15	0.2875		YES
07-MAY-1982	287	326.7	326.7	1.85	0.4625		YES
18-FEB-1983	104	328.55	326.05	N/A	N/A		N/A
02-JUN-1983	224	N/A	325.75	1.25	0.3125		YES
12-JAN-1984	581	327	325.8	-1.45	0.3625		YES
15-AUG-1985	644	324.35	325.75	-10.3	2.575		NO
21-MAY-1987	58	315.45	326.1	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	326.2	3.25	0.8125		YES
14-APR-1989	3	329.45	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	326.1	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	326.85	3.9	0.975		YES
07-DEC-1990		330.75	326.45				
FT-436							
12-NOV-1980	541	327.55	325.8	0.6	0.15		YES
07-MAY-1982	287	326.4	326.4	-0.925	0.23125		YES
18-FEB-1983	104	325.475	325.49	N/A	N/A		N/A
02-JUN-1983	224	N/A	326.25	-1.55	0.3875		YES
12-JAN-1984	581	324.7	325.75	-0.9	0.225		YES
15-AUG-1985	644	324.85	325.25	7.3	1.825		YES
21-MAY-1987	58	332.55	326	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	325.85	3.75	0.9375		YES
14-APR-1989	3	329.6	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	326.45	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	326	1.25	0.3125		YES
07-DEC-1990		327.25	326.4				

AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
T-444							
12-NOV-1980	541	327.25	325.85	N/A	N/A		N/A
07-MAY-1982	287	N/A	326.4	1.1	0.275		YES
18-FEB-1983	104	327.5	326	N/A	N/A		N/A
02-JUN-1983	224	N/A	325.65	-1.55	0.3875		YES
12-JAN-1984	581	324.1	325.15	-2.3	0.575		YES
15-AUG-1985	644	322.85	326.05	-1.05	0.2625		YES
21-MAY-1987	58	325	325.9	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	325.75	-1.95	0.4875		YES
14-APR-1989	3	323.8	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	325.75	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	326.6	6.15	1.5375		NO
07-DEC-1990		332.75	326.65				
FT-445							
12-NOV-1980	541	328.4	325.6	2.3	0.575		YES
07-MAY-1982	287	327.9	326.7	-1.175	0.29375		YES
18-FEB-1983	104	325.525	325.5	N/A	N/A		N/A
02-JUN-1983	224	N/A	326.05	0.15	0.0375		YES
12-JAN-1984	581	326.2	326.4	-0.15	0.0375		YES
15-AUG-1985	644	326.25	326.75	1.35	0.3375		YES
21-MAY-1987	58	328.1	326.3	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	326.35	-1.45	0.3625		YES
14-APR-1989	3	324.9	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	326.4	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	326.85	1.8	0.45		YES
07-DEC-1990		328.65	326.9				

'AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
'T-446							
12-NOV-1980	541	328.7	325.35	1.65	0.4125		YES
07-MAY-1982	287	327	325.8	0.3	0.075		YES
18-FEB-1983	104	326.1	325.25	N/A	N/A		N/A
02-JUN-1983	224	N/A	325.9	3.35	0.8375		YES
12-JAN-1984	581	329.25	325.75	-2.85	0.7125		YES
15-AUG-1985	644	322.9	325.5	2.5	0.625		YES
21-MAY-1987	58	328	325	N/A	N/A	*	N/A
18-JUL-1987	636	N/A	325.95	3.75	0.9375		YES
14-APR-1989	3	329.7	N/A	N/A	N/A	*	N/A
17-APR-1989	64	N/A	325.5	N/A	N/A	*	N/A
20-JUN-1989	535	N/A	323.5	4.65	1.1625		YES
07-DEC-1990		328.15	326.15				

'ROCEDURE: 3PC-R3,3A TITLE: PRESSURIZER LEVEL CALIBRATION SYSTEM: RCS

:OMPONENT: LEVEL TRANSMITTERS MANUFACTURER: FOXBORO MODEL NUMBER: N-E13DH-HIH1-BEK

VDA6 = 1.0799	VDA12 = 1.1014	VDA18 = 1.1085	VDA24 = 1.1294
(100 - 270) DAYS	(271 - 450) DAYS	(451 - 630) DAYS	(631 - 810) DAYS
NDP = 1	NDP = 0	NDP = 3	NDP = 2
NDP < VDA6 = 0	NDP < VDA12 = N/A	NDP < VDA18 = 2	NDP < VDA24 = 0
% < VDA6 = 0	% < VDA12 = N/A	% < VDA18 = 66.66	% < VDA24 = 0

TNDP = 6
% TNDP < VDA = 33.33

ACTUATION POINT: FOR HIGH LEVEL REACTOR TRIP AT 460 mVdc

/DA VALUES ARE IN (%CAL-SPAN)

NOTES:
1) THIS DATA SHEET INCLUDES: LT-459, LT-460, LT-461, LT-462
2) CALIBRATION SPAN: 100% LEVEL 263.7 "H2O 400 mV
3) DATA FOR OCTOBER 22, 1988 WAS EXTRACTED FROM (WR# I-9248).
4) SINCE LT-462 HAS A DIFFERENT CALIBRATION SPAN AND WAS NOT CALIBRATED UNTIL 1990, IT WAS NOT INCLUDED IN THIS ANALYSIS.

TAG/DATE	DAYS	AS FOUND (mVdc)	AS LEFT (mVdc)	DRIFT(mVdc)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
LT-459							
20-JUL-1987	460	500.6	499.9	-27.2	6.8	**	N/A
22-OCT-1988	198	472.7	502	16.2	4.05		NO
08-MAY-1989	512	518.2	500.35	-1.75	0.4375		YES
02-OCT-1990		498.6	501.6				
LT-460							
20-JUL-1987	658	498.8	498.8	10.8	2.7		NO
08-MAY-1989	512	509.6	501	-5.8	1.45		NO
02-OCT-1990		495.2	501.1				
LT-461							
20-JUL-1987	658	488.6	498.55	14.95	3.7375		NO
08-MAY-1989	512	513.5	501.6	-3.9	0.975		YES
02-OCT-1990		497.7	499.9				
LT-462 (WR)	SEE NOTE 4						

ROCEDURE: 3PC-R7,7A-7D TITLE: STEAM GENERATOR LEVEL TRANSMITTER CALIBRATION SYSTEM: FW

OMPONENT: LEVEL TRANSMITTERS MANUFACTURER: FOXBORO MODEL NUMBER: N-E13DH-HIM1-BEK

VDA6 = 1.4840 (100 - 270) DAYS	VDA12 = 1.4997 (271 - 450) DAYS	VDA18 = 1.5049 (451 - 630) DAYS	VDA24 = 1.5204 (631 - 810) DAYS
NDP = 1	NDP = 1	NDP = 11	NDP = 24
NDP < VDA6 = 1	NDP < VDA12 = 1	NDP < VDA18 = 10	NDP < VDA24 = 12
% < VDA6 = 100	% < VDA12 = 100	% < VDA18 = 90.91	% < VDA24 = 50

NDP = 36
TNDP < VDA = 66.67

ACTUATION POINT: FOR LOW LEVEL TRIP AND LOW LEVEL MISMATCH AT 132 mv.

OTE:
1) TRANSMITTERS INCLUDED IN LOW LEVEL TRIP:
   A) LT-417A,B,C; LT-427A,B,C; LT-437A,B,C; LT-447A,B,C
2) TRANSMITTERS INCLUDED IN LOW LEVEL MISMATCH:
   A) LT-417A,C; LT-427A,C; LT-437A,C; LT-447A,C
3) SETPOINT FOR LOW LEVEL TRIP AND LOW LEVEL MISMATCH = 132(mv)
4) SINCE LOW LEVEL TRIP AND LOW LEVEL MISMATCH HAVE THE SAME SET POINT THEY CAN BE COMBINED INTO ONE DATA SHEET.
5) CALIBRATION SPAN: 98 "H2O 400 mv
6) DATA FOR 4-9-90 WAS EXTRACTED FROM (WR-12317).

AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
LT-417A						
2-AUG-1985	655	101.55	100	-15.8	3.95	NO
8-JUN-1987	690	84.2	99.45	7.15	1.7875	NO
8-APR-1989	517	106.6	99.65	-1.9	0.475	YES
7-SEP-1990		97.75	98.9			
LT-427A						
2-AUG-1985	655	97.45	100.2	-14.65	3.6625	NO
8-JUN-1987	690	85.55	99.7	10.2	2.55	NO
8-APR-1989	517	109.9	99.7	-4.45	1.1125	YES
7-SEP-1990		95.25	99.55			

AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
T-437A						
2-AUG-1985	655	99.4	100.1	-12.25	3.0625	NO
8-JUN-1987	659	87.85	100.1	3.45	0.8625	YES
8-MAR-1989	377	103.55	99.95	5.5	1.375	YES
9-APR-1990	171	105.45	99.4	-1.15	0.2875	YES
7-SEP-1990		98.25	98.25			
T-447A						
2-AUG-1985	655	104.25	100.3	-6.4	1.6	NO
8-JUN-1987	690	93.9	99.55	3.7	0.925	YES
8-APR-1989	517	103.25	99.85	-5.2	1.3	YES
7-SEP-1990		94.65	99.4			
T-417B						
2-AUG-1985	655	101.2	100	-4.3	1.075	YES
8-JUN-1987	690	95.7	100.65	5.35	1.3375	YES
8-APR-1989	516	106	99.9	-2.35	0.5875	YES
6-SEP-1990		97.55	100.5			
T-427B						
2-AUG-1985	655	100.7	100.6	-3.2	0.8	YES
8-JUN-1987	690	97.4	99.9	-1.05	0.2625	YES
8-APR-1989	516	98.85	99.65	0.7	0.175	YES
6-SEP-1990		100.35	99.55			
T-437B						
2-AUG-1985	655	103	99.5	-9.85	2.4625	NO
8-JUN-1987	690	89.65	99.35	8.95	2.2375	NO
8-APR-1989	516	108.3	99.5	-5.1	1.275	YES
6-SEP-1990		94.4	98.4			

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)		DRIFT < VDA (YES OR NO)
LT-447B							
22-AUG-1985		98.45	99.8	4.7	1.175		YES
08-JUN-1987	655	104.5	99.5	1.85	0.4625		YES
28-APR-1989	690	101.35	100	-0.7	0.175		YES
26-SEP-1990	516	99.3	99.15				
LT-417C							
22-AUG-1985		104	99.85	-12.35	3.0875		NO
08-JUN-1987	655	87.5	100.45	9.75	2.4375		NO
28-APR-1989	690	110.2	99.95	0.15	0.0375		YES
22-SEP-1990	512	100.1	100.1				
LT-427C							
22-AUG-1985		99	99.8	0.05	0.0125		YES
08-JUN-1987	655	99.85	99.55	-12.7	3.175		NO
28-APR-1989	690	86.85	100.25	-6.05	1.5125		NO
19-SEP-1990	509	94.2	99.5				
LT-437C							
22-AUG-1985		102	99.7	-3.5	0.875		YES
08-JUN-1987	655	96.2	99.95	0.6	0.15		YES
28-APR-1989	690	100.55	100.3	-3.45	0.8625		YES
19-SEP-1990	509	96.85	99.2				
LT-447C							
22-AUG-1985		98.5	100	-22.45	5.6125	***	N/A
08-JUN-1987	655	77.55	99.95	0	0		YES
28-APR-1989	690	99.95	99.85	2.35	0.5875		YES
22-SEP-1990	512	102.2	99.5				

OCEDURE: 3PC-R7,7A-7D TITLE: STEAM GENERATOR LEVEL TRANSMITTER CALIBRATION SYSTEM: FW

MPONENT: LEVEL TRANSMITTERS MANUFACTURER: FOXBORO MODEL NUMBER: N-E13DH-HIM1-BEK

VDA6 = 1.4840 (100 - 270) DAYS	VDA12 = 1.4997 (271 - 450) DAYS	VDA18 = 1.5049 (451 - 630) DAYS	VDA24 = 1.5204 (631 - 810) DAYS
NDP = 0	NDP = 0	NDP = 12	NDP = 0
NDP < VDA6 = N/A	NDP < VDA12 = N/A	NDP < VDA18 = 11	NDP < VDA24 = N/A
% < VDA6 = N/A	% < VDA12 = N/A	% < VDA18 = 91.67	% < VDA24 = N/A

NDP = 12
NDP < VDA = 91.67% ACTUATION POINT

DA VALUES ARE IN (%CAL-SPAN)

OTE:
1) TRANSMITTERS INCLUDED IN LOW LEVEL TRIP:
   A) LT-417A,B,C; LT-427A,B,C; LT-437A,B,C; LT-447A,B,C
2) TRANSMITTERS INCLUDED IN LOW LEVEL MISMATCH:
   A) LT-417A,C; LT-427A,C; LT-437A,C; LT-447A,C
3) SETPOINT FOR LOW LEVEL TRIP AND LOW LEVEL MISMATCH = 132(mv)
4) SINCE LOW LEVEL TRIP AND LOW LEVEL MISMATCH HAVE THE SAME SETPOINT, THEY WERE COMBINED INTO ONE DATA SHEET.
5) CALIBRATION SPAN: 98 "H2O ~ 400 mv
6) DATA FOR 4-9-90 WAS EXTRACTED FROM (WR-12317).
7) DATA BEFORE 1990 WAS NOT USED TO CONFIRM THE AFFECT OF REFERENCE LEG ISOLATION.

AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
LT-417A						
27-SEP-1990	586	97.75	98.9	0.15	0.0375	YES
05-MAY-1992		99.05	100.5			
LT-427A						
27-SEP-1990	586	97.75	98.9	1.4	0.35	YES
05-MAY-1992		100.3	100.1			
LT-437A						
27-SEP-1990	586	97.75	98.9	-1.3	0.325	YES
05-MAY-1992		97.6	100.35			

AG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
;T-447A						
:7-SEP-1990)5-MAY-1992	586	97.75 100.2	98.9 100.3	1.3	0.325	YES
;T-417B						
:7-SEP-1990)1-MAY-1992	582	97.75 101.9	98.9 100.15	3	0.75	YES
;T-427B						
:7-SEP-1990)1-MAY-1992	582	97.75 99.3	98.9 100.65	0.4	0.1	YES
LT-437B						
27-SEP-1990 01-MAY-1992	582	97.75 106.35	98.9 100.3	7.45	1.8625	NO
LT-447B						
27-SEP-1990 01-MAY-1992	582	97.75 100.5	98.9 99.9	1.6	0.4	YES
LT-417C						
27-SEP-1990 29-APR-1992	580	97.75 94.55	98.9 99.7	-4.35	1.0875	YES
LT-427C						
27-SEP-1990 27-APR-1992	578	97.75 97.3	98.9 99.75	-1.6	0.4	YES

TAG/DATE	DAYS	AS FOUND (mv)	AS LEFT (mv)	DRIFT(mv)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
LT-437C						
27-SEP-1990	578	97.75	98.9	1.9	0.475	YES
27-APR-1992		100.8	100.8			
LT-447C						
27-SEP-1990	580	97.75	98.9	2.7	0.675	YES
29-APR-1992		101.6	99.8			

Appendix C

Analysis of Predicted Future Instrument Drift for RPS (Maximum Drift Point)

INFORMATION
ON
PAGES C-1 to C-34

INTENTIONALLY WITHHELD –

INFORMATION PROPRIETARY
TO
EBASCO SERVICES INC.

PROPRIETARY INFORMATION

Instrument Drift Analysis

Appendix D

Analysis of Predicted Future Instrument Drift for RPS (Actuation Point)

INFORMATION
ON
(PAGES D-1 to D-14)

INTENTIONALLY WITHHELD --

INFORMATION PROPRIETARY
TO
EBASCO SERVICES INC.

Instrument Drift Analysis

Appendix E

Vendor Drift Allowance for n Months (VDA_n) Calculations

NOTE: VDA_n calculations are the same for both the Maximum Drift Point and Actuation Point data sheets.

INFORMATION
ON
(PAGES E-1 to E-10)

INTENTIONALLY WITHHELD --

INFORMATION PROPRIETARY
TO
EBASCO SERVICES INC.

PROPRIETARY INFORMATION

Instrument Drift Analysis

Appendix F

Vendor Drift Allowance for 30 Months (VDA30) Calculations

NOTE: VDA30 calculations are the same for both the Maximum Drift Point and Actuation Point data sheets.

INFORMATION
ON
(PAGES F-1 to F-29)

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