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March 5, 1993

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Response to NRC Bulletin 90-01, Supplement 1

GNRO-93/00029

Gentlemen:

This submittal provides the Grand Gulf Nuclear Station (GGNS) response to NRC Bulletin (NRCB) 90-01, Supplement 1, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount". Supplement 1 to NRCB 90-01 was issued to inform licensees of activities taken by the NRC Staff and the nuclear industry in evaluating Rosemount transmitters and to request licensees to take actions to resolve this issue. The specific safety concern is the ability to readily detect failure resulting from a gradual loss of fill-oil in Rosemount Model 1153 (Series B and D) and Model 1154 transmitters manufactured prior to July 11, 1989.

Our response to the original bulletin (NRCB 90-01) was submitted by letter dated July 19, 1990 (AECM-90/0128) and augmented with additional information by letters dated September 12, 1990 and May 16, 1991, respectively. We understand that our response to Supplement 1 supersedes the actions requested by the original bulletin.

As committed in our response to the original bulletin, GGNS has established an enhanced surveillance monitoring program to identify degradation of transmitter function due to fill-oil loss in Rosemount Model 1153 Series B and D transmitters installed in either safety-related systems or systems installed in accordance with 10CFR50.62 (the ATWS rule). This program will remain in effect, with the transmitters listed in Tables 2, 3, and 4 being monitored on an 18-month (cycle) basis until replacement or the appropriate psi-month threshold recommended by Rosemount is achieved. The transmitters listed in Table 1 will be replaced during the next refueling outage, currently scheduled for October 1993. Transmitters confirmed of having a loss of fill-oil failure will be dispositioned in accordance with our non-conformance process or the applicable technical specification.

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Non-installed Rosemount Model 1153 Series B and D transmitters manufactured prior to July 11, 1989 will be tagged to preclude inadvertent installation in their current configuration. A review of plant records revealed that no Rosemount Model 1154 transmitters are currently installed at GGNS.

Applications utilizing Rosemount transmitters at GGNS were reviewed against the criteria stipulated by NRCB 90-01, Supplement 1. Results from this review, including specific actions to be performed and completion schedules are discussed in Attachment 1. GGNS will take the requested actions specified in this supplement. The addendum to Table 1 provides a discussion of the safety function, redundancy, and diversity of the transmitters listed in Table 1. The addenda to Tables 2 and 3 provide justifications for extending the monitoring frequency for the transmitters listed in Tables 2 and 3 to an 18-month basis. Supporting reference documents are listed on Attachment 3. The transmitters listed in Table 4 will be monitored on an 18-month (cycle) basis as recommended by the supplement.

With the enhanced surveillance monitoring program in place and increased awareness by plant personnel of the susceptibility for oil-loss from the transmitters in question, we are confident that symptoms of transmitter fill-oil loss will be detected should they develop.

This information is being submitted under affirmation in accordance with 10CFR50.54(f). As requested by Item 2(c) of the reporting requirements, we will provide written confirmation upon completion of the requested actions of the supplement. Please contact R. W. Byrd at 601-437-6550 should you have any questions or require additional information regarding this matter.

Yours truly,

WTC/CEB/mtc
attachments: 1) GGNS Response to NRCB 90-01, Supplement 1
2) Oath and Affirmation per 10CFR50.54(f)
3) References

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Attachment 1

GGNS Response to NRC Bulletin 90-01
Supplement 1

Grand Gulf Nuclear Station
Response to
NRC Bulletin 90-01, Supplement 1

Reporting Requirements Applicable to Operating Reactors

NRCB Item 1: Licensees are requested to provide a statement of whether they will take the recommended actions in this supplement under "Requested Actions".

GGNS Response: GGNS will implement the requested actions recommended in the supplement.

NRCB Items 2(a): and 2(b) Licensees are requested to provide a listing of specific actions that will be completed to achieve compliance with Item 1 of the requested actions. This listing should include appropriate justification for deviations from actions recommended by the supplement, and a completion schedule for these actions.

GGNS Response: A point by point comparison between a summarized extract from the requested actions of NRCB 90-01, Supplement 1 and the corresponding GGNS response follows:

Requested Actions Item 1 Licensees are requested to review plant records and identify Rosemount Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters manufactured before July 11, 1989, that are used or may be used in the future in either safety-related systems or systems installed in accordance with 10CFR50.62 (the ATWS rule), and perform the following requested actions:

Requested Actions Item 1(a)

Expeditiously replace, or monitor for the life of the transmitter on a monthly basis using an enhanced surveillance monitoring program, any transmitter that has a normal operating pressure greater than 1500 psi and that are installed in the reactor protection trip system, ESF actuation systems or ATWS systems...

GGNS Response to Item 1(a)

GGNS has no transmitters installed that are enveloped by this category. Rosemount transmitters manufactured prior to July 11, 1989 will be tagged to preclude inadvertent installation in their current configuration. This action is planned to be completed by March 31, 1993. Model 1154 transmitters manufactured by Rosemount are not used in any plant applications.

Requested Actions
Item 1 (Continued)

Requested Actions Item 1(b)

Replace, or monitor for the life of the transmitter on a quarterly basis using an enhanced surveillance monitoring program, any transmitters that have a normal operating pressure greater than 1500 psi and that are used in safety-related applications but are not installed in reactor protection trip systems, ESF actuation systems, or ATWS systems...

GGNS Response to Item 1(b)

GGNS has no transmitters installed that are enveloped by this category. Rosemount transmitters manufactured prior to July 11, 1989 will be tagged to preclude inadvertent installation in their current configuration. This action is planned to be completed by March 31, 1993. Model 1154 transmitters manufactured by Rosemount are not used in any plant applications.

Requested Actions Item 1(c)

Replace, or monitor on a monthly basis using an enhanced surveillance monitoring program, until the transmitter reaches the appropriate psi-month threshold criterion recommended by Rosemount, any transmitters that have a normal operating pressure greater than 500 psi and less than or equal to 1500 psi, that are installed in reactor protection trip systems, ESF actuation systems, or ATWS systems. On a case-by-case basis except for transmitters that initiate reactor protection or ATWS trips for high pressure or low water level, licensees may monitor using an enhanced surveillance program at least once every refueling cycle, but not exceeding 24 months, if sufficient justification is provided based upon transmitter performance in service and its specific safety function.

GGNS Response to Item 1(c)

GGNS has 10 transmitters installed that are enveloped by this category.

Requested Actions Item 1 (Continued)

GGNS Response to Item 1(c) (continued)

The 5 transmitters listed in Table 1 have accumulated 53,450 psi-months against the Rosemount threshold criteria of 130,000 psi-months. Although the recommended psi-month threshold has not been achieved, these transmitters have exhibited stable operation over three calibration cycles. None of these transmitters are used to initiate reactor protection or ATWS trip functions. The transmitters listed in Table 1 will be replaced during the next refueling outage (October 1993). Additional data regarding these transmitters is delineated in Table 1 and the attached calibration data sheets and graphs. Additional information regarding the safety function, system redundancy and diversity of these transmitters is discussed in the addendum to Table 1.

The remaining 5 transmitters will reach the appropriate psi-month criteria recommended by Rosemount during this year (1993). Although the recommended psi-month threshold has not been achieved, these transmitters have exhibited stable operation over three calibration cycles. These transmitters do not initiate reactor protection or ATWS trip functions. As permitted by the bulletin supplement, the monitoring frequency will be changed to an 18-month enhanced surveillance program beginning March 31, 1993, until the appropriate psi-month criteria recommended by Rosemount is achieved. Additional data regarding these transmitters along with justification for extending the monitoring frequency to an 18-month basis is provided in Tables 2 and 3.

Requested Actions Item 1(d)

Replace, or monitor at least once every refueling cycle, but not exceeding 24 months, using an enhanced surveillance monitoring program until the transmitter reaches the appropriate psi-month threshold criterion recommended by Rosemount, any transmitter used in safety-related systems that have a normal operating pressure greater than 500 psi and less than or equal to 1500 psi, and that are not installed in reactor protection trip systems, ESF actuation systems, or ATWS systems.

Requested Actions
Item 1 (Continued) GGNS Response to Item 1(d)

GGNS has 4 transmitters that are enveloped by this category. As recommended by the bulletin supplement, these transmitters will be included in the enhanced monitoring program on an 18-month frequency beginning March 31, 1993 until the appropriate psi-month criteria recommended by Rosemount is achieved. Table 4 provides a listing, along with additional details for these units.

Requested Actions Item 1(e)

At licensee discretion, exclude from the enhanced surveillance program any transmitters that have a normal operating pressure greater than 500 psi and less than or equal to 1500 psi that have reached the appropriate psi-month threshold recommended by Rosemount (60,000 psi-months or 130,000 psi-months depending on the range code of the transmitter)...

GGNS Response to Item 1(e)

GGNS has 7 transmitters that are enveloped by this category. As permitted by the supplement, these transmitters will be excluded from the enhanced surveillance program beginning March 31, 1993. A high degree of confidence remains that a loss of fill-oil failure is detectable during the normal 18-month calibration and during channel checks where applicable.

Requested Actions Item 1(f)

At licensee discretion, exclude from the enhanced surveillance program any transmitters that have a normal operating pressure less than or equal to 500 psi...

GGNS Response to Item 1(f)

GGNS has 95 transmitters that are enveloped by this category. As permitted by the supplement, these transmitters will be excluded from the enhanced surveillance program beginning March 31, 1993. A high degree of confidence remains that a loss of fill-oil failure is detectable during the normal 18-month calibration.

Requested Actions Item 2

Licensees are requested to evaluate the enhanced surveillance program to ensure that the program provides measurement data with an accuracy range consistent with that needed for comparison with manufacturers drift data criteria for determining degradation caused by a loss of fill-oil.

GGNS Response to Item 2

The enhanced surveillance monitoring program has been evaluated for measurement data accuracy. The calibration data trending has sufficient accuracy to detect drift consistent with manufacturers criteria. The process data trending (monthly) will not be used to satisfy requirements pursuant to this supplement.

NRCB Item 2(c):

When completed, provide the Staff a statement confirming completion of Requested Actions Items 1 and 2 to NRCB 90-01, Supplement 1.

GGNS Response:

We will change the monitoring frequency for the transmitters listed in Tables 2 thru 4 to an 18-month basis until the appropriate psi-month threshold is achieved. This change will be in effect no later than March 31, 1993. The transmitters listed in Table 1 are scheduled to be replaced during the next refueling outage (October 1993). We will provide the Staff with confirmation documenting the status of the above actions following replacement of the transmitters listed in Table 1.

NRCB Item 3:

Licensees are requested to identify those requested actions by the NRC that are not being taken along with an evaluation for deviating from the requested actions.

GGNS Response:

GGNS is complying with the requested actions of this supplement. As permitted by the supplement, the 5 transmitters listed in Tables 2 and 3 will be monitored on an 18-month (refueling cycle) frequency rather than the monthly frequency recommended by the supplement. Justification for extending the monitoring interval from the supplements recommended monthly monitoring to an 18-month frequency is delineated in the addenda to Tables 2 and 3.

Table 1

Reference NRCB Supplement 1
Requested Actions Item 1(c)

Transmitter Number	Serial Number	Model Number	ESF/RPS/ATWS Application	Accumulated PSI-Months	PSI-month Threshold	Transmitter Monitoring Function
1E31N086C	418312	1153DB7	ESF	53,450	130,000	Main Steam Line A Flow C PCIS
1E31N089A	418367	1153DB7	ESF	53,450	130,000	Main Steam Line D Flow A PCIS
1E31N089B	418195	1153DB7	ESF	53,450	130,000	Main Steam Line D Flow B PCIS
1E31N089C	418197	1153DB7	ESF	53,450	130,000	Main Steam Line D Flow C PCIS
1E31N089D	418198	1153DB7	ESF	53,450	130,000	Main Steam Line D Flow D PCIS

Table 1 Addendum

ADDITIONAL INFORMATION

Function:

These transmitters provide signals for the main steam line - high flow trip: main steam line high flow could indicate a break in a main steam line. Automatic closure of various valves prevents excessive loss of reactor coolant and release of significant amounts of radioactive material from the reactor coolant pressure boundary. On detection of main steam line high flow, the following pipelines are isolated:

a. All four main steam lines

b. Main steam line drain

High flow in each main steam line is sensed by four differential pressure transmitters that sense the pressure difference across the flow element in that line.

System Logic and Sequencing:

When a significant increase in main steam line flow is detected, trip signals are transmitted to the Containment and Reactor Vessel Isolation Control System (CRVICS). The CRVICS initiates closure of all main steam isolation and drain valves.

Four instrumentation trip logics are provided to assure protective action when required and to prevent inadvertent isolation resulting from instrumentation malfunctions. The trip signal for each instrumentation channel initiates a trip logic trip. The trip signals of the logic divisions are combined in one-out-of-two twice and two-out-of-two logic. Divisions 1 or 3 and Divisions 2 or 4 are required to initiate main steam line isolation. Divisions 2 and 3 or Divisions 1 and 4 are required to initiate main steam line drain isolation. Thus, failure of any one division does not result in inadvertent action.

System Redundancy and Diversity:

Redundancy of trip initiation signals for high flow is provided by four differential pressure transmitters connected to each main steam line. Each of the four differential pressure transmitters on a given steam line is associated with one of four logic divisions and is powered from an independent Class 1E uninterruptible power supply division - Divisions 1, 2, 3, and 4.

Diversity of trip initiation for main steam line break is provided by main steam line tunnel high space temperature, high differential temperature, main steam line high flow, and low-pressure instrumentation. An increase in space temperature, differential temperature, main steam line flow, or a decrease in pressure will initiate main steam line and main steam line drain isolation.

Table 1 Addendum
(Continued)

ADDITIONAL INFORMATION

Transmitter Performance:

The transmitters listed in Table 1 were installed in November 1987. They have been through three calibration cycles. The trend of cumulative zero drift for all five transmitters has been relatively flat. The trend of cumulative span drift has shown more variability. However, it is not directed and does not indicate loss of fill fluid. Transmitter calibration data and a graph of cumulative zero and span drift are attached.

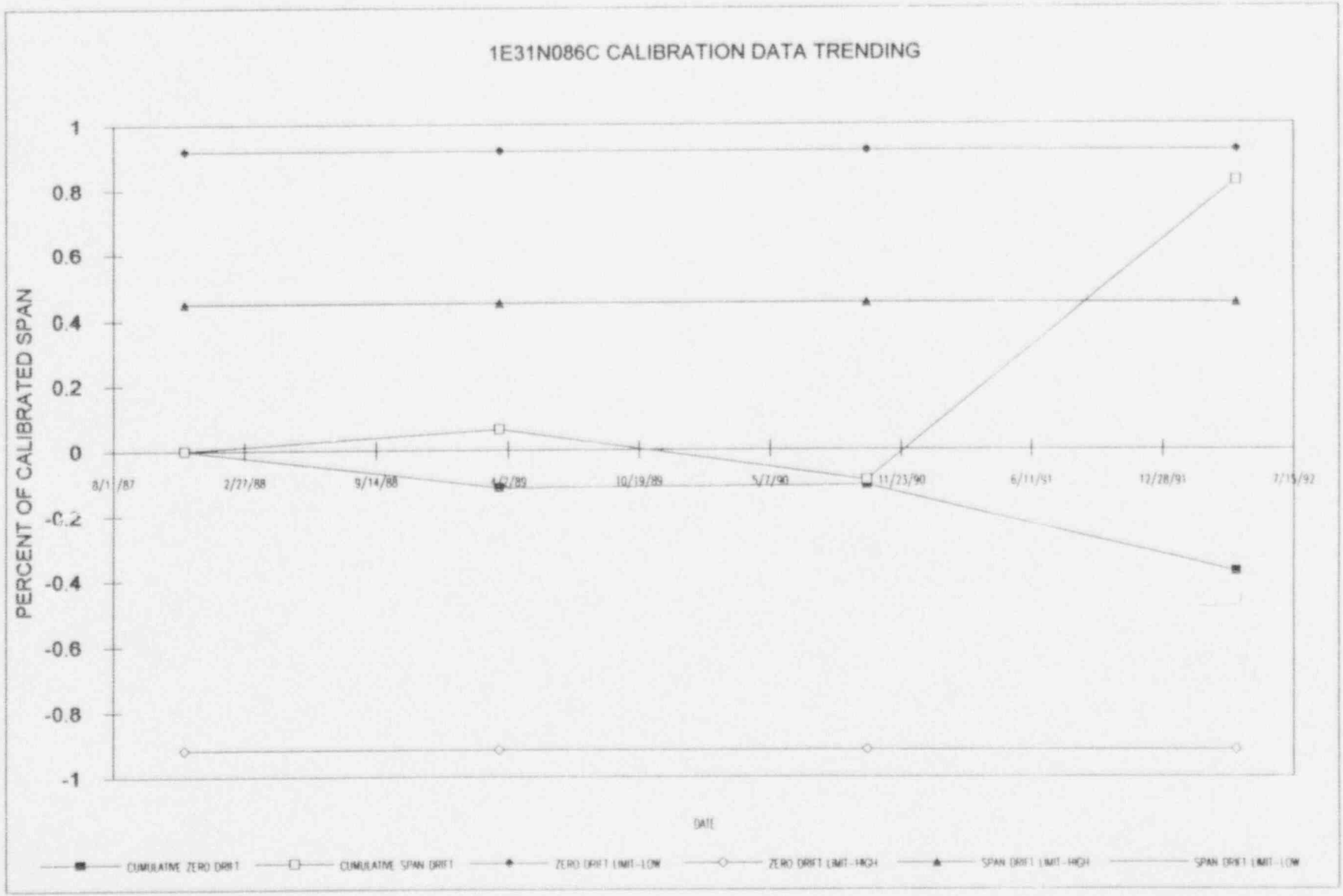
Based on safety function, trip diversity and redundancy, we are confident that the transmitters listed in Table 1 will continue to perform their intended function, until replacement during the upcoming refueling outage (October 1993).

Calibration Trending Data
for
Transmitters Listed in Table 1

GRAND GULF NUCLEAR STATION

ENHANCED MONITORING PROGRAM – CALIBRATION DATA TRENDING

			MPL #	SERIAL #	MODEL #	0% PSID	100%PSID	URL PSID	REF	DRIFT BASE DATE									
			1E31N086C	418312	1153087	-49	246	300	1.02	11/26/87									
DATE			AS FOUND	AS FOUND	FINAL	FINAL	AS FOUND	FINAL	INCREMENTAL	INCREMENTAL	CUMULATIVE ZE	CUMULATIVE SP	ZERO DRIFT	SPAN DRIFT	ZERO DRIFT	SPAN DRIFT	LEGL LOSS		PROJECTED
			0% mA	100% mA	0% mA	100% mA	EXTRAPOLATED	EXTRAPOLATED	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	LIMIT	LIMIT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
											0	0	HIGH	HIGH	LOW	LOW			
87	11	27			4.05	19.96	0	0	0	0	0	0	-0.918	0.4488	0.918	0.4488	9999999	11/27/87	04/11/42
89	3	19	4.03	19.95	4.03	19.95	6.674338983	6.692677966	-0.114618644	0.0625	-0.1146186	0.0625	-0.918	0.4488	0.918	0.4488	10.51066184	3/19/89	05/28/98
90	10	2	4.035	19.93	4.035	19.93	6.675186441	6.674338983	0.00529661	-0.15625	-0.109322	-0.09375	-0.918	0.4488	0.918	0.4488	23.94930105	10/2/90	11/01/11
92	4	19	3.968	20.01	3.994	19.987	6.63260339	6.675186441	-0.266144068	0.91875	-0.375466	0.825	-0.918	0.4488	0.918	0.4488	10.75782869	4/19/92	08/26/98


1E31N086C CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
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0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
8/1/87
2/27/88
9/14/88
4/2/89
10/19/89
5/7/90
11/23/90
6/11/91
12/28/91
7/15/92
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW

GRAND GULF NUCLEAR STATION

ENHANCED MONITORING PROGRAM - CALIBRATION DATA TRENDING

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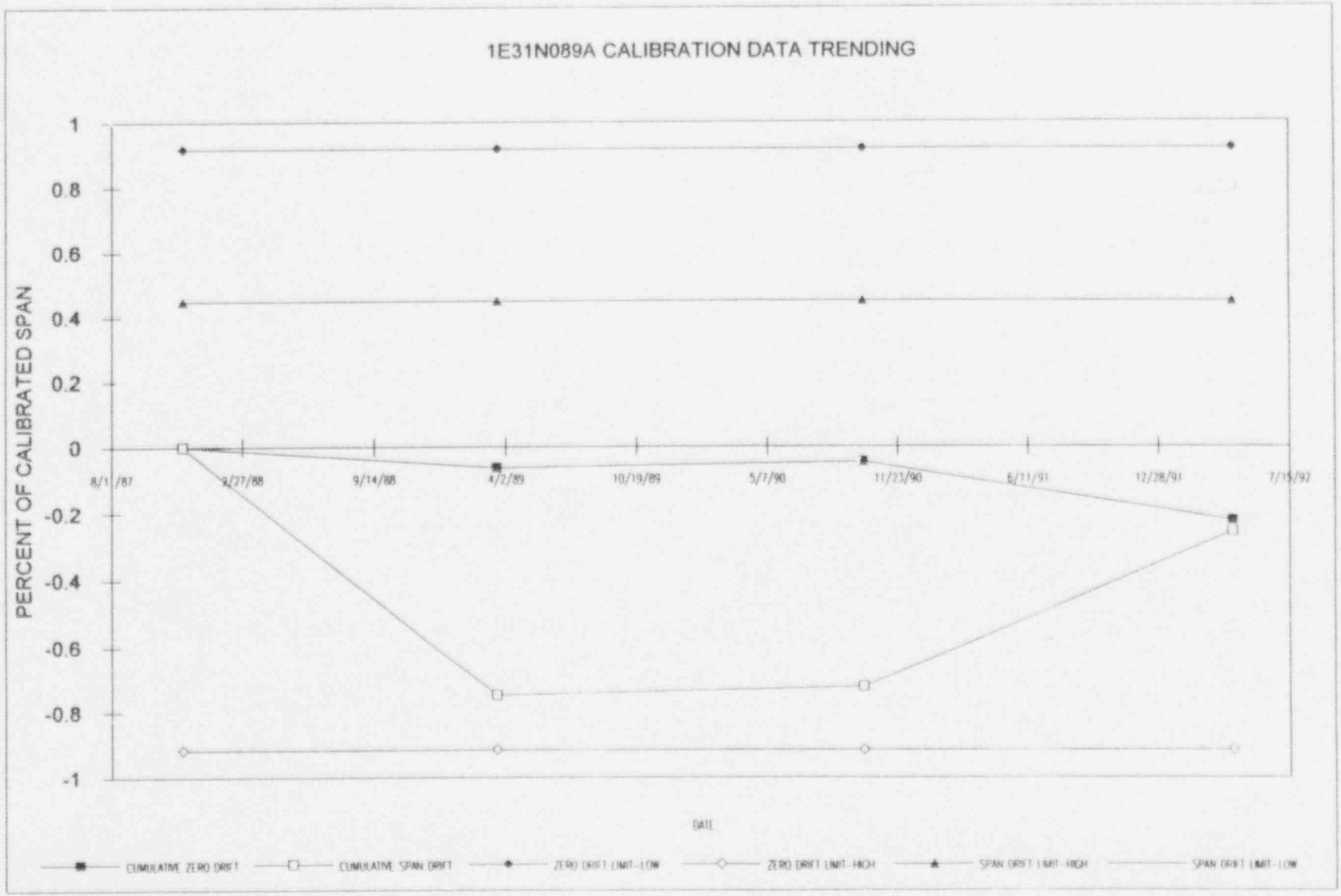
DATE			AS FOUND	AS FOUND	FINAL	FINAL	AS FOUND	FINAL	INCREMENTAL	INCREMENTAL	CUMULATIVE ZE	CUMULATIVE SP	ZERO DRIFT	SPAN DRIFT	ZERO DRIFT	SPAN DRIFT	L FOR LOSS		PROJECTED
			0% mA	100% mA	0% mA	100% mA	EXTRAPOLATED	EXTRAPOLATED	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	DRIFT	DRIFT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
											0	0	HIGH	HIGH	LOW	LOW			
87	11	27			4.02	19.96	0	0	0	0	0	0	-0.918	0.4488	0.918	0.4488	9999999	11/27/87	04/12/42
89	3	19	4.03	19.85	4.03	19.97	6.657728814	6.667661017	-9.932076271	-0.75	-0.0620763	-0.75	-0.918	0.4488	0.918	0.4488	19.36654243	3/19/89	04/04/07
90	10	2	4.032	19.976	4.032	19.976	6.680325424	6.677661017	0.016652542	0.075	-0.0454237	-0.725	-0.918	0.4488	0.918	0.4488	57.58380699	10/2/90	06/13/45
92	4	19	3.991	20.01	3.999	19.998	6.65178.051	6.680325424	-0.178389831	0.46875	-0.2238136	-0.25625	-0.918	0.4488	0.918	0.4488	18.03592662	4/19/92	12/05/05


1E31N089A CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
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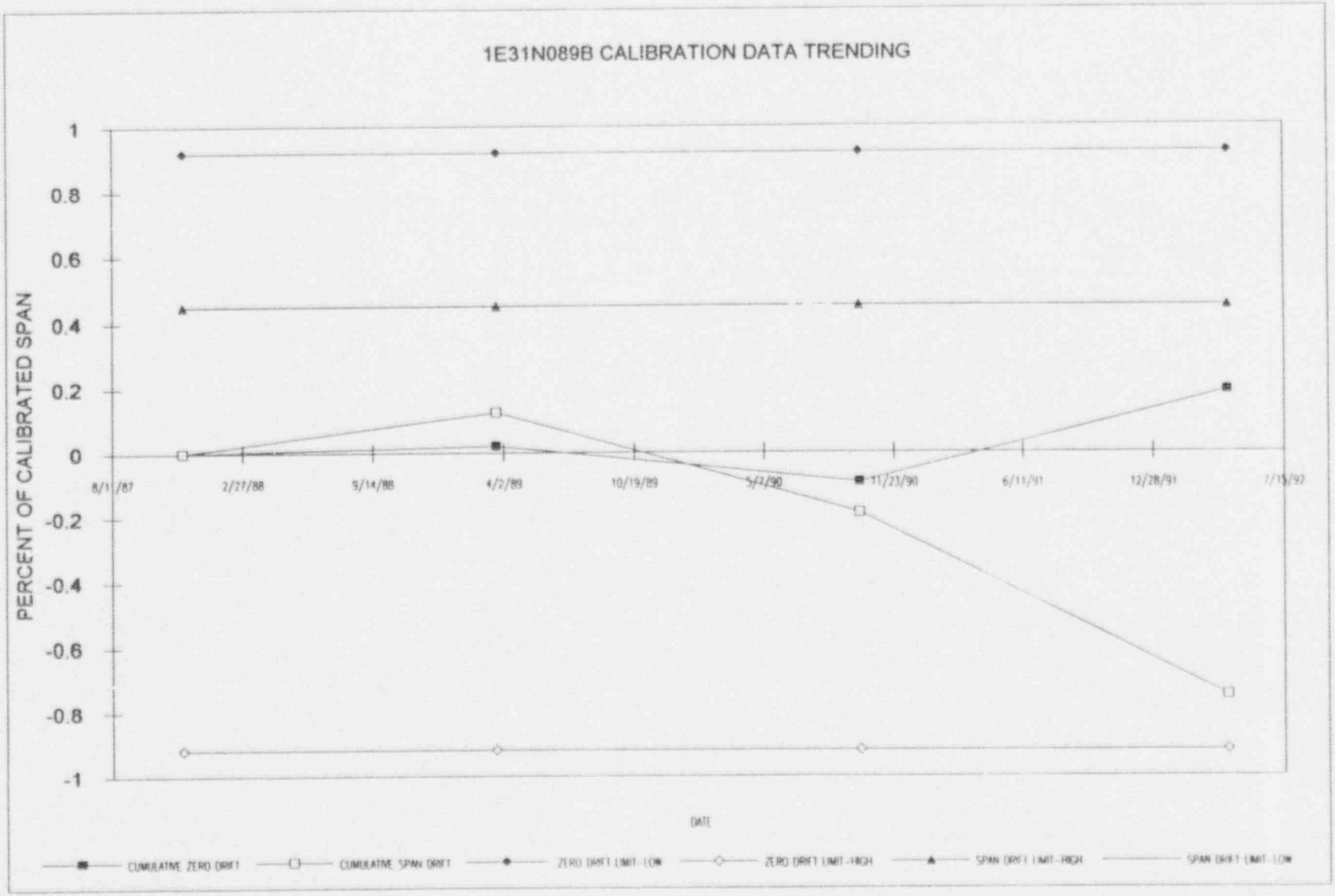
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
8/1 /87
2/27/88
9/14/88
4/2/89
10/19/89
5/7/90
11/23/90
6/11/91
12/28/91
7/15/92
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW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PERCENT OF CALIBRATED SPAN
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0.4
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-0.4
-0.6
-0.8
-1
8/1/87
2/27/88
9/14/88
4/2/89
10/19/89
5/2/90
11/23/90
6/11/91
12/28/91
7/15/92
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW

GRAND GULF NUCLEAR STATION

ENHANCED MONITORING PROGRAM - CALIBRATION DATA TRENDING

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			0% mA	100% mA	0% mA	100% mA	EXTRAPOLATED	EXTRAPOLATED	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	DRIFT	DRIFT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
					4	20					0	0	HIGH	HIGH	LOW	LOW			
87	11	27	4	20	4.03	19.96	6.657627119	6.657627119	0	0	0	0	-0.918	0.4488	0.918	0.4488	9999999	11/27/87	04/11/42
89	3	21	4.03	19.98	4.02	19.97	6.679322034	6.676	0.020762712	0.125	0.02076271	0.125	-0.918	0.4488	0.918	0.4488	58.26541124	3/21/89	02/15/46
90	10	1	4.01	19.91	3.99	19.94	6.651016949	6.669322034	-0.11440678	-0.3125	-0.0936441	-0.1875	-0.918	0.4488	0.918	0.4488	27.93205479	10/1/90	10/25/15
92	4	20	4.05	19.91	4.04	19.98	6.684372881	6.639322034	0.281567797	-0.5625	0.18792373	-0.75	-0.918	0.4488	0.918	0.4488	21.50720983	4/20/92	05/24/09

GRAND GULF NUCLEAR STATION

ENHANCED MONITORING PROGRAM - CALIBRATION DATA TRENDING

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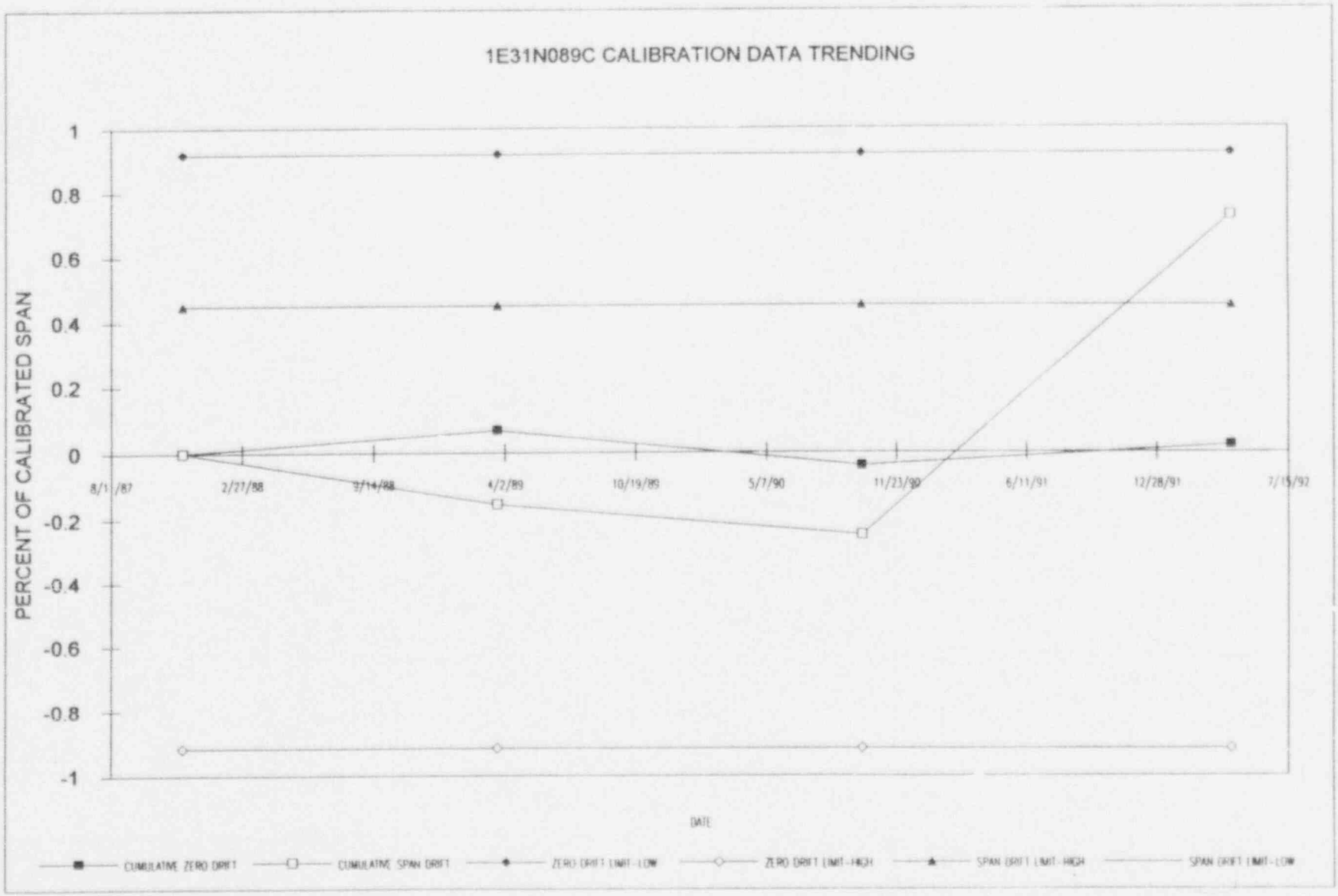
			0% mA	100% mA	0% mA	100% mA	EXTRAPOLATED	EXTRAPOLATED	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	LIMIT	DRIFT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
											0	0	HIGH	HIGH	LOW	LOW			
87	11	28			4.03	19.96	0	0	0	0	0	0	-0.918	0.4488	0.918	0.4488	9999999	11/28/87	04/12/42
89	3	21	4.045	19.95	4.02	19.97	6.686847458	6.676	0.06779661	-0.15625	0.06779661	-0.15625	-0.918	0.4488	0.918	0.4488	17.80668493	3/21/89	09/12/05
90	10	1	4.005	19.94	4.005	19.94	6.651830508	6.669322034	-0.109322034	-0.09375	-0.0415254	-0.25	-0.918	0.4488	0.918	0.4488	62.92906682	10/1/90	10/16/50
92	4	19	3.989	20.08	3.996	19.995	6.661742373	6.651830508	0.061949153	0.975	0.02042373	0.725	-0.918	0.4488	0.918	0.4488	197.6468141	4/19/92	06/01/85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0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
8/1 /87
2/27/88
3/14/88
4/2/89
10/19/89
5/7/90
11/23/90
6/11/91
12/28/91
7/15/92
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW

			GRAND GULF NUCLEAR STATION																
			ENHANCED MONITORING PROGRAM - CALIBRATION DATA TRENDING																
			MFL #	SERIAL #	MODEL #	0% PSID	100%PSID	URL PSID	ROI	DRIFT BASE DATE									
			1E31N089D	418198	115J087	-49	246	300	1.02	11/27/87									
DATE			AS FOUND	AS FOUND	FINAL	FINAL	AS FOUND	FINAL	INCREMENTAL	INCREMENTAL	CUMULATIVE ZE	CUMULATIVE SP	ZERO DRIFT	SPAN DRIFT	ZERO DRIFT	SPAN DRIFT	LEVEL LOSS		PROJECTED
			0% mA	100% mA	0% mA	100% mA	EXTRAPOLATED	EXTRAPOLATED	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	DRIFT	DRIFT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
											0	0	HIGH	HIGH	LOW	LOW			
87	6	9			4.01	19.94	0	0	0	0	0	0	-0.918	0.4488	0.918	0.4488	9999999	6/9/87	04/12/42
89	3	19	3.985	19.89	4.005	19.97	6.626847458	6.656	-0.18220339	-0.15625	-0.1822034	-0.15625	-0.918	0.4488	0.918	0.4488	6.598135967	3/19/89	07/01/94
90	10	2	4.065	19.868	4.036	19.96	6.689905085	6.656813559	0.206822034	-1.0125	0.02461864	-1.16875	-0.918	0.4488	0.918	0.4488	106.247575	10/2/90	01/29/94
92	4	20	3.978	20.07	4.005	19.932	6.650908475	6.68100339	-0.18809322	1.05	-0.1634746	-0.11875	-0.918	0.4488	0.918	0.4488	24.70842924	4/20/92	08/05/12

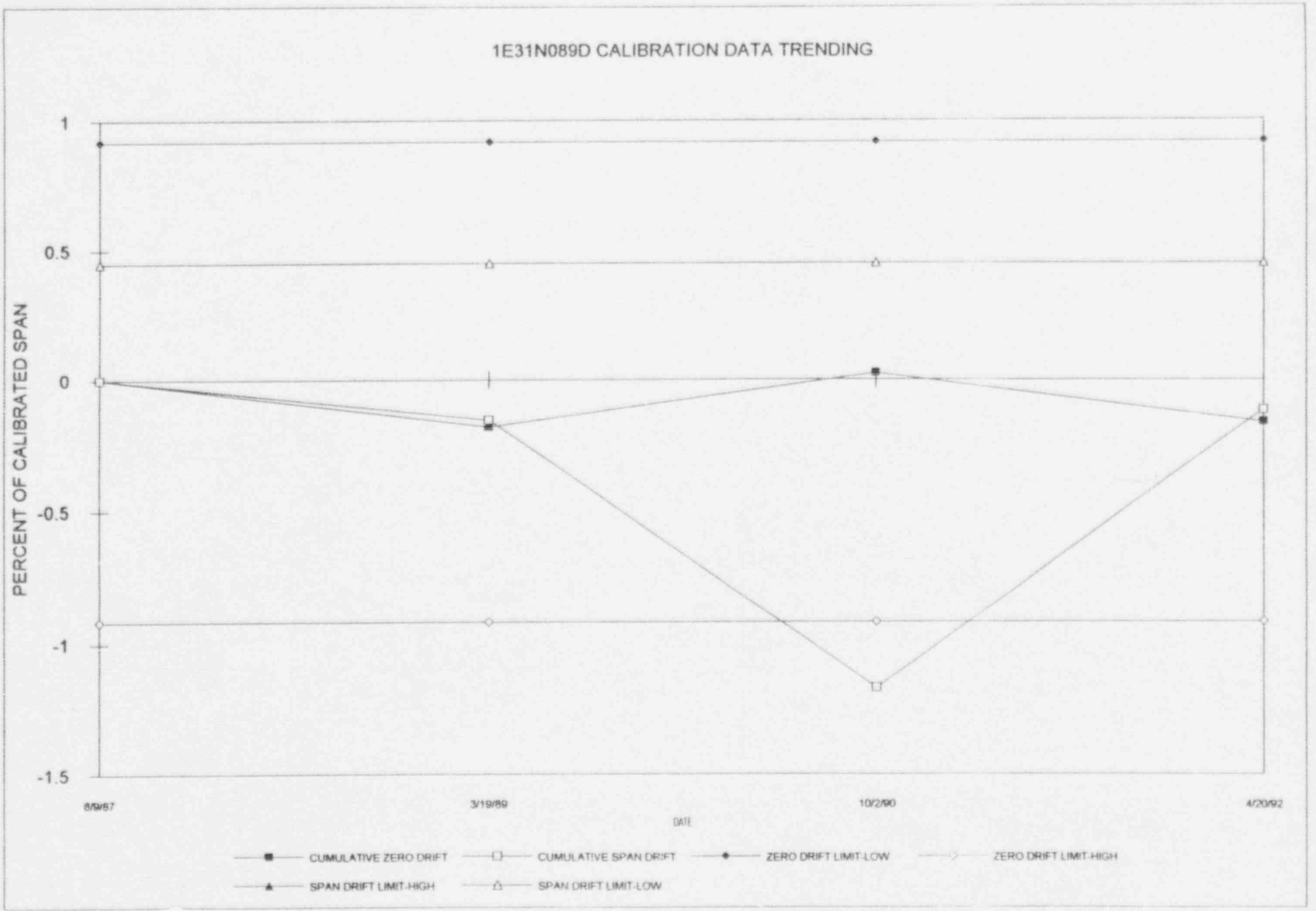

1E31N089D CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
1
0.5
0
-0.5
-1
-1.5
8/9/87
3/19/89
10/2/90
4/20/92
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW

Table 2

Reference NRCB Supplement 1
Requested Actions Item 1(c)

Transmitter Number	Serial Number	Model Number	ESF/RPS/ATWS Application	Accumulated PSI-Months	PSI-month Threshold	Transmitter Monitoring Function
1B21N081A	418193	1153DB5	ESF	53,320	60,000	Reactor Vessel Level
1B21N081C	418194	1153DB5	ESF	53,320	60,000	Reactor Vessel Level

Table 2 Addendum

JUSTIFICATION FOR EXTENDING ENHANCED SURVEILLANCE MONITORING PERIOD TO 18 MONTHS FOR THE TRANSMITTERS LISTED IN TABLE 2

Function:

These transmitters monitor Reactor Pressure Vessel (RPV) water level channels and provides actuation signals to the following systems:

Primary Containment Isolation (Groups 6A, 7, 8, 10)
Main Steam Line Isolation
Secondary Containment Isolation
Reactor Water Clean Up
Standby Gas Treatment
Control Room Emergency Filtration
Secondary Containment Ventilation Isolation Dampers

System Logic and Sequencing:

Main Steam Isolation Valves
One-out-of-Two taken Twice (Divisions 1 or 3 and Divisions 2 or 4)

All other systems
Two-Out-Two (Divisions 2 and 3 or Divisions 1 and 4)

System Diversity:

For pipe breaks inside the containment, diversity is provided by drywell pressure channels. A breach in the Main Steam Line is detectable by main steam line space high temperature and differential high temperature, main steam line high flow and low pressure instrumentation.

Transmitter Performance:

The transmitters listed in Table 2 were installed in December of 1987. They have been through three calibration cycles. In the first calibration cycle, a small positive zero drift of approximately one percent of calibrated span was observed. This is compared to a positive limit of 3.9% of calibrated span. During the next two calibration cycles, the transmitters have exhibited virtually no drift. Transmitter calibration data and a graph of cumulative zero and span drift is attached. Oil loss lifetime is calculated by dividing the appropriate zero drift limit by the average zero drift rate. The calculated oil loss lifetime is 17.7 years for 1B21N081A and 14.6 years for 1B21N081C.

Table 2 Addendum
(Continued)

JUSTIFICATION FOR EXTENDING ENHANCED SURVEILLANCE MONITORING PERIOD TO 18 MONTHS FOR THE TRANSMITTERS LISTED IN TABLE 2

Justification:

As stated in Reference 1, the analytical model developed by Rosemount for analyzing the loss-of-fill-fluid phenomenon has proven to be quite accurate. Based on this model, for transmitters with a sustained flat trend, the interval to identify oil loss increases with time in service. For the transmitters listed in Table 2, calibration data trending on an 18-month basis is effective because the calibration interval is small enough relative to the calculated oil loss lifetime to assure detection of oil loss prior to failure.

Conclusion:

Monitoring on a monthly basis would not result in an improvement in reliability for the transmitters listed in Table 2. Calibration data trending is the most effective means for detecting oil loss prior to failure. Although the recommended psi-month threshold has not been achieved, transmitter past performance, application, and redundant safety function, monitoring the transmitters listed in Table 2 on an 18-month (cycle frequency) is adequate for detecting symptoms of fill-oil loss.

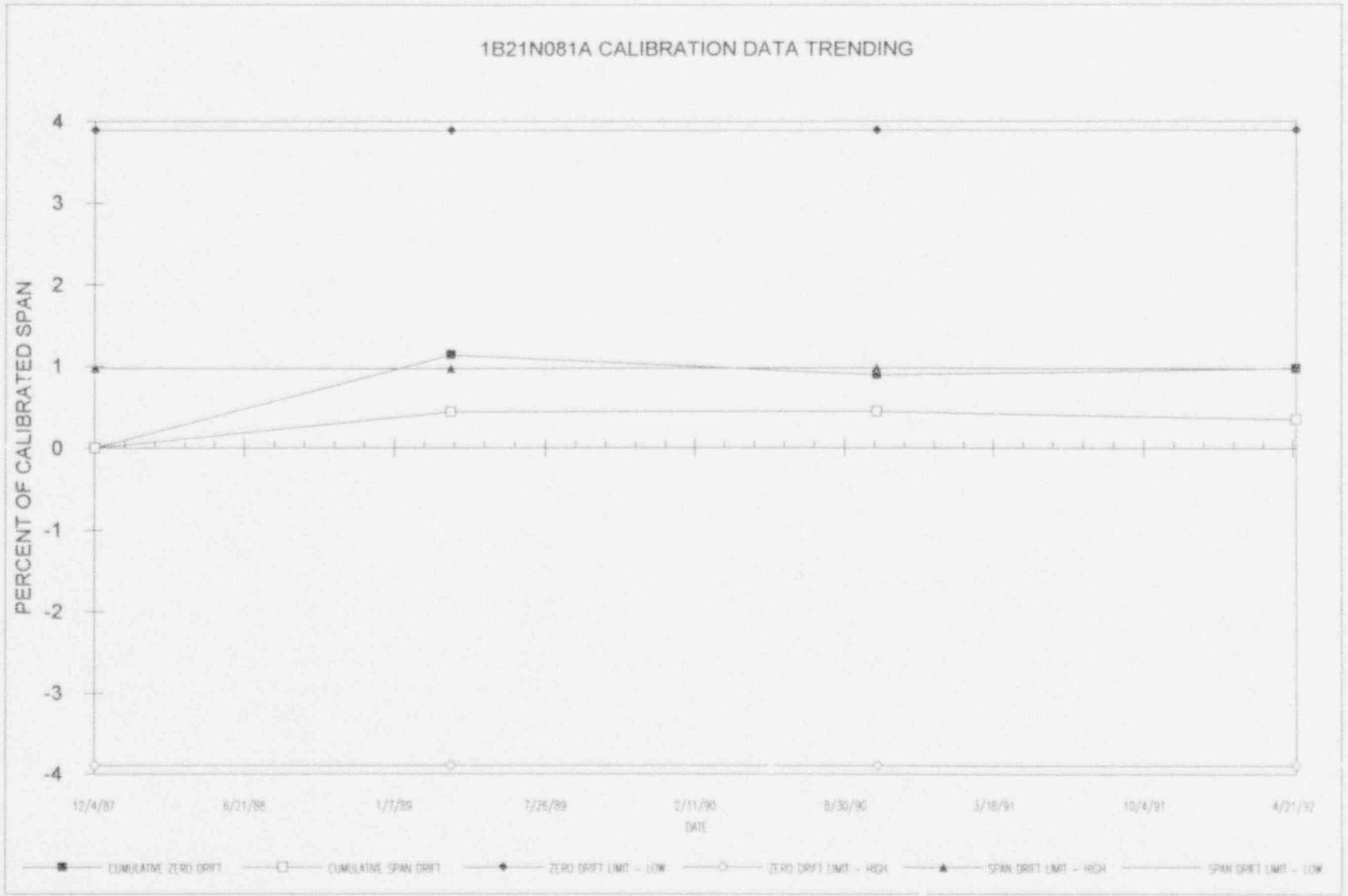
Calibration Trending Data
for
Transmitters Listed in Table 2

GRAND GULF NUCLEAR STATION

ENHANCED MONITORING PROGRAM - CALIBRATION DATA TRENDING

MPL#	SERIAL#	MODEL#	0%"H2O	100%"H2O	URL "H2O	RDF	DRIFT BASE DATE
1B21N081A	418193	1153DB5	-225	-71	750	4.87	12/05/87

DATE			AS FOUND	AS FOUND	FINAL	FINAL	AS FOUND	FINAL	INCREMENTA	INCREMENTAL	CUMULATIVE Z	CUMULATIVE S	ZERO DRI	SPAN DR	ZERO DRI	SPAN DR	OIL LOSS		PREDICTED
			0% mA	100% mA	0% mA	100% mA	EXTRAPOLAT	EXTRAPOL	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	DRIFT	DRIFT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
											0	0	HIGH	HIGH	LOW	LOW			
87	12	5			4.06	19.93	0	0	0	0	0	0	-3.896	0.974	3.896	0.974	99999	12/5/87	06/25/18
89	3	23	4.14	20.08	4.07	19.94	27.42896	27.2467	1.139205	0.4375	1.13920455	0.4375	-3.896	0.974	3.896	0.974	4.441224	3/23/89	05/13/92
90	10	12	4.03	19.9	4.05	19.95	27.21669	27.2567	-0.25	-2.22E-14	0.88920455	0.4375	-3.896	0.974	3.896	0.974	12.50812	10/12/90	06/04/00
92	4	25	4.085	19.971	4.038	19.952	27.29506	27.2805	0.090909	-0.0875	0.98011364	0.35	-3.896	0.974	3.896	0.974	17.45755	4/25/92	05/16/05


1B21N081A CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
4
3
2
1
0
-1
-2
-3
-4
12/4/87
6/21/88
1/7/89
7/26/89
2/11/90
8/30/90
3/18/91
10/4/91
4/21/92
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT - LOW
ZERO DRIFT LIMIT - HIGH
SPAN DRIFT LIMIT - HIGH
SPAN DRIFT LIMIT - LOW

GRAND GULF NUCLEAR STATION

ENHANCED MONITORING PROGRAM - CALIBRATION DATA TRENDING

			MPL #	SERIAL #	MODEL #	0% "H2O	100% "H2O	URL "H2O	RDF	DRIFT BASE DATE									
			B21N081C	418194	1153085	-225	-71	750	4.87	12/06/87									
DATE			AS FOUND	AS FOUND	FINAL	FINAL	AS FOUND	FINAL	INCREMENTAL	INCREMENTAL	CUMULATIVE Z	CUMULATIVE S	ZERO DRI	SPAN DR	ZERO D	SPAN DR	OL LOSS		PREDICTED
			0% mA	100% mA	0% mA	100% mA	EXTRAPOLATE	EXTRAPOL	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	DRIFT	DRIFT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
											0	0	HIGH	HIGH	LOW	LOW			
87	12	6			4.05	19.94	0	0	0	0	0	0	-3.896	0.974	3.896	0.974	99999	12/6/87	06/26/18
89	3	24	4.115	20.1	4.04	19.95	27.469708	27.2659	1.2737419	0.59375	1.27374188	0.59375	-3.896	0.974	3.896	0.974	3.972126	3/24/89	11/24/91
90	10	12	3.975	19.91	4.055	19.94	27.256656	27.2851	-0.177963	0.15625	1.09577922	0.75	-3.896	0.974	3.896	0.974	10.14037	10/12/90	01/23/98
92	4	24	4.06	19.95	4.06	19.95	27.275909	27.2636	0.0769075	0.03125	1.17268669	0.78125	-3.896	0.974	3.896	0.974	14.57255	4/24/92	06/28/02

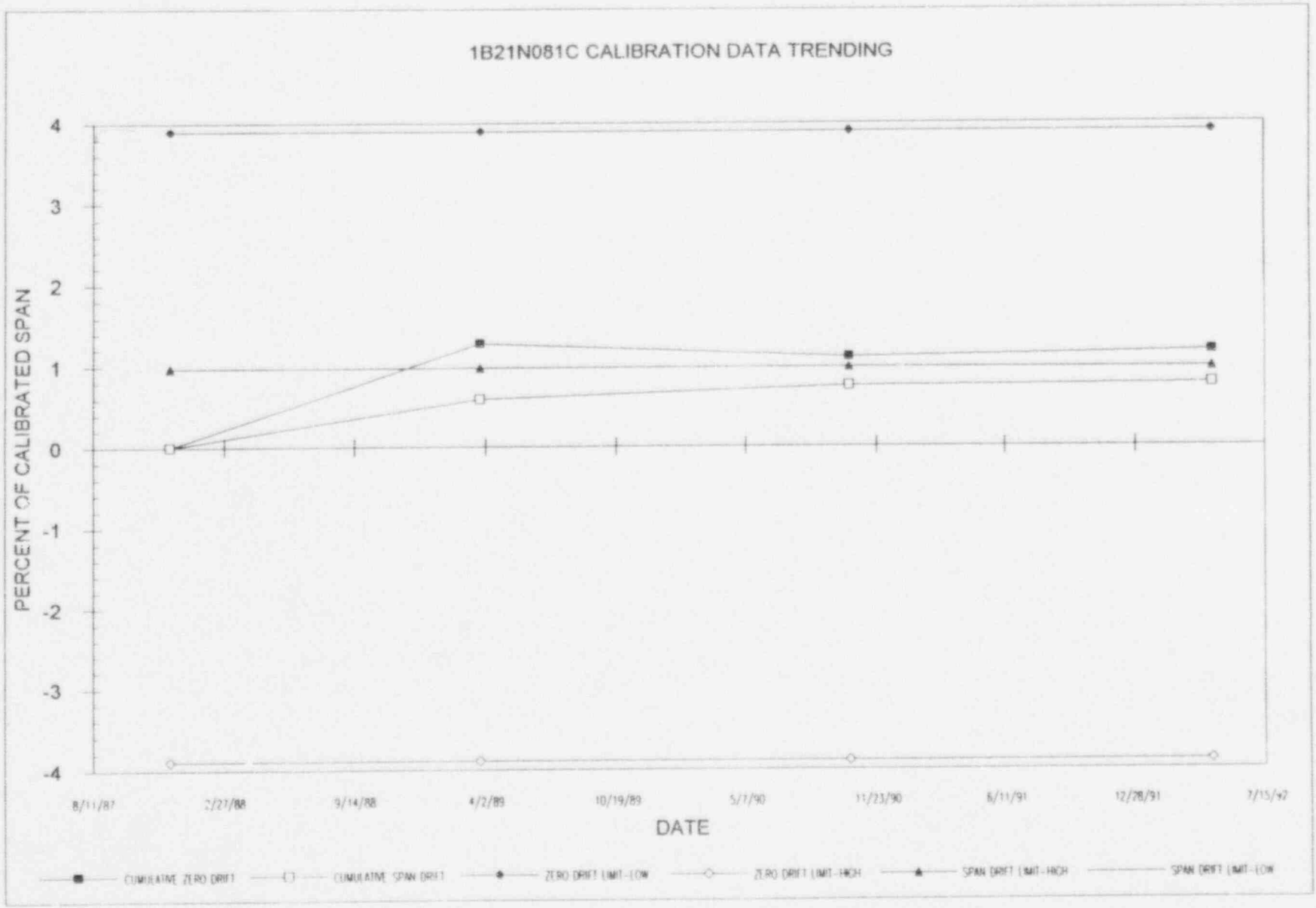

1B21N081C CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
4
3
2
1
0
-1
-2
-3
-4
8/11/87
2/27/88
9/14/88
4/2/89
10/19/89
5/7/90
11/23/90
8/11/91
12/28/91
7/15/92
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW

Table 3

Reference NRCB Supplement 1
Requested Actions Item 1(c)

Transmitter Number	Serial Number	Model Number	ESF/RPS/ATWS Application	Accumulated PSI-Months	PSI-month Threshold	Transmitter Monitoring Function
1E32N061A	418200	1153GB6	ESF	53,320	60,000	Main Steam Line A
1E32N061E	418199	1153GB6	ESF	53,320	60,000	Main Steam Line B
1E32N061N	418201	1153GB6	ESF	53,320	60,000	Main Steam Line D

Table 3 Addendum

JUSTIFICATION FOR EXTENDING ENHANCED SURVEILLANCE MONITORING PERIOD TO 18 MONTHS FOR THE TRANSMITTERS LISTED IN TABLE 3

Function:

The Main Steam Isolation Valve-Leakage Control System (MSIV-LCS) is designed to minimize the release of fission products which could leak through the closed MSIVs and bypass the standby gas treatment system after a postulated LOCA. The system is manually initiated after a LOCA. The transmitters listed in Table 3 provide a permissive signal to allow manual initiation only after main steam line pressure has dropped below the set point.

Redundancy and Diversity:

The MSIV-LCS consists of two subsystems: inboard and outboard. Each subsystem has instrumentation, controls and power sources which are separate and independent from each other. Either system may be manually initiated after a LOCA. This system is not required in itself to be diverse; it is interlocked by diverse parameter inputs.

Transmitter Performance:

The transmitters listed in Table 3 were installed in December of 1987. They have been through three calibration cycles. In the first calibration cycle a small positive zero drift of approximately one percent of calibrated span was observed. As can be seen from the attached calibration data and graphs, the trend for all three transmitters is quite flat. Oil loss lifetime is calculated by dividing the appropriate zero drift limit by the average zero drift rate. The calculated oil loss lifetimes are:

1E32N061A	40.5 years
1E32N061E	97.0 years
1E32N061N	19.5 years

Justification:

As stated in Reference 1, the analytical model developed by Rosemount for analyzing the loss-of-fill-fluid phenomenon has proven to be quite accurate. Based on this model, for transmitters with a sustained flat trend, the interval to identify oil loss increases with time in service.

For the transmitters listed in Table 3, calibration data trending on an 18-month basis is effective, because the calibration interval is small enough relative to the calculated oil loss lifetime to assure that oil loss is detected prior to failure.

Table 3 Addendum
(Continued)

JUSTIFICATION FOR EXTENDING ENHANCED SURVEILLANCE MONITORING PERIOD TO 18 MONTHS FOR THE TRANSMITTERS LISTED IN TABLE 3

Conclusion:

Monitoring on a monthly basis would not result in an improvement in reliability for the transmitters listed in Table 3. Calibration data trending is the most effective means for detecting oil loss prior to failure. Although the recommended psi-month threshold has not been achieved, transmitter past performance, application, and redundant safety function, monitoring the transmitters listed in Table 3 on an 18-month (cycle frequency) is adequate for detecting symptoms of fill-oil loss.

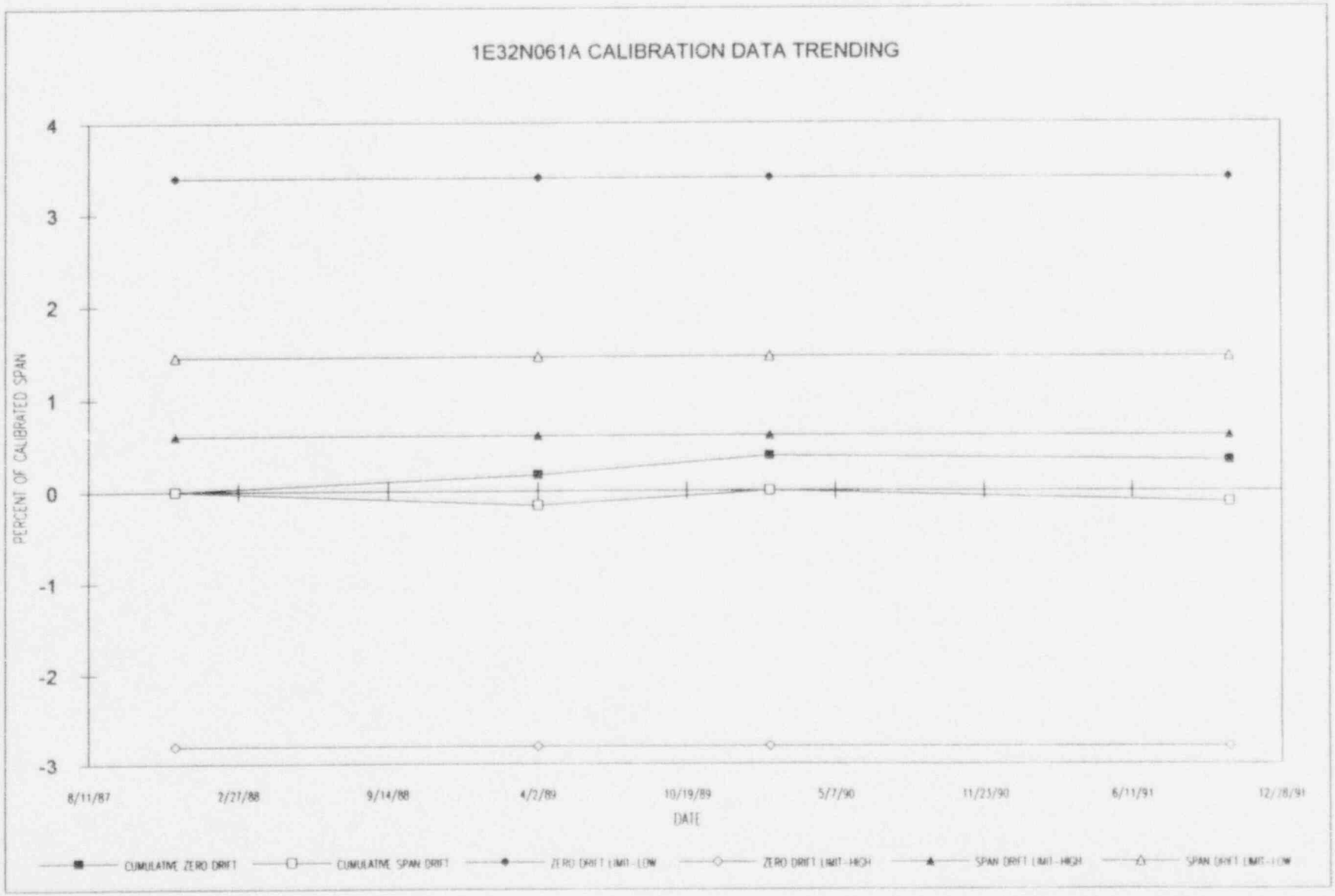
Calibration Trending Data
for
Transmitters Listed in Table 3

GRAND GULF NUCLEAR STATION

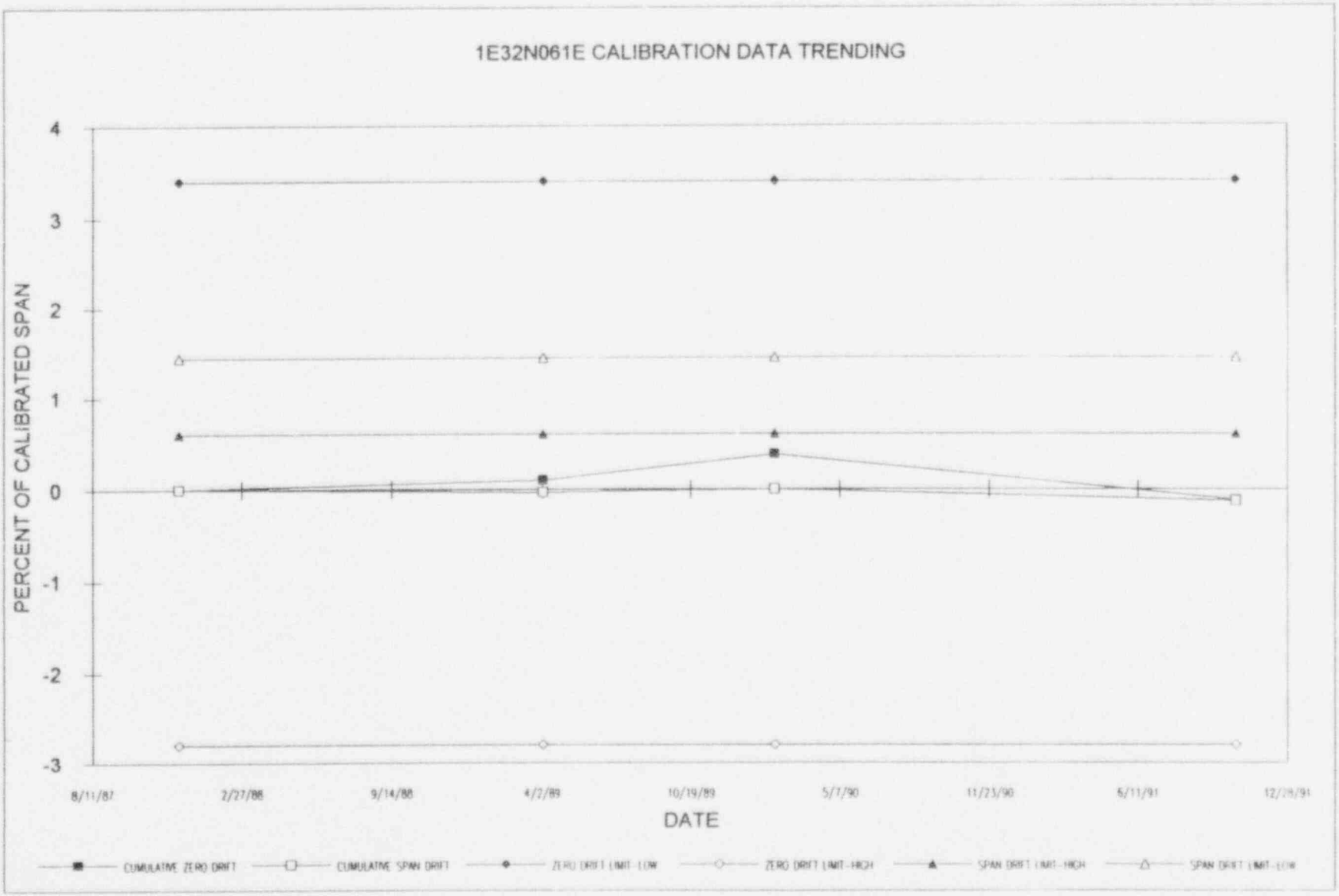
ENHANCED MONITORING PROGRAM - CALIBRATION DATA TRENDING

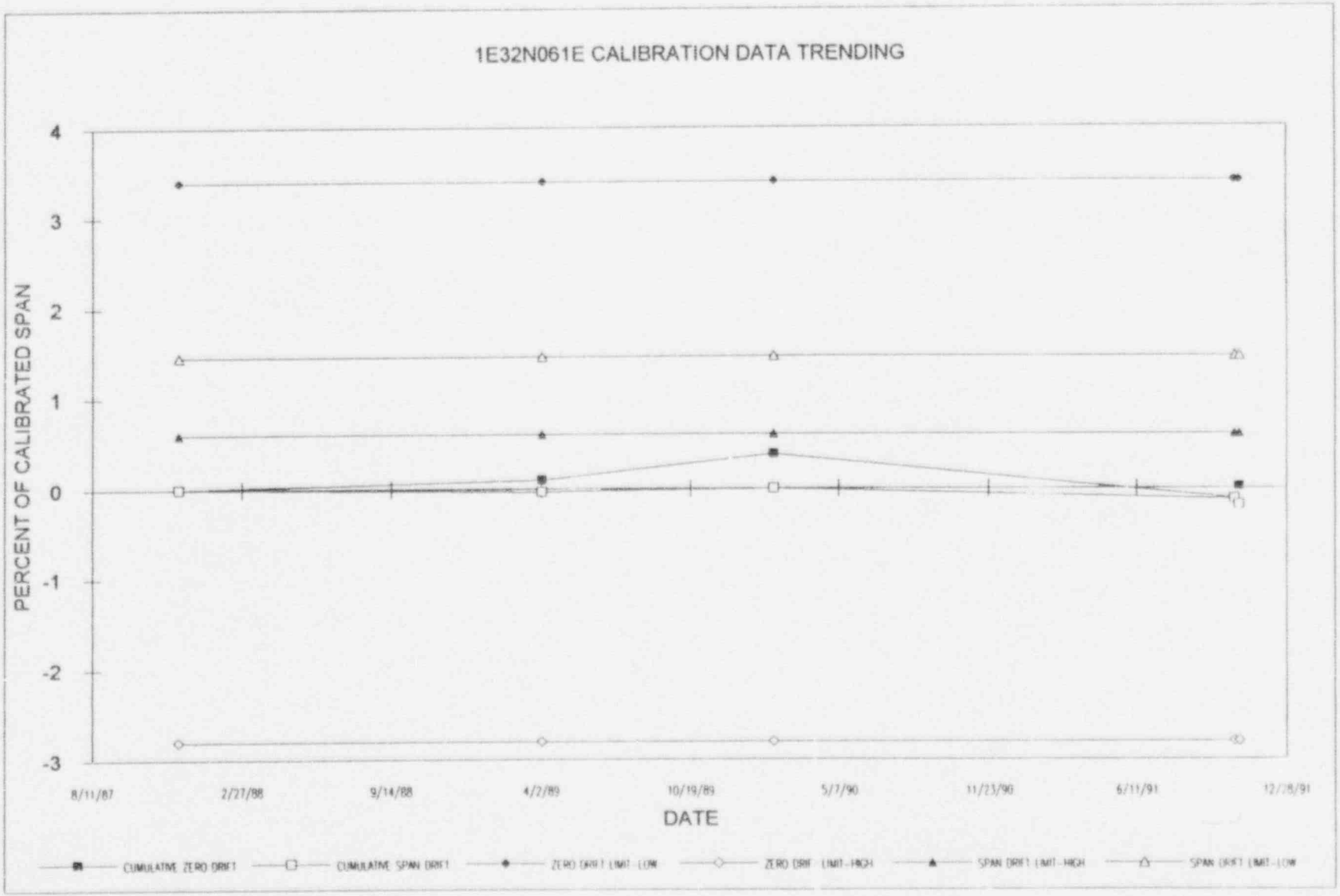
MPL#	SERIAL#	MODEL#	0% PSIG	100%PSIG	URL PSIG	RDF	DRIFT BASE DATE
1E32N061A	418200	1153GB6	10.4	110.4	100	1	12/04/87

DATE			AS FOUND 0% mA	AS FOUND 100% mA	FINAL 0% mA	FINAL 100% mA	AS FOUND EXTRAPOLAT ZERO	FINAL EXTRAPOLAT ZERO	INCREMEN ZERO DRIFT	INCREMENTAL SPAN DRIFT	CUMULATIVE ZERO DRIFT	CUMULATIVE S SPAN DRIFT	ZERO DR LIMIT HIGH	SPAN DR LIMIT HIGH	ZERO DR LIMIT LOW	SPAN DRI LIMIT LOW	OIL LOSS LIFETIME (YEARS)		PROJECTED FAILURE DATE
87	12	4			4	20	0	0	0	0	0	0	-2.8	0.6	3.4	1.45	9999999	12/4/87	04/19/42
89	4	2	4.025	20	4.025	20	2.3636	2.336	0.1725	-0.15625	0.1725	-0.15625	-2.8	0.6	3.4	1.45	26.190193	4/2/89	02/04/14
90	2	8	4.06	20.06	4	20	2.396	2.3636	0.2025	0.15625	0.375	0	-2.8	0.6	3.4	1.45	19.797626	2/8/90	09/16/07
91	10	20	3.99	19.97	3.99	19.97	2.32808	2.336	-0.049	-0.125	0.3255	-0.125	-2.8	0.6	3.4	1.45	40.522694	10/20/91	06/01/28


1E32N061A CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
4
3
2
1
0
-1
-2
-3
8/11/87
2/21/88
9/14/88
4/2/89
10/19/89
5/7/90
11/23/90
6/11/91
12/28/91
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW

			GRAND GULF NUCLEAR STATION																
			ENHANCED MONITORING PROGRAM – CALIBRATION DATA TRENDING																
			MFN #	SERIAL #	MODEL #	0% PSIG	100%PSIG	URL PSIG	ROI	DRIFT BASE DATE									
			1E32N061E	418200	1153GB6	10.4	110.4	100	1	12/04/87									
DATE			AS FOUND	AS FOUND	FINAL	FINAL	AS FOUND	FINAL	INCREMENTAL	INCREMENTAL	CUMULATIVE ZE	CUMULATIVE SP	ZERO DRI	SPAN DRI	ZERO DRI	SPAN DRI	DIL LOSS		PROJECTED
			0% mA	100% mA	0% mA	100% mA	EXTRAPOLATED	EXTRAPOLATED	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	DRIFT	DRIFT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
											0	0	HIGH	HIGH	LOW	LOW			
87	12	4			4	19.99	0	0	0	0	0	0	-2.8	0.6	3.4	1.45	9999999	12/4/87	04/19/42
89	4	3	4.015	20	4.015	20	2.35256	2.33704	0.097	-0.03125	0.097	-0.03125	-2.8	0.6	3.4	1.45	46.671.3741	4/3/89	07/25/34
90	2	8	4.06	20.05	4	20	2.39704	2.35256	0.278	0.03125	0.375	2.22045E-14	-2.8	0.6	3.4	1.45	19.79762557	2/8/90	09/16/07
91	10	20	3.92	19.9	4	19.99	2.25808	2.336	-0.487	-0.125	-0.112	-0.125	-2.8	0.6	3.4	1.45	96.986301.37	10/20/91	11/04/84


1E32N061E CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
4
3
2
1
0
-1
-2
-3
8/11/87
2/27/88
9/14/88
4/2/89
10/19/89
5/7/90
11/23/90
6/11/91
12/29/91
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW


1E32N061E CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
4
3
2
1
0
-1
-2
-3
8/11/87
2/27/88
9/14/88
4/2/89
10/19/89
5/7/90
11/23/90
6/11/91
12/28/91
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW

GRAND GULF NUCLEAR STATION

ENHANCED MONITORING PROGRAM - CALIBRATION DATA TRENDING

			MPL#	SERIAL#	MODEL#	0% PSIG	100%PSIG	URL PSIG	RDF	DRIFT BASE DATE									
			1E32N061N	418201	1153GB6	10.4	110.4	100	1	12/05/87									
DATE			AS FOUND	AS FOUND	FINAL	FINAL	AS FOUND	FINAL	INCREMENTAL	INCREMENTAL	CUMULATIVE Z	CUMULATIVE S	ZERO D	SPAN D	ZERO D	SPAN D	OIL LOSS		PROJECTED
			0% mA	100% mA	0% mA	100% mA	EXTRAPOLATE	EXTRAPOLA	ZERO	SPAN	ZERO	SPAN	DRIFT	DRIFT	DRIFT	DRIFT	LIFETIME		FAILURE
							ZERO	ZERO	DRIFT	DRIFT	DRIFT	DRIFT	LIMIT	LIMIT	LIMIT	LIMIT	(YEARS)		DATE
											0	0	HIGH	HIGH	LOW	LOW			
87	12	5			4.005	19.99	0	0	0	0	0	0	-2.8	0.6	3.4	1.45	9999999	12/5/87	04/20/42
89	4	3	4.025	20.07	3.995	20.02	2.35632	2.34256	0.086	0.375	0.086	0.375	-2.8	0.6	3.4	1.45	52.5326537	4/3/89	06/03/40
90	2	20	4.06	20	4	19.99	2.40224	2.3284	0.4615	-0.53125	0.5475	-0.15625	-2.8	0.6	3.4	1.45	13.7471696	2/20/90	08/30/01
91	10	26	4.02	20	4.02	20	2.35808	2.33704	0.1315	-0.0625	0.679	-0.21875	-2.8	0.6	3.4	1.45	19.4944217	10/26/91	05/29/07

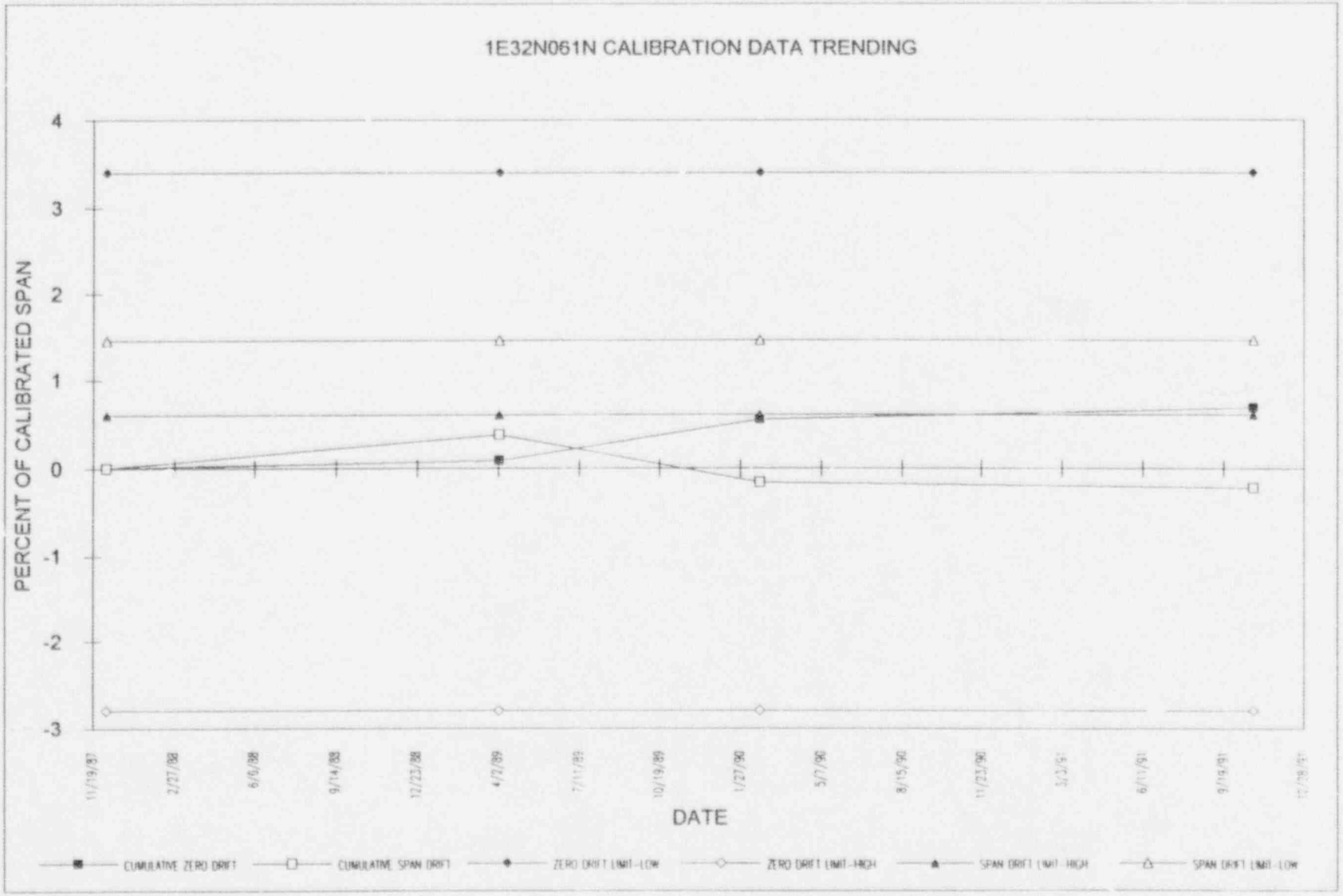

1E32N061N CALIBRATION DATA TRENDING
PERCENT OF CALIBRATED SPAN
4
3
2
1
0
-1
-2
-3
11/19/87
2/27/88
6/6/88
9/14/88
12/23/88
4/2/89
7/11/89
10/19/89
1/27/90
5/7/90
8/15/90
11/23/90
3/3/91
6/11/91
9/19/91
12/28/91
DATE
CUMULATIVE ZERO DRIFT
CUMULATIVE SPAN DRIFT
ZERO DRIFT LIMIT-LOW
ZERO DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-HIGH
SPAN DRIFT LIMIT-LOW

Table 4

Reference NRCP Supplement 1
Requested Actions Item 1(c)

Transmitter Number	Serial Number	Model Number	ESF/RPS/ATWS Application	Accumulated PSI-Months	PSI-month Threshold	Transmitter Monitoring Function
1B21N027A	418478	1153DD5	No	52,300	60,000	Reactor Vessel Shutdown Level A
1B21N027B	418479	1153DD5	No	52,300	60,000	Reactor Vessel Shutdown Level B
1B21N044C	418477	1153DD5	No	6,640	60,000	Reactor Vessel Fuel Zone Level
1B21N044D	418476	1153DD5	No	59,660	60,000	Reactor Vessel Fuel Zone Level

Attachment 2
Oath and Affirmation for NRC Bulletin 90-01, Supplement 1
per 10CFR50.54(f)

Attachment 3

References

1) Rosemount Report D9200129, Status Report on Oil Loss Rosemount Model 1153 Series B/D and 1154 Transmitters

2) Rosemount Technical Bulletin #4, Dated 12/22/89

BEFORE THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

LICENSE NO. NPF-29

DOCKET NO. 50-416

IN THE MATTER OF

MISSISSIPPI POWER & LIGHT COMPANY
and
SYSTEM ENERGY RESOURCES, INC.
and
SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION
and
ENTERGY OPERATIONS, INC.

AFFIRMATION

I, M. J. Meisner, state that I am Director, Nuclear Safety & Regulatory Affairs (GGNS) of Entergy Operations, Inc.; that on behalf of Entergy Operations, Inc., System Energy Resources, Inc., and South Mississippi Electric Power Association I am authorized by Entergy Operations, Inc. to sign and file with the Nuclear Regulatory Commission, this response to NRC Bulletin 90-01, Supplement 1 for the Grand Gulf Nuclear Station; that I signed this application as Director, Nuclear Safety & Regulatory Affairs (GGNS) of Entergy Operations, Inc.; and that the statements made and the matters set forth therein are true and correct to the best of my knowledge, information and belief.

M. J. Meisner

STATE OF MISSISSIPPI
COUNTY OF CLAIBORNE

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the County and State above named, this 5th day of March, 1993.

(SEAL)

Elizabeth L. Lang
Notary Public

My commission expires:

December 28, 1995