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September 2, 1994  
5000-94-0037  
C321-94-2022

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

Gentlemen:

Subject: Oyster Creek Nuclear Generating Station  
Docket No. 50-219  
Facility Operating License No. DPR-16  
Response to Request for Additional Information  
Re: Technical Specification Change Request No. 218  
dated May 12, 1994

This letter is in response to the conference call with members of my staff conducted with Mr. Alex Dromerick and Mr. Sang Rhew of the NRC staff on August 3, 1994. At that time, the APRM (Average Power Range Monitor) scram setpoint drift analysis supporting our request to revise the Channel Calibration interval from weekly to quarterly was requested. The approach taken in the analysis was to determine if high confidence exists that the Technical Specification limit would not be exceeded for the increased surveillance interval based on actual surveillance data. Attached to this letter are the APRM surveillance data (Attachment 1) and regression analysis computations (Attachment 2).

In the regression analysis, the slope (b) and intercept (a) of the regression line were computed based on the surveillance data (Y-axis) and the time interval between the surveillances (X-axis). The analysis follows:

- o Using the 'a' and 'b' (i.e., intercept and slope) values, the surveillance results are predicted at 3 months plus 25% margin ( $90 + 22.5 = 112.5$  days) as follows:

$$\hat{Y}_{(i)} = a + b * x_{(i)}, \text{ where } x_{(i)} = 112.5 \text{ days}$$

- o Variance,  $s^2(\hat{Y}_{(i)})$ , and standard deviation,  $s(\hat{Y}_{(i)})$ , of the predicted value,  $\hat{Y}_{(i)}$ , are calculated from the regression estimate,  $\hat{Y}$ , at 112.5 days.

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- o The 95% confidence range of the predicted value,  $\hat{Y}_{(i)}$ , is calculated using student-t distribution and standard deviation of the predicted value as follows:

$$\hat{Y}_{(i)} \pm t_{(0.1, N-2)} * s(\hat{Y}_{(i)}), \text{ for one-sided } t \text{ and } N-2 \text{ degrees of freedom}$$

This methodology is based on "Applied Statistics for Engineers" by William Volk (Second Edition), published by Robert E. Krieger Publishing Company, Huntington. New York, 1980. Also, this methodology was used for revisions to Three Mile Island Unit 1 Technical Specifications extending the interval for performance of selected surveillances to coincide with a 24-month operating cycle. The NRC staff has approved this methodology in "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 175 to Facility Operating License No. DPR-50" transmitted by NRC letter dated June 23, 1993. See paragraph 2.2 of the Safety Evaluation.

### **EVALUATION OF DATA & RESULTS**

Attachment 1 contains surveillance test and calibration data for the scram function pertaining to all eight APRM channels.

For APRM scram channels 1,3,4,5,6 & 8, AS-FOUND data for 25 weeks was within the specified tolerance and the AS-LEFT setpoint was adjusted only two times. These instances were for channel 4 (4/5/93) and channel 1 (9/26/93) where the AS-LEFT setpoint was adjusted although the AS-FOUND value was within the acceptance criteria in the surveillance procedure. Again, 25 weeks of AS-FOUND data for these channels was within the acceptance criteria. Hence, these channels are considered acceptable for a quarterly Channel Calibration surveillance interval versus the current frequency of once every week.

The setpoint for APRM scram channels 2 and 7 drifted outside the AS-FOUND acceptance criteria on three occasions (the Technical Specification limit was exceeded twice) over 25 surveillances for each channel, i.e., 3 times exceeding AS-FOUND acceptance criteria out of a total of 50 surveillances for these channels. The setpoints were adjusted to bring them within AS-LEFT criteria. Channels 2 and 7 are in different trip systems. Since all eight channels are identical in terms of hardware and function and as they share a common environment, four channels per trip system can be combined to determine a 95% Confidence Interval. As a simplified approach which provides conservative results, only the two channels whose setpoints were found outside

AS-FOUND acceptance criteria were analyzed using the regression model by combining the two sets of data in a single analysis (see Attachment 2). Accordingly, for the combined channels 2 and 7, the 95% Confidence Interval is as follows:

112.92 to 115.22% - This range exceeds the AS-FOUND criteria in the surveillance procedure but is well within the Technical Specification limit.

**NOTE: AS-FOUND Requirement - 113 to 115% Reactor Power**

**TECHNICAL SPECIFICATION Limit -  $\leq 115.7\%$  Reactor Power**

Thus, there exists a 95% confidence that the Technical Specification limit will not be exceeded.

Also enclosed as Attachment 3 are revised Technical Specification pages in Sections 3.1 and 4.1 which were affected by License Amendment No. 169. That amendment deleted the scram and isolation functions of the main steam line radiation monitor (MSLRM). The affected pages are 3.1-5, 3.1-6, 3.1-9, 3.1-10, 3.1-13 and 4.1-4. Page 3.1-6 is revised only as a result of pagination. These changes have been reviewed and approved by the NRC staff and do not alter Technical Specification Change Request No. 218 conclusions. A reliability assessment was performed and documented in General Electric Report NEDO-31400A, "Safety Evaluation for Eliminating The Boiling Water Reactor Main Steam Line Isolation Valve Closure Function and Scram Function of the Main Steam Line Radiation Monitor", October 1992 which addresses the effect on scram and isolation reliability of eliminating MSLRM scram and isolation functions. The assessment is documented on page 25/26 of NEDO-31400A.

Sincerely,



R. W. Keaten  
Vice President and Director  
Technical Functions

cc: Administrator, NRC Region I  
NRC Senior Resident Inspector, Oyster Creek  
Oyster Creek NRC Project Manager

## **Attachment 1**

FUNCTION: APRM  
 INSTRUMENT: APRM 1-8  
 PROCEDURE: 620.3.003

# ATTACHMENT 1

SECTION: TEST DATA SHEET (E2-2 - E2-5)

DATE	DATA															
	SCRAM SETPOINT															
	AS FOUND 114 +/- 1% APRM								AS LEFT (113 to 115) APRM							
	1	4	2	3	5	8	6	7	1	4	2	3	5	8	6	7
4/5/93	113.5	115	112.5	113	113	113	113.5	112.5	113.5	114	113	113	113	113	113.5	113
4/12/93	114	114.5	113.5	113.5	113	113	113.5	113	114	114.5	113.5	113.5	113	113	113.5	113
4/19/93	114	114	114	114	113.5	113.5	114	113	114	114	114	114	113.5	113.5	114	113
4/26/93	114	114	113.5	114	113.5	113.5	113.5	113	114	114	113.5	114	113.5	113.5	113.5	113
5/2/93	114	114	113.5	113	113.5	113	113	113	114	114	113.5	113	113.5	113	113	113
5/10/93	113	114.5	113.5	113	114	113	114	114	113	114.5	113.5	113	114	113	114	114
5/17/93	113	114.5	113.5	113.5	114	113.5	114	114	113	114.5	113.5	113.5	114	113.5	114	114
5/24/93	113.5	114.5	113	113.5	114	113	114	114	113.5	114.5	113	113.5	114	113	114	114
5/31/93	114	114.5	114	113.5	114.5	113.5	114	114	114	114.5	114	113.5	114.5	113.5	114	114
6/7/93	114	114.5	113	113	114	113	114	113.5	114	114.5	113	113	114	113	114	113.5
6/14/93	114	114.5	113.5	113.5	114	113	114	114	114	114.5	113.5	113.5	114	113	114	114
6/21/93	114	114.5	116	114	115	114.5	115	116	114	114.5	115	114	115	114.5	115	115
6/28/93	114	113.5	114	114	113.5	113.5	114	113.5	114	113.5	114	114	113.5	113.5	114	114
7/5/93	114	114	114	114	114	113.5	114	114	114	114	114	114	114	113.5	114	114
7/12/93	113.5	114	114	114	114	113	113	113	113.5	114	114	114	114	113	113	113
7/19/93	114	113.5	113.5	114	114	113	113.5	113.5	114	113.5	113.5	114	114	113	113.5	113.5
7/26/93	114	114	113.5	114	114	113	113.5	113.5	114	114	113.5	114	114	113	113.5	113.5
8/1/93	114	113	114	114	114	113.5	114	114	114	114	114	114	114	113.5	114	114
8/8/93	114	113.5	114	114	114	113	113.5	114	114	113.5	114	114	114	113	113.5	114
8/12/93						113								113		
8/15/93	114	114	114	113.5	114	113	114	114	114	114	114	113.5	114	113	114	114
8/22/93	114	114	113.5	113.5	113.5	113.5	114	114	114	114	113.5	113.5	113.5	113.5	114	114

FUNCTION: APRM  
 INSTRUMENT: APRM 1-8  
 PROCEDURE: 620.3.003

# ATTACHMENT 1

SECTION: TEST DATA SHEET (E2-2 - E2-5)

DATE	DATA															
	SCRAM SETPOINT															
	AS FOUND 114 +/- 1% APRM								AS LEFT (113 to 115) APRM							
	1	4	2	3	5	8	6	7	1	4	2	3	5	8	6	7
8/29/93	114	114	114	114	113.5	113	114	113.5	114	114	114	114	113.5	113	114	113.5
9/5/93	114	113.5	113	113	114	113	113.5	113.5	114	113.5	113	113	114	113	113.5	113.5
9/12/93	114	113.5	113.5	114	113.5	113.5	114	114	114	113.5	113.5	114	113.5	113.5	114	114
9/26/93	115	113.5	113.5	113.5	114	113	113.5	114	114	113.5	113.5	113.5	114	113	113.5	114

## **Attachment 2**



# ATTACHMENT 2

APRM CHANNEL 2 & 7 COMBINED: FLOW INDUCED SCRAM SURVEILLANCE DATA

CH2&7 / PAGE 1 OF 2  
FILE: SFRAPRM2

DATE	DAYS ELAPSED	SURVL DATA	x	y	Channel 2&7 Scram	$y^{\wedge} = a + bX$ (ESTIMATE)	$x - AVGx$	$(x - AVGx)^{\wedge} 2$	$y - AVGy$	$(y - AVGy)^{\wedge} 2$	$(x - AVGx)^{*}$ $(y - AVGy)$	$y^{\wedge} = y$ ESTIMATED	$y - y^{\wedge}$	$(y - y^{\wedge})^{\wedge} 2$
05-Apr-95	0	113	113.600120	-39.679245	1574.44250	-0.7641509	0.58392666	30.3209327	-0.6001205	0.3601446912				
12-Apr-95	7	113.5	113.629057925	-32.679245	1067.93307	-0.2641509	0.06977572	8.63225347	-0.1290579	0.0166559481				
19-Apr-95	14	114	113.657995	-25.679245	659.423638	0.23584905	0.05562477	-6.0564257	0.34200471	0.11696722				
26-Apr-95	21	113.5	113.686932	-18.679245	348.914204	-0.2641509	0.06977572	4.93414026	-0.1869326	0.03494381				
02-May-95	27	113.5	113.711736	-12.679245	160.763260	-0.2641509	0.06977572	3.34923460	-0.2117361	0.04483217				
10-May-95	35	113.5	113.744807	-4.6792452	21.8953364	-0.2641509	0.06977572	1.23602705	-0.2448073	0.05993064				
17-May-95	42	113.5	113.773744	2.32075471	5.38590245	-0.2641509	0.06977572	-0.6130295	-0.2737447	0.07493617				
24-May-95	49	113	113.802682	9.32075471	86.8764684	-0.7641509	0.58392666	-7.1224635	-0.8026820	0.64429854				
31-May-95	56	114	113.831619	16.3207547	266.367034	0.23584905	0.05562477	3.84923460	0.16838054	0.02835200				
07-Jun-95	63	113	113.860556	23.3207547	543.857600	-0.7641509	0.58392666	-17.820576	-0.8605568	0.74055803				
14-Jun-95	70	113.5	113.889494	30.3207547	919.348166	-0.2641509	0.06977572	-8.0092559	-0.3894941	0.15170571				
21-Jun-95	77	116	113.918431	37.3207547	1392.83873	2.23584905	4.99902100	83.4435742	2.08156846	4.33292726				
21-Jun-95	0	115	113.600120	-39.679245	1574.44250	1.23584905	1.52732289	-49.037557	1.39987943	1.95966243				
28-Jun-95	7	114	113.629057	-32.679245	1067.93307	0.23584905	0.05562477	-7.7073691	0.37094207	0.13759802				
05-Jul-95	14	114	113.657995	-25.679245	659.423638	0.23584905	0.05562477	-6.0564257	0.34200471	0.11696722				
12-Jul-95	21	114	113.686932	-18.679245	348.914204	0.23584905	0.05562477	-4.4054823	0.31306735	0.09801116				
19-Jul-95	28	113.5	113.715870	-11.679245	136.404770	-0.2641509	0.06977572	3.08508365	-0.2158700	0.04659986				
26-Jul-95	35	113.5	113.744807	-4.6792452	21.8953364	-0.2641509	0.06977572	1.23602705	-0.2448073	0.05993064				
01-Aug-95	41	114	113.769610	1.32075471	1.74439302	0.23584905	0.05562477	0.31149875	0.23038917	0.05307917				
08-Aug-95	48	114	113.798548	8.32075471	69.2349590	0.23584905	0.05562477	1.96244215	0.20145181	0.04058283				
15-Aug-95	55	114	113.827485	15.3207547	234.725525	0.23584905	0.05562477	3.61338554	0.17251445	0.02976123				
22-Aug-95	62	113.5	113.856422	22.3207547	498.216091	-0.2641509	0.06977572	-5.8960484	-0.3564229	0.12703728				
29-Aug-95	69	114	113.885360	29.3207547	859.706657	0.23584905	0.05562477	6.91527233	0.11463973	0.01314226				
05-Sep-95	76	113	113.914297	36.3207547	1319.19722	-0.7641509	0.58392666	-27.754538	-0.9142976	0.83594015				
12-Sep-95	83	113.5	113.943234	43.3207547	1876.68778	-0.2641509	0.06977572	-11.443218	-0.4432349	0.19645725				
26-Sep-95	97	113.5	114.001109	57.3207547	3285.66892	-0.2641509	0.06977572	-15.141331	-0.5011097	0.25111094				
4/5/93	0	113	113.600120	-39.679245	1574.44250	-0.7641509	0.58392666	30.3209327	-0.6001205	0.36014469				
4/12/93	7	113	113.629057	-32.679245	1067.93307	-0.7641509	0.58392666	24.9718761	-0.6290579	0.39571387				
4/19/93	14	113	113.657995	-25.679245	659.423638	-0.7641509	0.58392666	19.6228195	-0.6579952	0.43295779				
4/26/93	21	113	113.686932	-18.679245	348.914204	-0.7641509	0.58392666	14.2737629	-0.6869326	0.47187646				
5/2/93	27	113	113.711736	-12.679245	160.763260	-0.7641509	0.58392666	9.68885724	-0.7117361	0.50656827				
5/10/93	35	114	113.744807	-4.6792452	21.8953364	0.23584905	0.05562477	-1.1035955	0.25519262	0.06512327				
5/17/93	42	114	113.773744	2.32075471	5.38590245	0.23584905	0.05562477	0.54734781	0.22625526	0.05119144				
5/24/93	49	114	113.802682	9.32075471	86.8764684	0.23584905	0.05562477	2.19829120	0.19731790	0.03893435				
5/31/93	56	114	113.831619	16.3207547	266.367034	0.23584905	0.05562477	3.84923460	0.16838054	0.02835200				
6/7/93	63	113.5	113.860556	23.3207547	543.857600	-0.2641509	0.06977572	-6.1601993	-0.3605568	0.13000121				
6/14/93	70	114	113.889494	30.3207547	919.348166	0.23584905	0.05562477	7.15112139	0.11050582	0.01221153				
6/21/93	77	116	113.918431	37.3207547	1392.83873	2.23584905	4.99902100	83.4435742	2.08156846	4.33292726				
6/21/93	0	115	113.600120	-39.679245	1574.44250	1.23584905	1.52732289	-49.037557	1.39987943	1.95966243				
6/28/93	7	113.5	113.629057	-32.679245	1067.93307	-0.2641509	0.06977572	8.63225347	-0.1290579	0.01665594				
6/28/93	0	114	113.600120	-39.679245	1574.44250	0.23584905	0.05562477	-9.3583125	0.39987943	0.15990356				
7/5/93	7	114	113.629057	-32.679245	1067.93307	0.23584905	0.05562477	-7.7073691	0.37094207	0.13759802				
7/12/93	14	113	113.657995	-25.679245	659.423638	-0.7641509	0.58392666	19.6228195	-0.6579952	0.43295779				
7/19/93	21	113.5	113.686932	-18.679245	348.914204	-0.2641509	0.06977572	4.93414026	-0.1869326	0.03494381				
7/26/93	28	113.5	113.715870	-11.679245	136.404770	-0.2641509	0.06977572	3.08508365	-0.2158700	0.04659986				
8/1/93	34	114	113.740673	-5.6792452	32.2538269	0.23584905	0.05562477	-1.3394446	0.25932653	0.06725025				
8/8/93	41	114	113.769610	1.32075471	1.74439302	0.23584905	0.05562477	0.31149875	0.23038917	0.05307917				
8/15/93	48	114	113.798548	8.32075471	69.2349590	0.23584905	0.05562477	1.96244215	0.20145181	0.04058283				
8/22/93	55	114	113.827485	15.3207547	234.725525	0.23584905	0.05562477	3.61338554	0.17251445	0.02976123				
8/29/93	62	113.5	113.856422	22.3207547	498.216091	-0.2641509	0.06977572	-5.8960484	-0.3564229	0.12703728				
9/5/93	69	113.5	113.885360	29.3207547	859.706657	-0.2641509	0.06977572	-7.7451050	-0.3853602	0.14850253				
9/12/93	76	114	113.914297	36.3207547	1319.19722	0.23584905	0.05562477	8.56621573	0.08570237	0.00734489				
9/26/93	83	114	113.943234	43.3207547	1876.68778	0.23584905	0.05562477	10.2171591	0.05676500	0.00322226				

AVERAGES: 39.6792452 113.764150

STD. DEVI:

SUM(x-AVGx)^2:

SUM(y-AVGy)^2:

SUM(x-AVGx)\*(y-AVGy):

SUM(y-y^)^2:

37371.5471

21.3018867

154.490566

CHECK HERE > 0.63652298

= (y^ - y) / (y^ - y) \* (y^ - y)

s^2(y^ - y) = 0.40516150

20.6632368



## ATTACHMENT 2

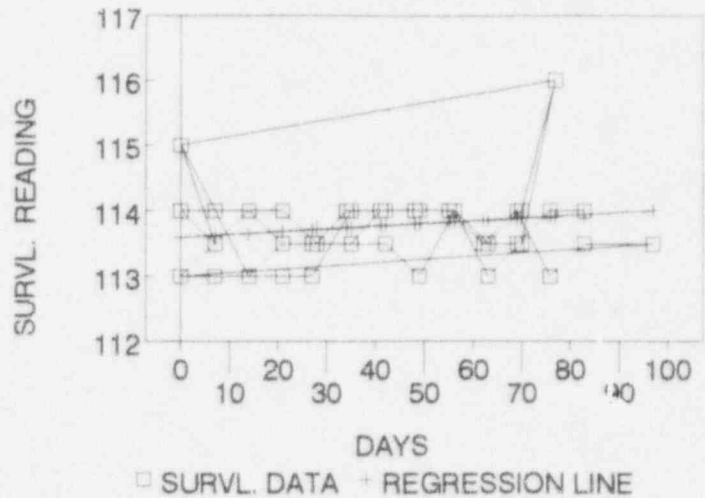
APRM CHANNEL 2 & 7 COMBINED: FLOW INDUCED SCRAM SURVEILLANCE DATA

CH 2&7 / PAGE 2 OF 2  
FILE: SFRAPRM2

### Regression Output:

Constant, a = 113.600120  
Std Err of Y Est = 0.63652298  
R Squared,  $r^2$  = 0.02998090  
No. of Observations, N = 53  
Degrees of Freedom, N-2 = 51  
  
X Coefficient(s), b = 0.00413390  
Std Err of Coef. = 0.00329263

### FLOW BIASED APRM SCRAM DATA - CHANNEL 2 & 7 COMBINED



AVGX = 39.6792452 SUM(x-AVGX)^2 = 37371.5471

#### o VARIANCE OF ANY PREDICTED VALUE, $Y(i)^{\wedge}$ .

$$s^{\wedge}2(Y(i)^{\wedge}) = s^{\wedge}2(y^{\wedge}) * [1 + (1/N) + \{(AVGX - x(i))^2 / \text{SUM}(x - AVGX)^2\}]$$

WHERE  $x(i) = 3 \text{ MONTHS} + 25\% = 90 \text{ days} + 22.5 \text{ days} = 112.5 \text{ days}$

$$= 0.40516150 * [1 + (1/53) + \{(33.4528301 - 112.5)^2 / 31035.1320\}]$$

$$= 0.47029674$$

#### o $Y^{\wedge} (@ x(i) + 112.5 \text{ days}) = a + b * x(i)$

$$Y^{\wedge} = 113.600120 + 0.00413390 * 112.5 \text{ days}$$

$$= 114.065185$$

#### o CONFIDENCE RANGE OF $Y^{\wedge}$ @ 112.5 days

$$= Y^{\wedge} (@ x(i) + 112.5 \text{ days}) \pm t(\text{ALPHA, DEGREES OF FREEDOM}) * s(Y(i))$$

$$= 114.065185 \pm t(.05, N-2) * s(Y(i)), \text{ FOR TWO-SIDED } t, \text{ or}$$

$$= 114.065185 \pm t(.1, N-2) * s(Y(i)), \text{ FOR ONE-SIDED } t, \text{ WHERE } N-2 =$$

$$= 114.065185 \pm 1.677 * \text{SQRT}(0.47029674)$$

$$= 114.065185 \pm 1.15005610$$

$$= 112.915129 \text{ to } 115.215241$$

N-2 =	t-VALUE(ONE-SIDED)
40	1.684
60	1.671
51	1.677 - BY INTERPOLATION

#### ACCEPTANCE CRITERIA:

AS-FOUND: 114 +/- 1%

TECH SPEC LIMIT: < OR = 115.7%

#### REFERENCES:

- o STANDING ORDER #1 (R.64)
- o TECH SPEC PARA. 2.3
- o PROCEDURE 620.3.003

### CONCLUSION

THE COMBINED CHANNELS DO NOT SATISFY THE "AS-FOUND" ACCEPTANCE CRITERIA BUT ARE NOT IN VIOLATION OF TECH SPEC LIMIT.

### NOTES:

- o SHADED NUMBERS SHALL BE CHECKED FOR ACCURACY
- o BOXED VALUES ARE USED IN THIS CALCULATION
- o e.g.,  $X^{\wedge}2$  REPRESENTS X-squared