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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Gentlemen:

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION
DOCKET NO. 50-219
TECHNICAL SPECIFICATION SETPOINTS

During the periods of October 17-21 and October 31 - November 4, 1988 NRC's Office of Nuclear Reactor Regulation conducted a Safety System Outage Modification Inspection (SSOMI) at the Oyster Creek Nuclear Generating Station (OCNGS). As part of the inspection, the NRC team reviewed instrument setpoint calculations performed for a modification involving replacement of mechanical pressure switches with analog instrument loops. This pressure instrumentation provides input to the actuation logic for the reactor protection system (RPS) (instrument loop RE03) and isolation condensers (instrument loop RE15). During the review of the setpoint calculation, the audit team raised the concern that inclusion of instrument measuring inaccuracies as part of the maximum allowable drift between surveillance tests could lead to setpoints exceeding Technical Specification limits. GPUN subsequently revised the calculation to treat instrument measuring inaccuracy as a systematic error. This error was added to the maximum allowable drift between surveillance tests to calculate the instrument setpoints. Further, GPUN committed to review the setpoints for the remaining Technical Specification supporting instrument loops.

Oyster Creek has a total of 39 Technical Specification supporting instrument loops. Of these 39 instrument loops GPUN has documented calculations for 14 instrument loops. For the remaining 25 loops, GPUN analyzed historical data to calculate actual instrument drift characteristics in order to judge the adequacy of the existing setpoints.

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ROUMES

On January 30, 1989, GPUN met with members of the NRC staff to discuss GPUN's evaluation approach regarding the 39 Technical Specification instrument loop setpoints. A list of these instruments with their important characteristics in tabular form was used to facilitate the discussion. Attachment II of this letter is a revision of that table. This revised table includes the results of the statistical analysis performed on the historical data.

For each instrument loop, historical as-found and as-left setpoint data was retrieved from OCNGS instrument data sheets. From this data actual instrument drift between surveillance tests was calculated and statistically analyzed to obtain the variance of the historical drift. Also, a determination was made that in order for the statistical analysis to produce an adequate confidence level, a minimum of 30 data points would be required. For most cases sufficient information was available to meet this requirement. The data was statistically analyzed to assess the potential for exceeding Technical Specification limits. For the drift determination the standard deviation was multiplied by the appropriate factor for one-sided tolerance limits for Normal Distribution to determine the random variation at a 95%/95% level of significance.

The results of the statistical analysis are summarized in Attachment I with our current plans to improve instrument performance, where appropriate. In addition, as requested at the January 30, 1989 meeting, a copy of the current revision of our engineering standard ES-002 "Instrument Error Calculation and Setpoint Determination," is forwarded as Attachment III.

Very truly yours,

J. C. DeVine, Jr.
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\sb

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ROUMES

ATTACHMENT 1

Group I Discussion

This group contains 14 instrument loops for which GPUN has documented setpoint calculations that indicate the Technical Specification limit should not be exceeded.

The analysis of historical data supports the calculations for instrument loops 3 through 10 and 14.

Instrument loops 1 and 2 are new instrument loops installed during the cycle 12R refueling outage. Therefore, insufficient data exists to perform a meaningful historical drift data analysis. However, these loops are analog loops and use hardware similar to loops 3 and 4. Based on the experience with loops 3 and 4, it is anticipated that loops 1 and 2 will also perform within the range established by the calculation results.

For instrument loops 11, 12 and 14 historical drift has been found to be greater than calculated drift. Originally, all three of these instrument loops were ITT Barton switches with mercury contacts. However, because of seismic reasons, the mercury contacts were replaced with snap-acting switches in 1978-1979. Although the hirtorical drift for instrument loop 14 exceeds the calculated drift, the instrument loop still does not exceed the Technical Specification limits. Instrument loops 11 and 12 have the potential to exceed their Technical Specification limits. GPUN has replaced 1 of the 8 RE22's (loop 11), 1 of the 4 RV46's (loop 14) and 1 of the 4 RE18 (loop 12) switches with qualified ITT Barton 580 switches. These were replaced during the 12R refueling outage as test switches. In addition, the ranges for the RE22 and RV46 test switches were narrowed to be more compatible with their respective setpoints. Based on GPUN's monitoring of the performance of these switches we are planning on replacing the remaining switches with ITT Barton 580 switches in the 13R refueling outage.

Instrument loop 11 (RE 22) has a potential maximum drift of 1.16 psid above the Technical Specification limits which does not present a safety concern. These RE22's are used for main steam line rupture detection and they provide an isolation signal to the main steam isolation valves. The Technical Specification limit of 96.5 psid corresponds to 120% of the rated flow. The calculated drift has the potential to exceed Technical Specification limit by 1.16 psid which corresponds to 120.72% of rated flow. Upon a break of a main steam line, the rate of increase in main steam flow and hence the measured differential is expected to be extremely rapid so that the difference in time to reach the instrument setpoint will be negligible.

Instrument loop 12, RE-18, has a potential maximum drift of 0.4 inches of water in excess of the Technical Specifications limit and does not present a challenge to safety. The rate of reactor water level decrease for events in which these switches are required to function is sufficiently rapid so that the time delay in switch actuation due to instrument drift would not be significant. Further, the actuation logic fed by these sensors which are configured in a one out of two twice logic, give high confidence that these switches will actuate and perform the intended safety function.

The historical drift for instrument loop 13 is greater than calculated drift and has the potential to exceed the Technical Specification limit. Instrument loop 13 contains qualified SOR differential pressure switches. GPUN is planning on replacing these switches with improved SOR switches during the 13R refueling outage. This instrument loop has a potential maximum drift of 0.36 inches of water column above the Technical Specification limit. This does not present a safety concern. The drift would result in approximately a 0.01 psig change in the instrument setpoint. The vacuum breakers would open at 0.513 psid vs. 0.50 psid and would still accomplish their safety function of protecting the torus from negative design pressure of 1 psid.

Group II Discussion

This group contains 8 loops for which GPUN had a generic evaluation which was based on engineering judgement and indicated that Technical Specification limits should not be exceeded. The analysis of the historical data supports the evaluation for instrument loops 1 and 2.

The remaining 6 instrument loops each have the possibility of exceeding their respective Technical Specification limits because of excessive drift. The following is a list of these instrument loops with GPUN's proposed resolutions:

Instrument Loop 3 - GPUN will change the instrument setpoint and/or calibration tolerance. A maximum potential drift of 1.88 psig below the Technical Specification limit would result in an insignificant delay of core spray injection. Based on the rate of reactor depressurization, either due to a line break or assisted by the Auto Depressurization System, the core spray injection time delay is insignificant.

Instrument Loops 4, 5, and 6 - These snap-acting switches are experiencing abnormal drift and are in the Long Range Plan (LRP) for replacement during the 13R refueling outage. GPUN plans to replace the switches with an instrument having better drift characteristics. Originally, these instruments were ITT Barton switches with mercury contacts. However, because of seismic reasons, the mercury contacts were replaced with snap-acting switches in 1978-1979. GPUN is planning on replacing these switches with new snap-acting ITT Barton switches.

Instrument loop 4, containment spray initiation could be delayed slightly by the IP15's drifting above the Technical Specification limit of 3.5 psig to 3.62 psig. There is no safety concern since the rate of drywell pressure increase is very rapid and the differential time between reaching the normal and the higher setpoint is insignificant.

Instrument loop 5, IB05, which detects isolation condenser high steam flow have a maximum potential drift of 1.25 psid above their Technical Specification limit. These switches detect a rupture which would develop a high differential pressure rapidly. Thus there would be an insignificant delay in the switch actuations to isolate the isolation condenser valves.

Instrument loop 6, IB11, which detect isolation condenser high condensate flow have a maximum potential drift of 4.09 inches of water column above their Technical Specification limit. These switches detect a rupture which would develop a high differential pressure rapidly. Thus there would be an insignificant delay in the switch actuations to isolate the isolation condenser valves.

Instrument Loop 7 - This loop provides an operational bypass of low condenser vacuum and main steam line valve closure signals to the RPS actuation circuit and it is utilized to permit plant operation to generate enough steam to establish turbine seals and condenser vacuum only during plant start-up. Currently this loop is calibrated every refueling outage. For the historical data analysis only 6 data points were available. GPUN will make a setpoint change to reduce the probability of exceeding the Technical Specification limit for this instrument loop. This function is an operational bypass and is not associated with accident mitigation.

Instrument Loop 8 - GPUN is planning replacement in 14R refueling outage. The Oyster Creek Final Safety Analysis Report analyzed transients for reactor pressure vessel pressurization. They are, Turbine Trip Without Bypass and Main Steam Isolation Valve Closure with Anticipated Transient Without Scram (ATWS). For both of these events, the drift of this instrument loop, combined with the low probability (0.00048) of having insufficient Electro-Matic Relief Valves (EMRV's) available, does not present a safety concern.

Group III Discussion

This group contains 10 loops for which engineering judgement indicated that the Technical Specification limit should not be exceeded. The analysis of the historical data supports this judgement for instrument loops 1, 2 and 7 through 9.

Instrument Loops 3 and 4 are Intermediate Range Neutron Flux Monitors (IRM) and Average Power Range Flux Monitors (APRM's). The IRM system consists of 8 independent channels of instrumentation for monitoring and protection during start-up, heat-up and shutdown from approximately 0.0003 to 40% of rated power. The IRM system provides protective trips (rod block and scram) in order to protect against rapid increases in reactor power which might cause fuel damage. 8 APRM channels monitor average core power during full power operation.

Our analysis show that for most APRM and IRM channels, the setpoints are quite stable. However, some channels have measurable long term drift. For the stable channels, the surveillance readings vary randomly about a constant mean value. In the channels experiencing drift, the surveillance readings vary randomly about a regression line which reflects the setpoint drift. As this regression line approaches a surveillance acceptable as-found limit, there is a finite probability that random variation will cause an individual surveillance reading to exceed the acceptance limit. When this occurs our practice is to reset the instrument to an acceptable as-left value. Based upon weekly surveillance, we can demonstrate that there is less than a 5% chance of exceeding the Technical Specification limit due to the combined effects of the drift and random variation.

GPUN will revise the plant procedures to provide additional guidance to assure that the channels are recalibrated prior to approaching a situation where 95%/95% level of significance is compromised.

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Instrument Loops 5 and 6 are Source Range Monitors. These loops are surveilled weekly but are not required to be recorded. Therefore, there is no data to perform a historical drift analyses. However, these loops use hardware similar to loops 3 and 4. Based on the experience with loops 3 and 4 plus the weekly surveillances, the performance of these loops is considered satisfactory. GPUN is currently evaluating a procedural change to record the surveillances and to assure 95%/95% confidence that Technical Specifications will not be exceeded. These source range monitors monitor the neutron flux during startup, shutdown and refueling. These monitors are withdrawn from the vessel after startup.

Instrument Loop 10 - This loop was installed during the 11R refueling outage utilizing state-of-the-art hardware. The qualitative analysis of limited surveillance data indicates that the instrument performance does not have potential to exceed the Technical Specification limits.

Group IV Discussion

This group contains 7 instrument loops for which engineering judgement indicated that Technical Specification limits may be exceeded. The analysis of the historical data supports this prediction for loop 2.

Instrument Loop 1 - PSL senses the absence or presence of oil pressure at the output of the turbine control system acceleration relay. The function is to detect the absence of oil pressure which means turbine trip/load rejection. There is no setpoint listed in the Oyster Creek Technical Specifications Section 2.3.N. Therefore, there is no potential to exceed Technical Specification limit and there is no safety concern.

Instrument Loop 2 - GPUN has changed the setpoint of this instrument loop from 23" Hg +0.35"/-0" Hg vacuum to 23.65" Hg + 0.35"/-0" Hg vacuum.

Instrument Loops 3, 4, 5 and 6 - are SRM's, IRM's and APRM's. The discussion in Group III loops 3 through 6 address these instrument loops as well.

Instrument Loop 7 - This instrument loop monitors the radiation levels in Air Ejector Off-Gas process steam and isolation off-gas system for radiation levels which exceed the predetermined value. During the cycle 11R outage, electronics for this instrument loop was replaced with state-of-the-art hardware. This hardware is manufactured by General Electric and is being marketed as the NUMAC system. The performance of this instrument loop has significantly improved since this replacement. Currently the instrument setpoint is the same as the Technical Specification limit. GPUN will change the instrument setpoint to provide margin to the Technical Specification limit. If the instrument loop drifts above the Technical Specification limit, a delay of isolation to the steam jet air ejectors would occur. The Turbine Building RAGEM's monitors this effluent path and provides quantification of any releases to the environment.

ATTACHMENT II
TECHNICAL SPECIFICATIONS INSTRUMENT LOOPS

GROUP I

	Instrument (Tag) & Function	Numb. of Channels	Manuf.	Range	Setpoint	Calib. Tolerance	Calcul Drift	Historical Drift	Tech. Spec. Limit	Surveil-lance Freq.
1	Rx Hi Press. (RE03) SCRAM	4	Rosemount Foxboro	700-1200 psig	1046 psig	+2 psig	+8 psig	N/A	1060 psig	Monthly
2	Rx Hi Press. (RE15) IC Initiation	4	Rosemount Foxboro	700-1200 psig	1050 psig	+2 psig	+8 psig	N/A	1060 psig	Monthly
3	Rx Lo Water Level (RE05, 05/19) SCRAM	4	Rosemount Foxboro	70.2" WC (Span)	58.5" WC	+0.1" WC	+1.04" WC	+0.62" WC	59.79" WC	Monthly
4	Rx Lo-Lo Water Level (RE02) MSIV Closure Contain. Isol.	4	Rosemount Foxboro	70.2" WC (Span)	92.8" WC	+1.0" WC	+1.04" WC	0.96" WC	95.56" WC	Monthly
5	Rx Lo-Lo Water Level (RE02) Core Spray/ Contain. Spray Initiation	4	Rosemount Foxboro	70.2" WC (Span)	92.8" WC	+1.0" WC	+1.04" WC	0.96" WC	95.56" WC	Monthly
6	Rx Lo-Lo Water Level (RE02) IC/SBGTS	4	Rosemount Foxboro	70.2" WC (Span)	92.8" WC	+1.0" WC	+1.04" WC	0.96" WC	95.56" WC	Monthly
7	SDV Hi Level-North (RD 87, 88) SCRAM	2 (4)	Gould Foxboro	0-100" WC	60.625" WC	+1.0" WC	+2.338" WC	0.78" WC	93.29" WC	Monthly
8	SDV Hi Level-South (RD 91, 92) SCRAM	2 (4)	Gould Foxboro	0-100" WC	60.625" WC	+1.0" WC	+2.338" WC	0.80" WC	93.29" WC	Monthly
9	SDV Hi Level-North (RD 86) Rod Block	1	Gould Foxboro	0-100" WC	(18") 29" WC *	+1.9" WC	+1.9" WC	1.42" WC	45.04" WC	Monthly
10	SDV Hi Level-South (RD 90) Rod Block	1	Gould Foxboro	0-100" WC	(18") 29" WC *	+1.9" WC	+1.9" WC	0.79" WC	45.04" WC	Monthly
11	MSL Hi Flow (RE22) Reactor Isol.	8	Barton	0-200 psid	87.5 psid	+2.5 psid	+1.14 psid	7.66 psid	96.5" psid	Monthly
12	Rx Lo-Lo-Lo Water (RE18) ADS Actuation	4	Barton	0-145" WC	117.0" WC	+2.0" WC	+1.12" WC	7.80" WC	126.4" WC	Monthly
13	Rx Bldg. to Torus Diff. Press. (DPS66) Open Vacuum Brkr.	2	SOR	5-40" WC	11.07" WC	+1.38" WC	+0.63" WC	1.75" WC	13.84" WC	Quarterly
14	Drywell Hi Press. (RV 46) Core Spray, ADS, SBGTS Initiation	4	Barton	0-10 psig	2.9 psig	+0.1 psig	+0.042 psig	0.37 psig	3.5 psig	Monthly

NOTE 1: The setpoint plus the Calibration Tolerance and the Historical Drift represents the maxium anticipated value of the drifted setpoint.

* The value specified within the parenthesis is the actual instrument setpoint which corresponds to the number outside the parenthesis for T.S. comparisons. This difference is due to the instrument tap location on the SDIV.

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ATTACHMENT II
TECHNICAL SPECIFICATIONS INSTRUMENT LOOPS

GROUP II

	Instrument (Tag) & Function	Numb. of Channels	Manuf.	Range	Setpoint	Calib. Tolerance	Historical Drift	Tech. Spec. Limit	Surveil-lance Freq.
1	Drywell Hi Press. (RE04) SCRAM, Contain. Isol.	4	SOR	0-10 psig	2.9 psig	+0.1 psig	+0.062 psig	3.5 psig	Monthly
2	MSL Tunnel Hi Temp. (IB10) Rx Isolation	16	Fenwal	100°-600°F	178°F	+2°F	+18.20°F	200°F	Refuel
3	Rx Lo Press. (RE17) Core Spray Permiss-ive Injection Valve	4	Barksdale	50-1200 psig	300 psig	-5 psig	-11.88 psig	285 psig	Monthly
4	Drywell Hi Pess. (IP15) Contain. Spray Initiation	4	Barton	0-10 psig	2.9 psig	+0.1 psig	+ 0.62 psig	+3.5 psig	Monthly
5	IC Hi Flow-Steam (IB05) IC Isolation	4	Barton	0-50 psid	15 psid	+0.5 psid	+ 5.75 psid	20 psid	Quarterly
6	IC Hi Flow-Condensate (IB11) IC Isolation	4	Barton	0-60" WC	24" WC	+0.5" WC	+ 6.59" WC	27" WC	Quarterly
7	Rx Press. Lo (RE16) RPS Operat. Bypass	2	Barksdale	50-1200 psig	584 psig 582 psig	+5 psig	+38.59 psig	608.34 psig 606.1 psig	Refuel
8	Rx Hi Press. (IA83) Open EMRV	5							
		A	Barksdale	50-1200 psig	1069	2.5	15.23	1079.15	Monthly
		B	Barksdale	50-1200 psig	1094	2.5	13.08	1104.5	Monthly
		C	Barksdale	50-1200 psig	1086	2.5	13.35	1096.8	Monthly
		D	Barksdale	50-1200 psig	1072	2.5	13.92	1082.2	Monthly
		E	Barksdale	50-1200 psig	1092	2.5	10.47	1102.2	Monthly

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ATTACHMENT II
TECHNICAL SPECIFICATIONS INSTRUMENT LOOPS

GROUP III

	Instrument (Tag) & Function	Numb. of Channels	Manuf.	Range	Setpoint	Calib. Tolerance	Historical Drift	Tech. Spec. Limit	Surveil-lance Freq.
1	MSL Lo Press. (RE23) Rx Isolation	4	Melotron	25-1400 psig	854 psig	-2.0 psig	-17.36 psig	834.6 psig	Monthly
2	Recirc. Flow Hi (RI03) SCRAM	2	GEMAC	0-125%	115%	+0%	+ 1.31%	117%	Refuel
3	APRM Downscale (RI02) Rod Block	8	GE	0-150%	4%	-1%	*-0.035%/wk	2%	Weekly
4	IRM Downscale (RH01) Rod Block	8	GE	0-125%	7%	-1.0%	*-0 %/wk	5%	Weekly, each startup
5	SRM Upscale (RG07) Rod Block	4	GE	0.1-10xE5 counts/sec	1.0xE5 counts/sec	+0.1xE5 counts/sec	N/A counts/sec	5.0xE5 counts/sec	Weekly, each startup
6	SRM Downscale (RG07) Rod Block	4	GE	0.1-10xE5 counts/sec	500 counts/sec	-100 counts/sec	N/A counts/sec	100 counts/sec	Weekly, each startup
7	MSL Hi Radiation (RN06) SCRAM	4	GE	1-2xE6 mR/Hr	600 mR/Hr	+100 mR/Hr	+47.13 mR/Hr	850 mR/Hr	Weekly, Quarterly
8	Rx Bldg. Operating Floor Hi Radiation (RO14) SBGTS Initiation	2	GE	0.1-10xE3 mR/Hr	70 mR/Hr	+10 mR/Hr	+13.00 mR/Hr	100 mR/Hr	Weekly, Quarterly
9	Rx Bldg. Vent. Hi Radiation (RN04) SBGTS Initiation	2	GE	0.1-10xE3 mR/Hr	13 mR/Hr	+1 mR/Hr	+2.21 mR/Hr	17 mR/Hr	Weekly, Quarterly
10	Drywell Hi Radiation (CHRRM) Contain. Vent/Purge Isolation	2	Victoreen	1.0-1.0E7 R/Hr	45 R/Hr	+8 R/Hr	--	74.6 R/Hr	Refuel

* Based on Analysis described in Attachment I, Group III, Loops 3 and 4.

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ATTACHMENT II
TECHNICAL SPECIFICATIONS INSTRUMENT LOOPS

GROUP IV

	Instrument (Tag) & Function	Numb. of Channels	Manuf.	Range	Setpoint	Calib. Tolerance	Historical Drift	Tech. Spec. Limit	Surveil-lance Freq.
1	Gen. Load Rejection (PSL) SCRAM	4	GE	30-300 psig	183 psig	-2 psig	-3.30 psig	**	Quarterly
2	Main Conden. Lo Vacuum (RSCS) SCRAM data)	4	GE	0-30" Hg Vacuum	23.65" Hg Vacuum	-0" Hg Vac	-0.52" Hg Vacuum	23" Hg. Vacuum	Refuel
3	APRM Upscale (RI02) SCRAM	8	GE	0-150%	114%	+1%	*+0.025%/wk	115.7%	Weekly/ Refuel
4	APRM Upscale (RI02) Rod Block	8	GE	0-150%	106.5%	+1%	*+0 %/wk	108%	Weekly
5	IRM Upscale (RH01) SCRAM	8	GE	0-125%	118%	+1.0%	*+0 %/wk	120%	Weekly, each startup
6	IRM Upscale (RH01) Rod Block	8	GE	0-125%	106%	+1.0%	*+0.036%/wk	108%	Weekly, each startup
7	Off-Gas Hi Radiation (RN12) Off-Gas Isolation	2	GE	1-10E6 mR/Hr	1.5xE4 mR/Hr	+0 mR/Hr	0 mR/Hr	1.5xE4 mR/Hr	Weekly, Refuel

*Based on Analysis described in Attachment 1, Group III, Loops 3 and 4.
**No Technical Specification exists. Instrument Loop initiates upon loss of oil pressure from the turbine acceleration relay.

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ATTACHMENT III

GPUN Engineering Standard
ES-002
Instrument Error Calculation
and Setpoint Determination

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