LILCO
LONG ISLAND LIGHTING

LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

July 10, 1981

SNRC-591

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SHOREHAM NUCLEAR POWER STATION - Unit 1
Docket No. 50-322

Dear Mr. Denton:

Enclosed herewith are sixty (60) copies of LILCO responses to specific NRC concerns which were previously identified as requiring additional information to complete NRC review. Attachment A provides a list of the specific responses included.

If you require additional information or clarification, please do not hesitate to contact this office.

Very truly yours,

M. S. Pollock

M. S. Pollock
Vice President - Nuclear

RCW/mh

Enclosures

cc: J. Higgins

B001
S1/1

ATTACHMENT A

Responses to the following are enclosed:

1. Clarification for SER Open Item No. 26 - Suppression Pool Bypass.

2. Supplemental Information for SER Open Item No. 38 - Containment Pressure Boundary Materials.

3. Clarification to NUREG-0737 Item II.E.4.1 - Containment Dedicated Penetrations.

4. NUREG-0737 Item II.D.3 - Relief and Safety Valves Position Indication.

5. Supplemental Information for NUREG-0737 Item II.K.1.22 - Auxiliary Heat Removal System Procedures.

Clarification for SER Open Item No. 26 - Suppression Pool Bypass

Vacuum breaker leakage will be included when determining if the acceptance criteria (10% of $A\sqrt{K} = 0.9ft^2$) is met for the preoperational high pressure leakage test. At this time, however, a decision has not been made whether to expose the downstream side of the vacuum breakers to the test pressure or to test them separately.

SUPPLEMENTAL INFORMATION FOR SER OPEN ITEM NO. 38-

CONTAINMENT PRESSURE BOUNDARY MATERIALS

1. Mill test report for containment top head flange ring

2. Heat treatment chart (normalizing) for Main Steam Isolation Valve 1B*21AOV-082

3. Mill test report for the sleeve material for main feedwater penetration X-2A

4. Main steam isolation valve body wall thickness

This document should also serve to confirm that the outboard isolation valves for the main steam and main feedwater systems are welded directly to the containment penetration process pipe with no intervening pipe spools. Two branch connections are welded to each feedwater line penetration process pipe (3/4" size). In addition, each outbard main steam isolation valve has a 2" branch connection welded to it on the upstream side of the valve. The small size of these lines excludes them from consideration relative to brittle fracture.

• Fiske ... h-Doe Mines Steel Co.
Mr. Jack McCarthy

1009 3

COALESVILLE, PA. 19320
TEST CERTIFICATE

DATE: 6-11-71
CONSIGNEE:

TOP HEAD FLANGE
23C RL

MILL ORDER NO.	CUSTOMERS P.O.	
48942-8	631-4	EZ 6471 EM

SPECIFICATIONS
SA-516-GR Gr. 70 SA-516-68 Cl 1 Mod. by P.D.M. KS-7.13 Sect VIII Div. 1 1969 Summer Addenda
Sect III Cl B 1968

BEND TEST O.K. HOMOGENEITY TEST

CHEMICAL ANALYSIS

MELT NO.	C	MN	P	S	CU	SI	NI	CR	MO	V	TI	AL	B		Grain Size
3[illegible]	27	93	010	020		23									7-8

PHYSICAL PROPERTIES

MELT NO.	SEAM NO.	YIELD PSI X 1000	TENSILE PSI X 1000	% ELONG IN 2"	% R.A.	BHN	IMPACTS Charpy V-notch 0°F.			Fracture Appearance % Shear	DESCRIPTION
3[illegible]	2	390	730	30			41	43	48	30-30-30	1-30C x 57 x 5-3/4"
							Lateral Expansion in Inches				
							.036	.031	.039		

[illegible]ate and [illegible]ste norm. 1650°F[illegible]25°F., hold 1/2 hour per inch min. [illegible]d air cooled.

[illegible]ste stress relieved by heating within a rate of 100°F. per hr. [illegible]1150°F[illegible]25°F., hold [illegible]1-1/2 hours and furnace cooled within a [illegible]te of 100°F. per hr. to 600°F.

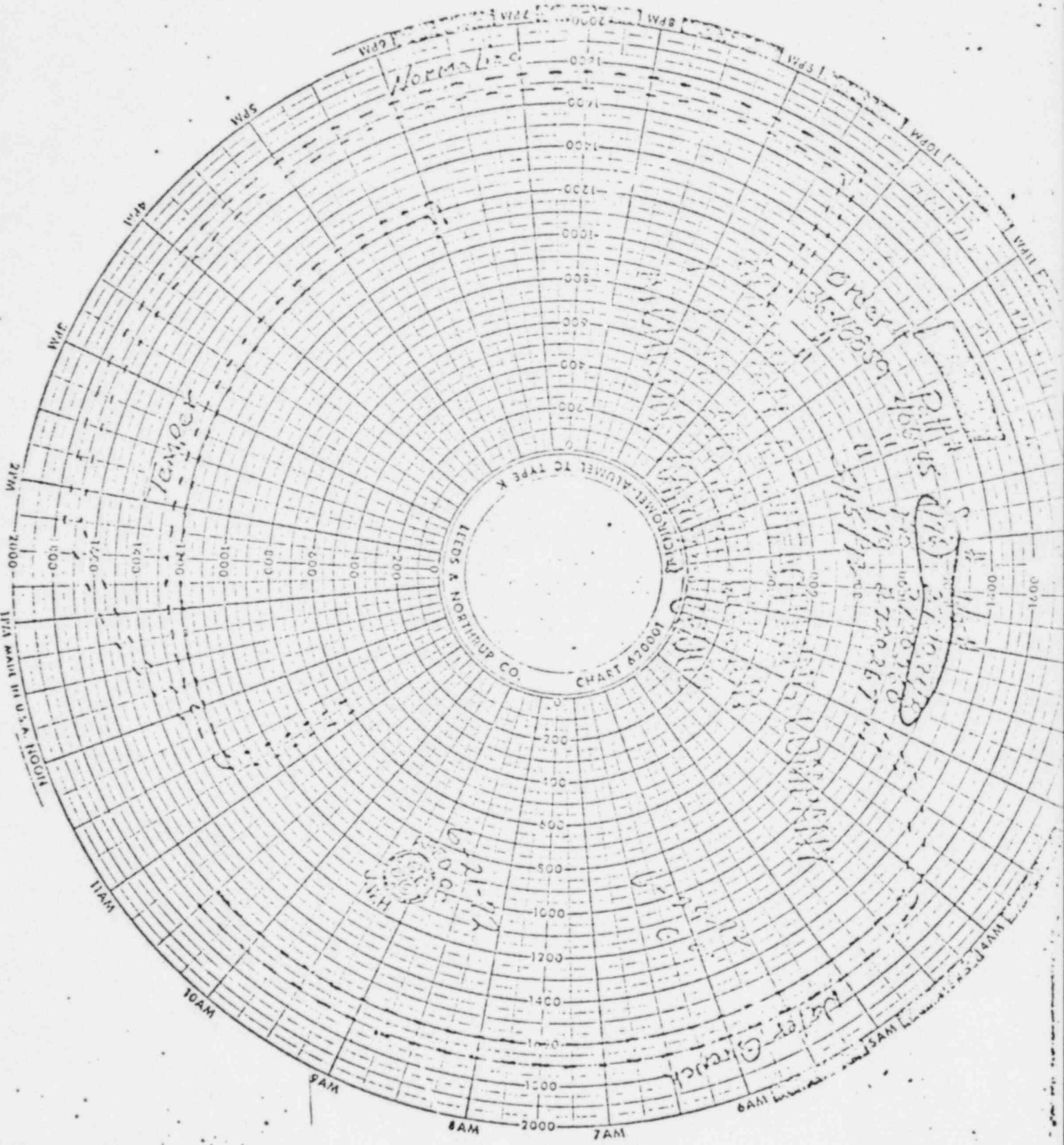
REFERENCE LILCO P.O. 310103

R. Levy 6/8/71

ATTACHMENT 1

I hereby certify the above figures are correct as contained in the records of the company.

SUPERVISOR TESTING C. A. Kline



1B21*AOV-082C

3,502 P-1A

United States Steel Corporation 10093 REFERENCE LTLCO P.O. SH 2.1

SLEEVE MTL.

REPORT OF PLATES

FOR PENT X-2A FEEDWATER

NORTHWESTERN DISTRICT U.S.S. ORDER NO. L002665 LOAD TALLY OR INVOICE NO. 163-36154

BUYER ORDER NO. 3 [illegible]-2 1/13/71

TRUCK NO. PC 56539 SHIPPER NO. & DATE 43870 3/25/71 160

PURCHASING DEPT. 40a

PITTSBURGH DES MOINES STL CO
EMILLE ISLAND BRANCH
ITTSBURGH PA 15225

SHIP TO

PITTSBURGH DES MOINES STL CO
DEVILLE ISLAND PA

WE HEREBY CERTIFY THAT THE CHEMICAL ANALYSIS AND/OR TESTS SHOWN IN THIS REPORT ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

SIGNATURE M. E. HAYSOM, CH. MET.

DATE 3/25/71

ASTM-A387-GR-PRESSURE-VESSEL-QUAL-GRADE-B-NORMALIZED-TEMPER-TO-PDS SPEC-PDS-10.6-REV-11/3/70-CHARPY-IMP-V-NTCH-20FT/LBS-AT-MINUS-50-DEG-F-TESTS

C08304

ALL CERT T/R LABLE TEST RESULTS PER SPEC FURNACE CHARTS ATTACHED TO T/R 6 T/R TO STORE 2 WEBSTER ENGINEER ING CORP PO BOX 232 35 BOSTON MASS 02107 ATTN MC SHEPHERD TELE 617-434-7224 TR 3

0612

ITEM NO.	HEAT NO.	TEST OR PIECE IDENTITY NO.	MATERIAL DESCRIPTION: NO. PCS.	THICKNESS OR SECTION	WIDTH, DIA. OR FT. WT.	LENGTH	WEIGHT	YIELD PT. PSI.	TENSILE STR. PSI.	ELONGATION %: IN 8"	ELONGATION %: IN 2"	% RED. OF AREA
11	6[illegible]962	2577496 EC TC	1	1/2	94	314	4180	* 75100	90100		26.0	
								* 77000	88100		22.0	
	Longitudinal V Notch Charpy Impact Tests 10 x 10 MM Made at Minus 50 Deg F. 102-92-89 Ft Lbs.											
	% Shear Rate - 100-100-100 and Lateral Expansion - .072-.070-.062 Mils.											
	LATERAL EXPANSION AND PERCENT SHEAR FOR INFORMATION ONLY.											
12	6[illegible]962	2577496 EC TC	1	1/2	94	396	5273	* 81300	91400		26.0	
								* 77100	89500		28.0	
	Longitudinal V Notch Charpy Impact Tests 10 x 10 MM Made at Minus 50 Deg F. 83-85-96 Ft Lbs.											
	% Shear Rate - 100-90-100 and Lateral Expansion - .057-.062 -.065 Mils.											
	LATERAL EXPANSION AND PERCENT SHEAR FOR INFORMATION ONLY.											
					Furnace charts attached to test reports - 3/31/71							

* MIDD POINT @ .0050 INT.

EN SIZE TESTED ACCORDING TO COMPANY RECORDS CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATION LISTED ABOVE

* B OR H INDICATE COMPLIANCE OF BEND OR HOMO TESTS, RESPECTIVELY

HEAT NO.	TYPE	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	Al	N	V	B	Ti	Cb	Ca
[illegible]962	[illegible]	23	133	.014	022	32	23	20	10	03								

Grain Size #8 FINE GRAIN

R. Faz 4-7-71

ATTACHMENT 3

LFR 10

Attachment 4

Rockwell
MANUFACTURING COMPANY

400 N. LEXINGTON AVENUE • PITTSBURGH, PENNSYLVANIA 15208 • TELEPHONE: (412) 241-8100

CUSTOMER REPORT

Department 40-8648
Report No. 2764-02-0[illegible]
REV. A

SUBJECT

Calculation for Rockwell-Edward 24X20X24 Fig. 1612 JIMMY Flite-Flow valve. Per General Electric, P.O. No. AB-317
Specification No. 21A1330 REV 1
731E615 REV 2
Plant: LILCO
Mark No. B21-F022, B21-F028

RECEIVED
MAR 11 1974
ALB DIVISION

ABSTRACT

This analysis demonstrates that the subject valve fulfills all design requirements relative to stress levels from seismic loads (0.6 G vertical and 1.5 G horizontal) and functional performance. Calculations were based on the maximum operating conditions of 1250 psi @ 575°F and environmental conditions of 77 psi @ 310°F. Allowable stresses were determined from Section III or VIII of the ASME Code.

AUTHOR [signature] APPROVED [signature]

TITLE [illegible] Engg. APPROVED _____

DATE FEB 2, 1971

KEY WORDS

General Electric, Seismic, Balanced Valve, Design Calculation

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GENERAL ELECTRIC
Atomic Power Equipment Department
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Reviewed by [signature]
Date 3/21/74
VPF No. 2743-60-3

Revision 2 2/18/74-TEK

Revised 1/20/71 - TEK

Note: Revisions marked by line on right side of page.

I. INTRODUCTION

The Rockwell-Edward 24 X 20 X 24 inch Fig. 1612 JIMMY is equipped with an air cylinder operator for opening and closing the valve. Springs are incorporated which will close the valve with or without air cylinder assist.

A hydraulic cylinder is incorporated in the system which provides the speed control function. This control is provided by use of pressure compensated adjustable flow control valves. These valves provide a constant stem speed throughout the stroke of the valve during flowing and non-flowing conditions.

The valve design allows removal of the entire yoke assembly (cylinders, springs, etc), as a unit in a minimum of space. The cylinders can be removed without unloading the springs. The spring flange is not directly connected to the stem coupling thus allowing the air cylinder to close the valve even if springs have failed causing binding of the spring guides or the safety pins are inadvertently left in the yoke tubes.

This report covers all the design and performance analyses required by G-E specifications.

II. BODY MINIMUM WALL THICKNESS

The design condition as given in the GE specification is 1250 psi @ 575°F. The equivalent primary service pressure rating is 655. Since this is a basic 20" valve with 24" ends, two areas will be checked for minimum wall thickness.

One check is where the largest inside diameter to thickness occurs. This is in the guide rib area of the valve neck where the diameter is 18.77 inches.

The second check is near the weld ends, where the diameter is 21.83 inches (assumed equal to the pipe inside diameter).

The actual wall thickness should be greater or equal to the value obtained from the following equation.

$$t = 1.5 \left[\frac{Pd}{2S - 1.2P} \right] + C$$

where:

t = calculated thickness, in inches

P = primary service pressure rating
= 655 psi

d = I.D. of valve where calculation is made

S = stress = 7000 psi

C = corrosion allowance = 0.120 inches

	Near Weld End	Neck Section
Actual Thickness		
Casting nominal minimum t	2.50"	2.31"
Core shift allowance	- .25"	- .25"
	2.25"	2.06"
maximum material machined	- 0.0"	- .55"
Actual minimum wall thickness	2.25"	1.51"
Required Thickness		
d =	21.83"	18.77"
t =	$1.5\left[\frac{.655(21.83)}{2(7000)-1.2(655)}\right]+.12$	$1.5\left[\frac{.655(18.77)}{2(7000)-1.2(655)}\right]+.12$
t required =	1.74"	1.51"

In both cases the actual minimum pressure containing wall thickness is equal to or greater than the required minimum wall thickness.

III. DISK STRESS

General Electric Company engineering data sheet No. H1165-5 recommended the use of equations from Chapter X, "Formulas for Stress and Strain" by Roark, for calculating disk stresses. A summation of Case 13 and 14 is used for determining tangential stress at the pilot seat diameter. Since the disk thickness varies, an average thickness of the shaded portion (shown in Figure 1) of 5.18 inches is used for "t" in the equation.

In addition, Case 22 is used to determine stresses where a reduced thickness is incorporated to increase the disk flexibility at the seating area, thickness used for calculation is an average of this cross hatched area shown in the disk sketch. This average thickness is 2.32 inches.

"Roark", Chapter X, Case 13.

$$S_t = -\frac{3w}{4mt^2(a^2-b^2)}\left[a^4(3m+1)+b^4(m-1)-4ma^2b^2-4(m+1)a^2b^2\log\frac{a}{b}\right]$$

where: w = 1250 psi b = 2.48 in.
m = 3.3 t = 5.18 in.
a = 9.25 in.

Clarification to NUREG 0737 item II.E.4.1 - Containment Dedicated Penetrations

Isolation valves for the primary containment penetrations serving the hydrogen recombiners are administratively controlled by means of keylock control switches in the main control room.

II.D.3 Relief and Safety Valves Position Indication

NRC Position

Reactor coolant system relief and safety valves shall be provided with a positive indication in the control room derived from a reliable valve-position detection device or a reliable indication of flow in the discharge pipe. The paragraphs that follow clarify the above position.

The basic requirement is to provide the operator with unambiguous indication of valve position (open or closed) so that appropriate operator actions can be taken. The valve position should be indicated in the control room and an alarm should be provided in conjunction with this indication.

The valve position indication may be safety grade. If the position indication is not safety grade, a reliable single-channel direct indication powered from a vital instrument bus may be provided if backup methods of determining a valve position are available and are discussed in the emergency procedures as an aid to operator diagnosis of an action.

The valve position indication should be seismically qualified consistent with the component or system to which it is attached. It also should be qualified for its appropriate environment (any transient or accident which would cause the relief or safety valve to lift) and in accordance with Commission Order, May 23rd, 1980 (CLI-20-81).

It is important that the displays and controls added to the control room as a result of this requirement not increase the potential for operator error. A human-factor analysis should be performed taking into consideration:

the use of this information by an operator during both normal and abnormal plant conditions,

integration into emergency procedures,

integration into operator training, and

other alarms during emergency and need for prioritization of alarms.

LILCO Position

There are a total of eleven (11) dual function safety relief valves (SRV) in the Shoreham Reactor System. The SRVs

installed in this facility are of the Target Rock two-stage pilot operated design. Direct main stem position indication is not accessible in a valve of this type. Accordingly, positive position indication is provided utilizing pressure transmitters on each SRV discharge line.

The discharge of each SRV is independently piped to approximately five (5) feet from the bottom of the suppression pool. The calculated steady state pressure near the valve discharge is in the range of 300 psig when the valve relieves at set pressure. This pressure is sufficiently high that a positive and unambiguous signal is available with ample margin for tolerances in calibration and variance in line pressure. When a valve recloses, pressure will return to normal in a fraction of a second. Thus, pressure measurement does not have the slow response time which characterizes discharge pipe temperature monitoring instrumentation. Since each valve discharge is independently piped, the pressure signal provides unique indication for the associated valve.

Nonredundant safety-grade instrumentation is provided to monitor pressure in the discharge pipe of each SRV. The transmitters are located in the secondary containment and connected to the SRV discharge piping by instrument lines penetrating the primary containment. Individual display and trip set point instrumentation is provided for each SRV in the main control room. The range of instrumentation allows for a trip setpoint of 10-50 percent of rated flow. This gives a positive open position indication and also provides sufficient sensitivity to detect a partially open SRV. A common alarm is also provided in the control room to promptly alert the operator when any SRV is open. The display instrumentation is located as close as possible to the SRV control station in the main control room. A human factor analysis was performed to assure that the indicators and alarms are integrated with existing instrumentation in the main control room in a manner to minimize the potential for operator error. In addition, operator training and emergency procedures will address the utilization of these indicators and alarms.

This instrumentation has been qualified in accordance with IEEE 323 for the environment expected during events resulting in SRV discharge to the suppression pool, and it is included in our program to upgrade the qualification of all safety-related equipment to the requirements of NUREG-0588. In addition, it meets Seismic Category I requirements in accordance with IEEE 344-1971 and is powered from a Class 1E power supply.

The existing temperature monitoring instrumentation is retained for its original function, detection of valve leakage conditions as backup/confirmatory indication for the pressure instrumentation.

TMI Item II.K.1.22

NRC Request

Describe why the CRD pumps are tripped on Level 1.

LILCO Response

The control rod drive (CRD) pumps are fed from 4160 V emergency buses 101 and 102. These buses also supply power to the residual heat removal (RHR), core spray (CS), and service water (SW) pumps. Upon a LOCA signal (Reactor Water Low Level 1 and/or Hi Drywell Pressure), the RHR, CS, and SW pumps are sequenced onto the bus. If these pumps are already on the buses and a loss of off-site power occurs, these pumps are stripped from the bus and resequenced on after the buses are re-energized by the emergency diesels. The CRD pumps are also tripped by the above mentioned LOCA signals to facilitate sequencing of the large safety related loads, (RHR, CS, and SW). Manual override is provided to enable the CRD pumps to be restarted 1 minute after the respective diesel generator accepts loads.