BALTIMORE
GAS AND
ELECTRIC

CHARLES CENTER • P. O. BOX 1475 • BALTIMORE, MARYLAND 21203

ARTHUR E. LUNDVALL, JR.
VICE PRESIDENT
SUPPLY

March 14, 1983

Director of Nuclear Reactor Regulation
Attention: Mr. R. A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Calvert Cliffs Nuclear Power Plant
Units Nos. 1 & 2; Dockets Nos. 50-317 and 50-318
TMI Action Plan, Items II.F.1.4, 5, & 6
Post-Implementation Review

Gentlemen:

By your letter of January 11, 1983, you requested information for your post-implementation review of our containment pressure, water level, and hydrogen monitors. Our response is provided as an attachment to this letter.

Please feel free to contact us if you have any additional questions on this subject.

Very truly yours,

A. E. Lundvall Jr.

AEL/MDP/gvg

Attachment

cc: J. A. Biddison, Jr., Esq.
G. F. Trowbridge, Esq.
Mr. D. H. Jaffe, NRC
Mr. R. E. Architzel, NRC

A046

CALVERT CLIFFS NUCLEAR POWER PLANT
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
IN REGARD TO TMI ACTION PLAN ITEM II.F.1

(1) EXCEPTIONS BEING TAKEN TO NUREG-0737 REQUIREMENTS

Question: (1a) Please indicate any exceptions that you plan to take to the NUREG-0737 items in our scope of review. For each exception indicate: (1) why you find it difficult to comply with this item; (2) how this exception will affect the monitor system accuracy, speed, dependability, availability, and utility; (3) if this exception in any way comprises the safety margin that the monitor is supposed to provide; and (4) any extenuating factors that make this exception less deleterious than it appears at face value.

Response: No exceptions are being requested for the NUREG-0737 items listed in the letter except as noted below.

Question: (1b) In your letter of December 15, 1980 from A. E. Lundvall (BG&E) to Darrell G. Eisenhut (NRC) you state that for the containment pressure monitor, data gathering and logging will be performed by the process computer. Describe all the computer outputs for the pressure monitor and give the reasons you feel your system is adequate for post accident pressure monitoring. How accessable is the computer output to the control room operator? Can the computer output be displayed on an existing addressable point strip chart in the control room? How many addressable point strip charts do you have in the control room? During accident conditions would all the addressable point strip charts be monopolized logging other data, and hence be unavailable for pressure monitoring? How far behind real time will your process computer be running under accident conditons? What is the scan frequency of your process computer for the pressure signal? Does your present system have any pressure readout in the control room?

Response:

1) Containment pressure data is logged after an accident by the Technical Support Center (TSC) computer and monitored by the Plant Process computer. Historical data will be available from the TSC computer printer logs and the TSC addressable strip chart recorders. Also, the data will be archived on magnetic tape for later retrieval. On line data will be available from the various TSC peripheral devices, the Plant Process Computer printers, and the control room indicators.

2) The TSC computer printer logs will be available in the TSC, which is adjacent to the control room.

3) Two addressable point strip chart recorders in the control room display outputs from the Plant Process computer. These may be used to display containment presssure. In addition, nine addressable, three-pen strip chart recorders in the TSC display outputs from the TSC computer which may include containment pressure.

4) If during accident conditions all the addressable point strip chart recorders are dedicated to other parameters, the data will still be output to the printer logs and the magnetic tape logs. Trending will be available from the TSC computer peripherals.

5) The TSC computer and the Plant Process computer will be logging in real time under accident conditions.

6) The containment pressure channel is scanned once each second by the TSC computer and once every thirty seconds by the Plant Process computer.

7) The containment presure channels have meter readouts in the control room.

Question: (1c) In your letter of January 19, 1982 from A. E. Lundvall (BG&E) to R. A. Clark (NRC) you state that you are getting erroneous water level indications, but you think you have a fix for the problem which you should be able to implement on Unit 1 in April 1982 and on Unit 2 in October 1982. Has the fix on Unit 1 been completed? Have the erroneous water level indications been corrected? If not, please explain the current status of the problem.

Response: All water level measurement systems have been repaired and are functioning properly as reported in our submittal dated January 21, 1983.

(2) II.F.1.4 - PRESSURE MONITORING SYSTEM (PMS)

Question: (2a) Provide a block diagram of the configuration of modules that make up your PMS. Provide an explanation of any details in the block diagram that might be necessary for an understanding of your PMS accuracy and time response.

Question: (2b) For each module provide a list of all parameters which describe the overall uncertainty in the transfer function of the module.

Response: Refer to Figure 1 for the block diagram and uncertainty parameters for the containment pressure monitoring system.

Question: (2c) Combine parameters in 2b to get an overall system uncertainty. If you have both strip chart recorder and indicator output, give the overall system uncertainty for both systems. If you have systems spanning different ranges, give the overall system uncertainty for each system.

Response: The total maximum uncertainty for channel A is $\pm$ 1.8% and for channel B is $\pm$ 1.2% under normal operating conditions.

Question: (2d) For each module indicate the time response. For modules with a linear transfer function, state either the time constant, τ , or the Ramp Asymptotic Delay Time, RADT.

For modules with an output that varies linearly in time, state the full scale response time. (Most likely the only module you have in this category is the strip chart recorder.)

Response: The time responses for the modules are listed below:

Channel A

ITT Barton Transmitter - 180 msec for 10% to 90% of step function.
Sigma Meter - 2 second nominal full scale response

Channel B

Fischer and Porter transmitters - first order step response time is .03 second.
Sigma Meters - 2 second nominal full scale response

(3) II.F.1.5 - WATER LEVEL MONITORING SYSTEM (WLMS)

Question: (3a) Provide a block diagram of the configuration of modules that make up your WLMS. Provide an explantion of any details in the block diagram that might be necessary for an understanding of your WLMS accuracy.

Question: (3b) For each module provide a list of all parameters which describe the overall uncertainly in the transfer function of that module.

Response: Refer to Figure 2 for the block diagram and uncertainty parameters for the containment water level monitoring system.

Question: (3c) Combine parameters in 3b to get an overall system uncertainty. If you have both strip chart recorder and indicator output, give the overall system uncertainty for both systems. If you have systems spanning different ranges, give the overall system uncertainty for each system.

Response: For normal operating conditions, the total maximum system uncertainty is $\pm$ 1.8%.

(4) II.F.1.6 - HYDROGEN MONITOR SYSTEM (HMS)

Question: (4a) Provide a block diagram of the configuration of modules that make up your HMS. Provide an explanation of any details in the block diagram that might be necessary for an understanding of your HMS accuracy. If you have different types of HMS's give this information for each type.

Question: (4b) For each module provide a list of all parameters which describe the overall uncertainty in the transfer function of that module.

Response: Refer to Figure 3 for the block diagram and uncertainty parameters for the containment hydrogen monitoring system.

Question: (4c) Combine the parameters in 4b to get an overall system uncertainty. If you have both strip chart recorder and indicator output, give the overall system uncertainty for both systems.

Response: The total maximum system uncertainly for the indicator loop is $\pm$ 3.2% and for the strip chart recorder loop is $\pm$ 2.5% under normal conditions.

Question: (4d) Indicate the placement and number of hydrogen monitor intake ports in containment. Indicate any special sampling techniques that are used either to examine one region of containment or to assure that a good cross section of containment is being monitored.

Response: The intake ports for hydrogen sampling are located at six points within each containment. The sample ports are located at the containment north primary shield, the containment west 135 foot elevation, the containment dome 189 foot elevation, the containment east 135 foot elevation, the pressurizer compartment and the containment south primary shield. Each port is sampled for five minutes in a predefined sequence.

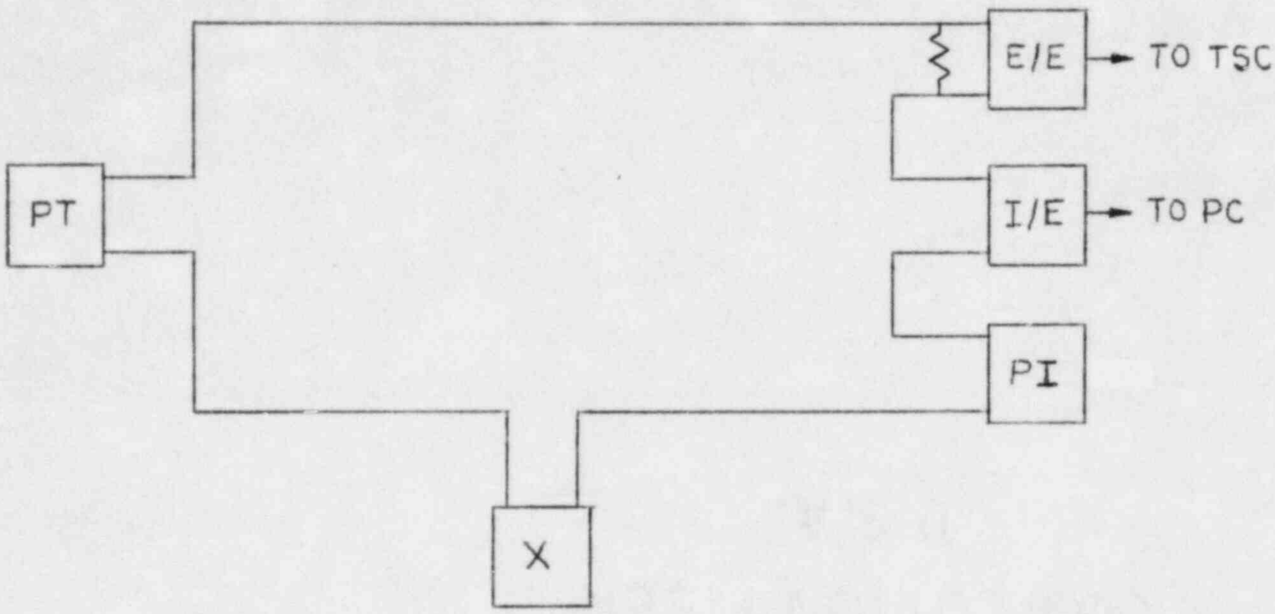
Question: (4e) Are there any obstructions which would prevent hydrogen escaping from the core from reaching the hydrogen sample ports quickly?

Response: No obstructions exist which would prevent the detection of hydrogen in the containment.

FIGURE 1

PRESSURE MONITORING SYSTEM

System Block Diagram for Channel A:



Parameters:

Pressure Transmitter (PT)
ITT Barton Model 764, Tag Numbers 1 (2) PT-5310

calibrated span	=	-5 to 150 psig
Reference accuracy	=	± 0.5% FS
thermal effects	=	± 1.0% FS
long term drift	=	± 1.0% FS
static pressure effects	=	negligible
power supply effects	=	negligible

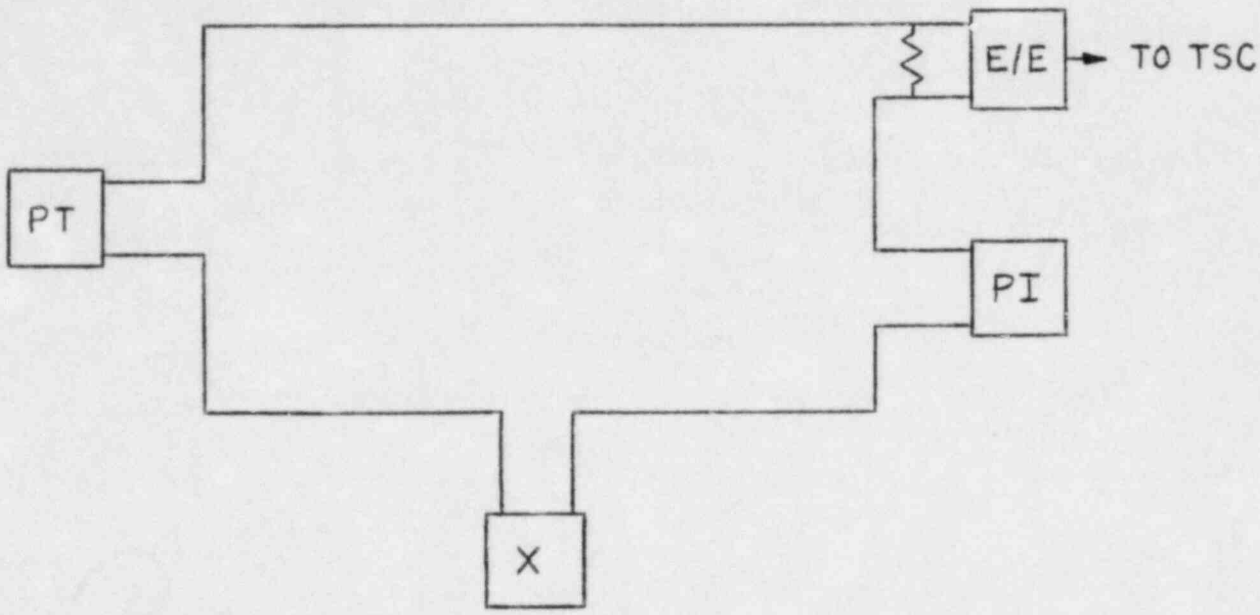
Pressure Indicator (PI)
Sigma Model 9262, Tag numbers 1 (2) PI-5310

span	=	-5 to 150 psig
reference accuracy	=	± 1% FS
deadband and hyteresis	=	± 1/3% FS

FIGURE 1

PRESSURE MONITORING SYSTEM

System Block Diagram for Channel B:



Channel B consists of two loops configured as above with one calibrated 0-150 psig and the other -5 to 5 psig.

Parameters:

Pressure Transmitter (PT)

Fischer & Porter Model 50 EP1071ANS, Tag Nos. 1(2)PT-5307
Fischer & Porter Model 50 EN1021ANS, Tag Nos. 1(2)PT-5308

accuracy	= ± 0.5%
repeatability	= ± 0.1%
deadband	= ± 0.1%
calibrated span	= 0 to 150 psig for 1(2)PT-5307
calibrated span	= -5 to 5 psig for 1(2)PT-5308

Pressure Indicator (PI)

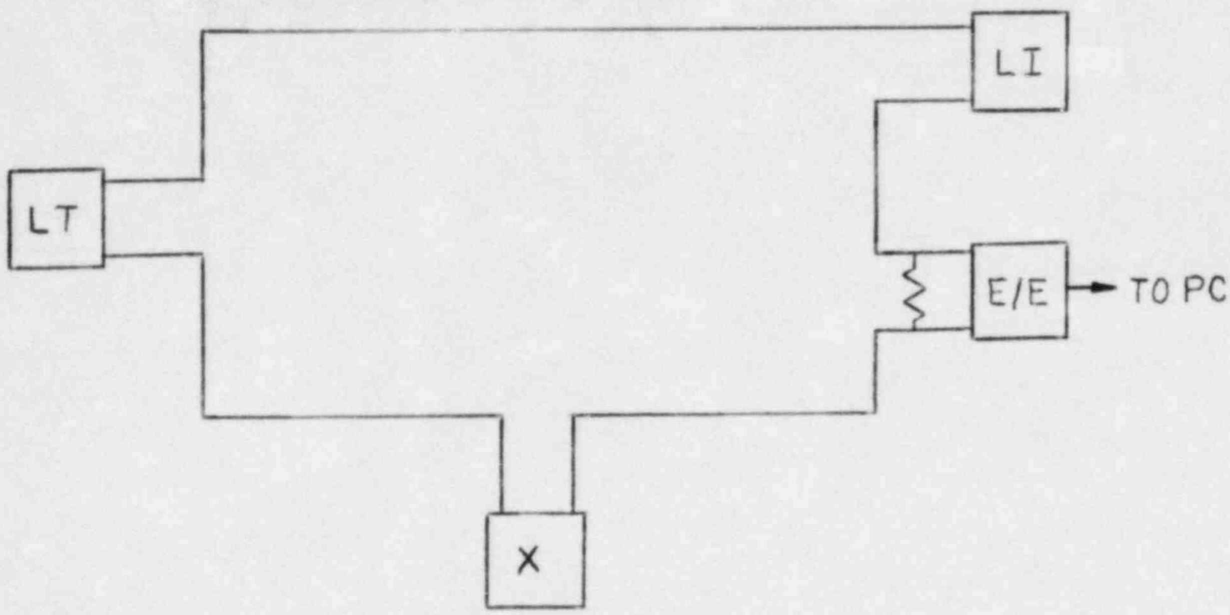
Sigma Model 9262, Tag Nos. 1(2)PI-5307, 1(2)PI-5308

span	= 0 to 150 psig for 1(2)PI-5307
span	= -5 to 5 psig for 1(2)PI-5308
reference accuracy	= ± 1% FS
deadband and hysteresis	= ± 1/3% FS

FIGURE 2

WATER LEVEL MONITORING SYSTEM

System Block Diagram:



Parameters:

Pressure Transmitter (PT)

ITT Barton Model 764, Tag Nos. 1(2) LT-4146, 1 (2) LT-4147

calibrated span	=	0-120 in. H_2O
reference accuracy	=	$\pm$ 0.5% FS
thermal effects	=	$\pm$ 1.0% FS
long term drift	=	$\pm$ 1.0% FS
static pressure effects	=	negligible
power supply effects	=	negligible

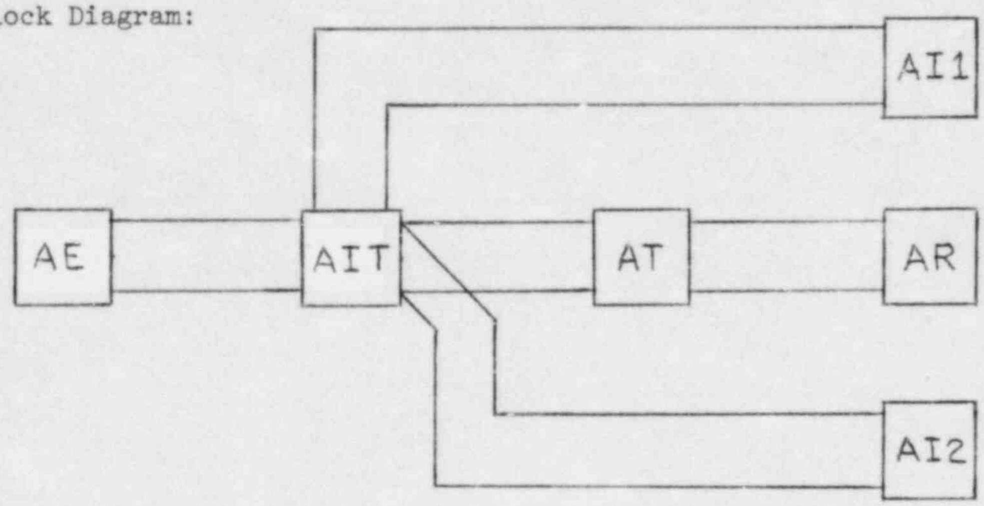
Level Indicator (LI)

Sigma Model 9262, Tag Nos. 1(2)LI-4146, 1(2)LI-4147

span	=	0-120 in. H_2O
reference accuracy	=	$\pm$ 1% FS
deadband and hysteresis	=	$\pm$ 1/3% FS

FIGURE 3
HYDROGEN MONITORING SYSTEM

System Block Diagram:



Parameters:

AE & AIT: Delphi Instruments Model B5, Tag Nos. 0-AE-6519, 0-AE-6527
0-AIT-6519, 0-AIT-6527

accuracy = ± 1%

AT: Comsip, Inc. Model CD-4000 (AGM), Tag Nos. 0-AT-6519A, 0-AT -6527

accuracy - ± 0.5%

AI1 & AI2= API Model 7045-N5-4702-0000

Tag Nos. 0-AI-6519A, 0-AI-6541, 0-AI-6527, 0-AI-6540

accuracy = ± 2%

AR = Tracor Westronics Model D4E, Tag Nos. 0-AR-6519, 0-AR-6527

accuracy = ± 0.5%

Additional uncertainties are present due to the following:

calibration gas concentration = ± 2%

flow of gas through analyzer = ± 1%