NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 666-6911

March 11, 1983

Docket No. 50-213
50-336
B10714

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Reference: (1) D. G. Eisenhut letter to All Licensees of Operating Westinghouse and CE PWR's (Generic Letter No. 82-28) dated December 10, 1982.

Haddam Neck Plant
Millstone Unit No. 2
Inadequate Core Cooling Instrumentation System

In the referenced letter, the NRC requested that licensees submit information concerning the Inadequate Core Cooling (ICC) Instrumentation System pursuant to 10 CFR 50.54 (f) by March 10, 1983. Specifically, the Staff requested that each licensee identify the reactor coolant inventory tracking system selected; provide schedules for engineering, procurement and installation; review the status of conformance of all ICC instrumentation with the recommendation of NUREG-0737 Item II.F.2 and complete the design summary checklist attached to the referenced letter.

In response to the Staff's request, Connecticut Yankee Atomic Power Company (CYAPCO), on behalf of the Haddam Neck Plant, and Northeast Nuclear Energy Company (NNECO), on behalf of Millstone Unit No. 2, present the information contained herein.

Attachment 1 contains a description of the ICC Instrument System which is presently installed or planned at Haddam Neck. Appendix 1 contains the design summary checklist for Haddam Neck. Attachment 2 and Appendix 2 contain similar information for Millstone Unit No. 2.

The Core Exit Thermocouples (CET) and Subcooled Margin Monitors (SMM) have been installed or upgraded as described in Attachments 1 and 2, and CYAPCO and NNECO currently plan to install a reactor coolant inventory tracking system during the 1984 refueling outages. These outages are presently scheduled for June 1984 for Haddam Neck and October 1984 for Millstone Unit No. 2.

A002
3/A0

Both CYAPCO and NNECO have selected the Combustion Engineering Heated Junction Thermocouples(HJTC) for their reactor coolant inventory tracking system. These systems have been ordered for both plants and delivery is expected later in 1983. In addition, the required cabling to support this system has been installed from the reactor vessel head to the containment penetration at the Haddam Neck Plant as part of the head area cable upgrade.

CYAPCO and NNECO are continuing to monitor and evaluate industry and research developments which could result in an inventory monitoring system which is more effective and less expensive than the presently planned system. Should future developments warrant a change in our course of action, CYAPCO and NNECO will inform the Staff.

One issue not addressed in this submittal concerns the displays for ICC Instrumentation. Since ICC instrumentation readouts and data acquisition are an integral part of the Safety Parameter Display System (SPDS), CYAPCO and NNECO intend to address this issue in our response to Generic Letter 82-33 on April 15, 1983. As such, the inservice date for the entire system cannot be established until an integrated review of all related upgrades is completed.

We trust that the information contained in this letter and its attachments is responsive to your request. If you have any additional requirements, please feel free to contact my staff.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY,

W. G. Counsil
W. G. Counsil
Senior Vice President

STATE OF CONNECTICUT)
) ss. Berlin
COUNTY OF HARTFORD)

Then personally appeared before me W. G. Counsil, who being duly sworn, did state that he is Senior Vice President of Northeast Nuclear Energy Company and Connecticut Yankee Atomic Power Company, Licensees herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Licensees herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Sheila M. Oates
Notary Public
My Commission Expires March 31, 1986

Attachment 1

Haddam Neck Plant

Inadequate Core Cooling Instrumentation

CONNECTICUT YANKEE

In response to NUREG 0737 recommendations for detection of inadequate core cooling (ICC), Connecticut Yankee Atomic Power Company (CYAPCO), licensee of the Haddam Neck Plant, docketed its position on the installation of additional instrumentation for providing an unambiguous indication of approach to ICC in Reference 1. On December 10, 1982, the NRC Staff fowarded generic letter 82-28 (Reference 2) which outlined the requirements for the installation of additional instrumentation for detection of ICC. Reference 2 requires CYAPCO to provide the documentation of the proposed instrumentation system and installation schedule by March 10, 1983.

Presently installed instrumentation at the Haddam Neck Plant can provide an indication of ICC as the event progresses. CYAPCO has concluded, however, that a reactor vessel water level system (RVWLS) that provides an unambiguous indication of coolant inventory above the core would be a valuable tool for following the progression of the level in the upper plenum down to the top of the core.

CYAPCO has evaluated the RVWLS's offered by the various vendors and has concluded that Combustion Engineering's HJTC provides the best available system for monitoring indications of coolant inventory above the core under simulated accident conditions. Connecticut Yankee has evaluated the feasibility of installation of Combustion Engineering's HJTC for the Haddam Neck Plant, and has issued a purchase order to Combustion Engineering for the HJTC system's procurement.

The reactor vessel liquid inventory above the core and the fluid conditions at various locations in the primary system will be measured by the following:

1. Subcooled Margin Monitor (SMM)*.

2. Heated Junction Thermocouple (HJTC).

3. Core Exit Thermocouples (CET)*.

*Existing systems.

These instruments collectively comprise the ICC system as documented in Reference 1. The associated ICC display package will be addressed in response to generic letter 82-33 (Reference 4) by April 15, 1983.

Detailed information on the existing sensors is presented in the following sections.

Subcooled Margin Monitor (SMM)

The subcooled margin monitor for Connecticut Yankee is a Combustion Engineering monitor described in Reference 1. Five in-core thermocouples are used for temperature inputs (range: 100°F-904°F) and two reactor coolant system pressure (range: 0-3000 psig) are used for pressure input.

The subcooled margin monitor takes analog input signals (1-5V) and converts them to digital signals. The highest temperature and the lowest pressure are selected by auctioneering devices and the corresponding saturated pressure and saturated temperature are calculated by a microcomputer which contains steam tables and interpolation routines.

The saturated temperature and pressure are then compared with the actual process temperature and the pressure and margin from saturation conditions is calculated.

The subcooled margin monitor can display upon selection, either the temperature margin or pressure margin. When the temperature margin in below 25°F an alarm is initiated.

The inputs to the subcooled margin monitor are electrically isolated from the instrumentation loops that they are derived from, by a qualified (Devar) isolation device.

Only one subcooled margin monitor is installed. As a backup other existing instrumentation is utilized with steam tables and plant procedures.

The subcooled margin monitor range will be increased to include a superheat steam condition and will be upgraded upon completion of the ICC system display. (Reference 4).

For more detailed information, please refer to Reference 1.

Core Exit Thermocouples (CET)

The Haddam Neck Plant has forty-eight (48) core exit, Type K, chromel-alumel, thermocouples, forty (40) of which are located in one quadrant. The reminaing eight (8) core exit thermocouples are located in the other three quadrants. It is CYAPCO's conclusion that during the progression of events leading to ICC, the core exit thermocouples temperature from one quadrant would be representative of the temperature profile across the full core at the core exit thermocouple elevation. The core exit thermocouple system has been upgraded to IEEE-323-1974 and IEEE-344-1975 inside containment including the containment penetrations. Documentation is still pending formal submittal from the vendor (CE). The part of the system outside containment is presently under review.

Presently, the core exit thermocouple signals are fed directly to the plant computer and subcooled margin monitor. A printout map may be called for at any time by the operator. The range is from 100°F to 904°F at the present time. NUREG 0737 indicates that the core exit thermocouple should be able to read to 1800°F or more. The range and display capabilities will be evaluated and will be addressed in response to generic letter 82-33 by April 15, 1983.

Heated Junction Thermocouples (HJTC)

Combustion Engineering's HJTC system has undergone extensive testing through Combustion Engineering sponsored test programs.

The HJTC test program was submitted to the NRC per Reference 1 and test results along with further qualifications (Reference 3) were submitted to D. M. Crutchfield on June 1, 1982. Connecticut Yankee has planned installation of the HJTC during the next available refueling outage (June 1984) barring unforeseen circumstances.

The checklist provided in Reference (2) has been completed and the results are contained in Appendix 1.

REFERENCES

1. W. G. Counsil letter to D. G. Eisenhut, dated December 31, 1980.

2. Generic Letter 82-28, dated December 10, 1982.

3. CEOG Letter from K. Baskin (CEOG) to D. M. Crutchfield (NRC), dated June 1, 1982.

4. Generic Letter 82-33, dated December 17, 1982.

APPENDIX I

Checklist
for Plant Specific Review of
Inadequate Core Cooling (ICC) Instrumentation System

For HADDAM NECK PLANT Docket No. 50-213

Operated by: CONNECTICUT YANKEE ATOMIC POWER COMPANY

The following items for review are taken from NUREG-0737, pp II.F.2-3, and 4. Responses should be made to full requirements in NUREG-0737, not abbreviated forms below. Applicants should provide reference to either the applicant's submittal or the generic description under the column labled "Reference." These items are required to be reviewed on a plant specific basis by NUREG-0737 for all plants. Differences from the generic descriptions provided by Westinghouse, the Westinghouse Owner's Group, Combustion Engineering, or Combustion Engineering Owner's Group must be indicated by "yes or no" in the column labled deviations and must be justified. Under the Column labeled schedule, either indicate that your documentation of the item is complete or provide a proposed schedule for your submittal.

	Reference	Deviations	Schedule
1. Description of the proposed final system including: a. a final design description of additional instrumentation and displays; b. detailed description of existing instrumentation systems. c. description of completed or planned modifications.	1. CEN-185 (SECTION 3.1.2) 2. CEN-181 (QUESTIONS 4, 7, 8, & 11) 3. REFERENCE 3 QUESTION 1 ATTACHMENT 1 ATTACHMENT 1		
2. A design analysis and evaluation of inventory trend instrumentation, and test data to support design in item 1.	1. CEN-181, QUESTION 2 2. CEN-185 (APPENDIX A) 3. CEN-185 (SECTION 6) & SUPPLEMENTS 1, 2, & 3 4. REFERENCE 3, QUESTIONS 1, 2, 3, 4		
3. Description of tests planned and results of tests completed for evaluation, qualification, and calibration of additional instrumentation.	1. CEN-185 (SECTION 5) 2. CEN-185 (SUPPLEMENTS 1, 2, & 3) 3. CEN-181 QUESTION 12		

* ON THIS PAGE THERE ARE NO DEVIATIONS.

	DEVIATIONS
4. Provide a table or description covering the evaluation of conformance with NUREG-0737: II.F.2, Attachment 1, and Appendix B (to be reviewed on a plant specific basis)*	CEN-185 (SECTION 8) 1. SMM ON ATTACHMENT 1 2. CET'S ON ATTACHMENT 1
5. Describe computer, software and display functions associated with ICC monitoring in the plant.	1. CEN-185 (SECTION 3) 2. CEN-185 (SUPPLEMENT 3) 1. SMM ON ATTACHMENT 1 2. CET'S ON ATTACHMENT 1
6. Provide a proposed schedule for installation, testing and calibration and implementation of any proposed new instrumentation or information displays.	ATTACHMENT 1
7. Describe guidelines for use of reactor coolant inventory tracking system, and analyses used to develop procedures.	1. CEN-185 (SECTION 2) 2. CEN-181 (QUESTION 2) 3. REFERENCE 3 (QUESTION 1) 4. CEN-152
8. Operator instructions in emergency operating procedures for ICC and how these procedures will be modified when final monitoring system is implemented.	THE EMERGENCY OPERATING PROCEDURES (EOP) FOR ICC WILL BE ADDRESSED IN RESPONSE TO GENERIC LETTER 82-33 BY APRIL 15, 1983.
9. Provide a schedule for additional submittals required**	THE ICC DISPLAY SYSTEM WILL BE ADDRESSED IN RESPONSE TO GENERIC LETTER 82-33 BY APRIL 15, 1983.

*II.F.2 Attachment 1 (for Core Exit Thermocouples)

In response to item 4 in the above checklist, the following materials should be included to show that the proposed system meets the design and qualification criteria for the core exit thermocouple system.

1. Provide diagram of core exit thermocouple locations or reference the generic description if appropriate.
2. Provide a description of the primary operator displays including:
   a. A diagram of the display panel layout for the core map and description of how it is implemented, e.g., hardware or CRT display.
   b. Provide the range of the readouts.
   c. Describe the alarm system.
   d. Describe how the ICC instrumentation readouts are arranged with respect to each other.
3. Describe the implementation of the backup display(s) (including the subcooling margin monitors), how the thermocouples are selected, how they are checked for operability, and the range of the display.
4. Describe the use of the primary and backup displays. What training will the operators have in using the core exit thermocouple instrumentation? How will the operator know when to use the core exit thermocouples and when not to use them? Reference appropriate emergency operating guidelines where applicable.

*DEVIATIONS NOTED ON ITEMS 4 AND 5 ONLY.

5. Confirm completion of control room design task analysis applicable to ICC instrumentation. Confirm that the core exit thermocouples meet the criteria of NUREG-0737, Attachment 1 and Appendix B, or identify and justify deviations.

6. Describe what parts of the systems are powered from the 1E power sources used, and how isolation from non-1E equipment is provided. Describe the power supply for the primary display. Clearly delineate in two categories which hardware is included up to the isolation device and which is not.

7. Confirm the environmental qualification of the core exit thermocouple instrumentation up to the isolation device.

Appendix B (of NUREG-0737, II.F.2)

Confirm explicitly the conformance to the Appendix B items listed below for the ICC instrumentation, i.e., the SMM, the reactor coolant inventory tracking system, the core exit thermocouples and the display systems.

HJTC ONLY

	Reference	Deviations
1. Environmental qualification	1. CEN-185 (SECTION 5) 2. CEN-185, SUPPLEMENT 3	NONE NONE
2. Single failure analysis	1. CEN-181 2. REFERENCE 3, QUESTION 4	NONE NONE
3. Class 1E power source	1. PLANT VITAL POWER	NONE
4. Availability prior to an accident	1. CEN-185, SUPPLEMENT 3 2. CEN-181, QUESTION 2	NONE NONE
5. Quality Assurance	QA CATEGORY I	NONE
6. Continuous indications	CEN-185 (SECTIONS 2 & 4)	NONE
7. Recording of instrument outputs	ATTACHED MEMO	NONE
8. Identification of instruments	HJTC	NONE
9. Isolation	REFERENCE 3, QUESTION 4	NONE

SMM & CET'S

THESE SYSTEMS ARE DESCRIBED ON THE ATTACHMENT 1; HOWEVER, THE SMM T/C INPUT HAS NOW BEEN QUALIFIED IN CONTAINMENT TO CLASS 1E. ADDITIONALLY, THE T/C RANGE HAS BEEN INCREASED TO 904° F.

**For the users of either Combustion Engineering Heated Junction Thermocouple (HJTC) System or Westinghouse Differential Pressure (dp) system a detailed response to the plant specific items stated below should be provided.

	Reference	Deviations
A. Westinghouse dp System		
1. Describe the effect of instrument uncertainties on the measurement of level.		
2. Are the differential pressure transducers located outside containment?		
3. Are hydraulic isolators and sensors included in the impulse lines?		
B. CE HJTC System		
1. Discuss the spacing of the sensors from the core alignment plate to the top of the reactor vessel head. How would the decrease in resolution due to the loss of a single sensor affect the ability of the system to detect an approach to ICC?	CEN-185-P, SUPPLEMENT 3-P	

* NO DEVIATIONS

Attachment 2

Millstone Nuclear Power Station

Unit No. 2

Inadequate Core Cooling Instrumentation

MILLSTONE UNIT NO. 2

In response to NUREG 0737 recommendations for detection of inadequate core cooling (ICC), NNECO, licensee of Millstone Unit No. 2 docketed its position on the installation of additional instrumentation for providing an unambiguous indication of approach to ICC in Reference 1. On December 10, 1982, the NRC Staff forwarded generic letter 82-28 (Reference 2) which outlined the requirements for the installation of additional instrumentation for detection of ICC. Reference 2 requires NNECO to provide the documentation of the proposed instrumentation system and installation schedule by March 10, 1983.

Presently installed instrumentation at Millstone Unit No. 2 can provide an indication of ICC as the event progresses. NNECO has concluded, however, that a reactor vessel water level system (RVWLS) that provides indication of coolant inventory above the core would be a valuable tool for following the progression of the level in the upper plenum down to the top of the core.

NNECO has evaluated the RVWLS's offered by the various vendors and has concluded that Combustion Engineering's HJTC provides the best available system for monitoring indication of coolant inventory above the core under simulated accident conditions. NNECO has evaluated the feasibility of installation of Combustion Engineering's HJTC for Millstone Unit No. 2 and have issued a purchase order to Combustion Engineering for the HJTC system's procurement.

The reactor vessel liquid inventory above the core and the fluid conditions at various locations in the primary system will be measured by the following:

1. Subcooled Margin Monitor (SMM)*.

2. Heated Junction Thermocouple (HJTC).

3. Core Exit Thermocouples (CET)*.

*Existing systems.

These instruments collectively consist of the ICC system as documented in Reference 1. The associated ICC display package will be addressed in response to generic letter 82-33 (Reference 4) by April 15, 1983.

Detailed information on the existing sensors is presented in the following sections.

Subcooled Margin Monitor (SMM)

The subcooled margin monitor for Millstone Unit No. 2 is a Combustion Engineering monitor described in Reference 1. Two "T" hot RTD's are used as temperature inputs for the range of 150°F to 750°F.

Two overlapping pressurizer transmitters, PT100Y (1500-2500 psia) and PT 103 (0-1600 psia), are used for pressure inputs.

The subcooled margin monitor takes analog input signals (1-5V) and converts them to digital signals. The highest temperature is selected and its corresponding saturated pressure is calculated. The corresponding saturated temperature is also calculated for the pressurizer pressure. The calculation is done by a microcomputer which contains steam tables and interpolation routines.

The saturation temperature and pressure are then compared with the actual process temperature and pressure and the margin from saturation conditions is calculated.

The subcooled margin monitor can display upon selection, either the temperature or pressure margin.

The inputs to the subcooled margin monitor are derived from control grade instrumentation loops. These inputs are the hot leg temperatures and pressurizer pressure inputs are taken from control grade instrumentation loops.

Power is supplied from a reliable semi-vital source. Only one subcooled margin monitor is installed. As a backup system, other existing instrumentation is utilized with steam tables and plant procedures.

The subcooled margin monitor range presently does not include a superheat steam condition and will be upgraded upon completion of the ICC system display. (Reference 4).

For more detailed information, please refer to Reference 1.

Core Exit Thermocouple (CET)

The Millstone Unit No. 2 reactor contains 45 thermocouples that are top mounted and placed above the fuel alignment plate. There are approximately eleven (11) CET's per quadrant. The thermocouples are Type K (chromel-alumel) and are connected in the same incore instrumentation (ICI) with the incore neutron detectors. The CET system has been upgraded to IEEE-323-1974 and IEEE-344-1975 inside containment including the penetrations. Documentation is still pending formal submittal from the vendor (CE). The part of the system outside containment is presently under review.

Presently the core exit thermocouple signals are input directly to the plant computer. A printout map may be called for at any time by the operator. The range is from 70°F to 2300°F at the present time. The display capabilities will be modified and will be addressed in response to generic letter 82-33 by April 15, 1983.

Heated Junction Thermocouple (HJTC)

Combustion Engineering's HJTC system has undergone extensive testing though Combustion Engineering sponsored test programs.

The HJTC test program was submitted to the NRC per Reference 1 and test results along with further qualifications (Reference 3) were submitted to D. M. Crutchfield on June 1, 1982. NNECO has planned installation of the HJTC during the October 1984 refueling outage barring unforseen circumstances.

NNECO has completed the checklist (Appendix 2) provided in Reference 2 and it is attached.

REFERENCES

1. W. G. Counsil letter to D. G. Eisenhut, dated December 31, 1980.

2. Generic Letter 82-28, dated December 10, 1982.

3. CEOG Letter from K. Baskin (CEOG) to D. M. Crutchfield (NRC), dated June 1, 1982.

4. Generic Letter 82-33, dated December 17, 1982.

APPENDIX II

Checklist
for Plant Specific Review of
Inadequate Core Cooling (ICC) Instrumentation System

For MILLSTONE UNIT NO. 2 Docket No. 50-336

Operated by: NORTHEAST NUCLEAR ENERGY COMPANY

The following items for review are taken from NUREG-0737, pp II.F.2-3, and 4. Responses should be made to full requirements in NUREG-0737, not abbreviated forms below. Applicants should provide reference to either the applicant's submittal or the generic description under the column labled "Reference." These items are required to be reviewed on a plant specific basis by NUREG-0737 for all plants. Differences from the generic descriptions provided by Westinghouse, the Westinghouse Owner's Group, Combustion Engineering, or Combustion Engineering Owner's Group must be indicated by "yes or no" in the column labled deviations and must be justified. Under the Column labeled schedule, either indicate that your documentation of the item is complete or provide a proposed schedule for your submittal.

	Reference	Deviations	Schedule
1. Description of the proposed final system including: a. a final design description of additional instrumentation and displays; b. detailed description of existing instrumentation systems. c. description of completed or planned modifications.	1. CEN-185 (SECTION 3.1.2) 2. CEN-181 (QESTIONS 4, 7, 8, & 11) 3. REFERENCE 3 QUESTION 1 1. ATTACHMENT 2 2. CEN-117 ATTACHMENT 2		
2. A design analysis and evaluation of inventory trend instrumentation, and test data to support design in item 1.	1. CEN-181, QUESTION 2 2. CEN-185 (APPENDIX A) 3. CEN-185 (SECTION 6) & SUPPLEMENTS 1, 2, & 3 4. REFERENCE 3, QUESTIONS 1, 2, 3, 4		
3. Description of tests planned and results of tests completed for evaluation, qualification, and calibration of additional instrumentation.	1. CEN-185 (SECTION 5) 2. CEN-185 (SUPPLEMENTS 1, 2, & 3) 3. CEN-181 QUESTION 12		

* NO DEVIATIONS ON THIS PAGE

	DEVIATIONS
4. Provide a table or description covering the evaluation of conformance with NUREG-0737: II.F.2, Attachment 1, and Appendix B (to be reviewed on a plant specific basis)*	CEN-185 (SECTION 8) CET'S ON ATTACHMENT 2
5. Describe computer, software and display functions associated with ICC monitoring in the plant.	1. CEN-185 (SECTION 3) CET'S ON ATTACHMENT 2 2. CEN-185 (SUPPLEMENT 3)
6. Provide a proposed schedule for installation, testing and calibration and implementation of any proposed new instrumentation or information displays.	ATTACHMENT 2
7. Describe guidelines for use of reactor coolant inventory tracking system, and analyses used to develop procedures.	1. CEN-185 (SECTION) 2. CEN-181 (QUESTION 2) 3. REFERENCE 3 (QUESTION 1) 4. CEN-152
8. Operator instructions in emergency operating procedures for ICC and how these procedures will be modified when final monitoring system is implemented.	THE EMERGENCY OPERATING PROCEDURES (EOP) FOR ICC WILL BE ADDRESSED IN RESPONSE TO GENERIC LETTER 82-33 BY APRIL 1, 1983.
9. Provide a schedule for additional submittals required**	THE ICC DISPLAY SYSTEM WILL BE ADDRESSED IN RESPONSE TO GENERIC LETTER 82-33 BY APRIL 15, 1983

*II.F.2 Attachment 1 (for Core Exit Thermocouples)

In response to item 4 in the above checklist, the following materials should be included to show that the proposed system meets the design and qualification criteria for the core exit thermocouple system.

1. Provide diagram of core exit thermocouple locations or reference the generic description if appropriate.
2. Provide a description of the primary operator displays including:
   a. A diagram of the display panel layout for the core map and description of how it is implemented, e.g., hardware or CRT display.
   b. Provide the range of the readouts.
   c. Describe the alarm system.
   d. Describe how the ICC instrumentation readouts are arranged with respect to each other.
3. Describe the implementation of the backup display(s) (including the subcooling margin monitors), how the thermocouples are selected, how they are checked for operability, and the range of the display.
4. Describe the use of the primary and backup displays. What training will the operators have in using the core exit thermocouple instrumentation? How will the operator know when to use the core exit thermocouples and when not to use them? Reference appropriate emergency operating guidelines where applicable.

* DEVIATIONS ON ITEMS 4 AND 5 ONLY.

5. Confirm completion of control room design task analysis applicable to ICC instrumentation. Confirm that the core exit thermocouple meet the criteria of NUREG-0737, Attachment 1 and Appendix B, or identify and justify deviations.

6. Describe what parts of the systems are powered from the 1E power sources used, and how isolation from non-1E equipment is provided. Describe the power supply for the primary display. Clearly delineate in two categories which hardware is included up to the isolation device and which is not.

7. Confirm the environmental qualification of the core exit thermocouple instrumentation up to the isolation device.

Appendix B (of NUREG-0737, II.F.2)

Confirm explicitly the conformance to the Appendix B items listed below for the ICC instrumentation, i.e., the SMM, the reactor coolant inventory tracking system, the core exit thermocouples and the display systems.

HJTC ONLY

	Reference	Deviations
1. Environmental qualification	1. CEN-185 (SECTION 5) 2. CEN-185, SUPPLEMENT 3	
2. Single failure analysis	1. CEN-181 2. REFERENCE 3, QUESTION 4	
3. Class 1E power source	1. PLANT VITAL POWER 1. CEN-185, SUPPLEMENT 3	
4. Availability prior to an accident	2. CEN-181, QUESTION 2	
5. Quality Assurance	QA CATEGORY I	
6. Continuous indications	CEN-185 (SECTIONS 2 & 4)	
7. Recording of instrument outputs	ATTACHMENT 2	
8. Identification of instruments	HJTC	
9. Isolation	REFERENCE 3, QUESTION 4	

SMM & CET'S

THESE SYSTEMS ARE DESCRIBED ON THE ATTACHMENT 2.

* NO DEVIATIONS

**For the users of either Combustion Engineering Heated Junction Thermocouple (HJTC) System or Westinghouse Differential Pressure (dp) system a detailed response to the plant specific items stated below should be provided.

	Reference	Deviations
A. Westinghouse dp System		
1. Describe the effect of instrument uncertainties on the measurement of level.		
2. Are the differential pressure transducers located outside containment?		
3. Are hydraulic isolators and sensors included in the impulse lines?		
B. CE HJTC System		
1. Discuss the spacing of the sensors from the core alignment plate to the top of the reactor vessel head. How would the decrease in resolution due to the loss of a single sensor affect the ability of the system to detect an approach to ICC?	CEN-185-P, SUPPLEMENT 3-P	

* NO DEVIATIONS