

January 18, 1984

Distribution

Docket File
 ORB#4 File
 Gray File +4
 NRC PDR
 L PDR
 OELD
 ACRS 10
 E Jordan
 J Taylor D Brinkman
 L Harmon W Jones
 R Diggs T Barnhart
 R Ingram J Stolz
 R Hernan H Ornstein
 E Blackwood SECY
 D Eisenhut C Miles

Docket No. 50-302

Mr. Walter S. Wilgus
 Vice President, Nuclear Operations
 Florida Power Corporation
 ATTN: Manager, Nuclear Licensing
 & Fuel Management
 P. O. Box 14042; M. A. C. H-2
 St. Petersburg, Florida 33733

Dear Mr. Wilgus:

SUBJECT: NUREG 0737 ITEMS II.F.1.4, II.F.1.5 AND II.F.1.6

On July 22, 1982, we forwarded our Safety Evaluation on TMI Action Plan Items II.F.1.4, "Containment Pressure Monitor", II.F.1.5, "Containment Water Level Monitor", and II.F.1.6, "Containment Hydrogen Monitor." The scope of our review included all requirements except for the criteria requiring that the equipment be environmentally qualified (Appendix B of NUREG-0737). This latter issue will be reviewed separately under the scope of the Commission's environmental qualification program. Your letter dated October 18, 1982 provided clarifications regarding installation of instrumentation for Items II.F.1.4 and II.F.1.6, such as the fact that some instruments were located in the Emergency Feedwater Initiation and Control (EFIC) room rather than in the control room. The attached Safety Evaluation supersedes the one sent to you on July 22, 1982 and acknowledges your October 18, 1982 comments.

As discussed in the previous Safety Evaluation, we have concluded that the requirement of NUREG-0737, Items II.F.1.4, II.F.1.5 and II.F.1.6 for Crystal River, Unit 3 have been met and thus, these items are considered resolved. This conclusion remains unchanged.

Sincerely,

8401310082 840118
 PDR ADOCK 05000302
 P PDR

John F. Stolz, Chief
 Operating Reactors Branch No. 4
 Division of Licensing

Enclosure:
 Safety Evaluation Report

cc w/enclosure:
 See next page

ORB#4:DL
 RHernan;ef
 01/18/84

ORB#4:DL
 JStolz
 01/18/84

Crystal River Unit No. 3
Florida Power Corporation

50-302

cc w/enclosure(s):
Mr. S. A. Brandimore
Florida Power Corporation
Vice President and General Counsel
P. O. Box 14042
St. Petersburg, Florida 33733

Mr. Wilbur Lengely, Chairman
Board of County Commissioners
Citrus County
Inverness, Florida 36250

Regional Radiation Representative
EPA Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Mr. Robert B. Borsum
Babcock & Wilcox
Nuclear Power Generation Division
Suite 220, 7910 Woodmont Avenue
Bethesda, Maryland 20814

Mr. Tom Stetka, Resident Inspector
U.S. Nuclear Regulatory Commission
Route #3, Box 717
Crystal River, Florida 32629

Nuclear Plant Manager
Florida Power Corporation
P. O. Box 219
Crystal River, Florida 32629

Bureau of Intergovernmental Relations
660 Apalachee Parkway
Tallahassee, Florida 32304

Uray Clark, Administrator
Radiological Health Services
Department of Health and
Rehabilitative Services
1323 Winewood Blvd.
Tallahassee, Florida 32301

Administrator
Department of Environmental Regulation
Power Plant Siting Section
State of Florida
2600 Blair Stone Road
Tallahassee, Florida 32301

Attorney General
Department of Legal Affairs
The Capitol
Tallahassee, Florida 32304

Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission, Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

SAFETY EVALUATION

NUREG-0737 ITEMS

II.F.1.4 CONTAINMENT PRESSURE MONITOR

II.F.1.5 CONTAINMENT WATER LEVEL MONITOR

II.F.1.6 CONTAINMENT HYDROGEN MONITOR

Crystal River, Unit 3

Docket No. 50-302

Florida Power Corporation

Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission

TABLE OF CONTENTS

<u>SECTION TITLE</u>	<u>SECTION NUMBER</u>	<u>PAGE</u>
BACKGROUND -----	1.0	1
SCOPE OF REVIEW -----	2.0	1
CONTAINMENT PRESSURE MONITOR SYSTEM (CPMS) -----	3.0	1
NUREG-0737 CPMS POSITION -----	3.1	1
NUREG-0737 CPMS CLARIFICATION -----	3.2	1
SCOPE OF CPMS EVALUATION -----	3.3	2
LICENSEE COMPLIANCE WITH NUREG-0737 CPMS REQUIREMENTS -----	3.4	2
EVALUATION OF CPMS ACCURACY AND TIME RESPONSE -----	3.5	2
CONTAINMENT WATER LEVEL MONITOR SYSTEM (CWLMS) -----	4.0	3
NUREG-0737 CWLMS POSITION -----	4.1	3
NUREG-0737 CWLMS CLARIFICATION -----	4.2	3
SCOPE OF CWLMS EVALUATION -----	4.3	3
LICENSEE COMPLIANCE WITH NUREG-0737 CWLMS REQUIREMENTS -----	4.4	4
EVALUATION OF CWLMS ACCURACY -----	4.5	4
CONTAINMENT HYDROGEN MONITOR SYSTEM (CHMS) -----	5.0	4
NUREG-0737 CHMS POSITION -----	5.1	4
NUREG-0737 CHMS CLARIFICATION -----	5.2	4
SCOPE OF CHMS EVALUATION -----	5.3	5
LICENSEE COMPLIANCE WITH NUREG-0737 CHMS REQUIREMENTS -----	5.4	5
EVALUATION OF CHMS ACCURACY AND SAMPLE PORT PLACEMENT -----	5.5	5
CONCLUSION -----	6.0	6
REFERENCES -----	7.0	6

1.0 BACKGROUND

By our letter of 5 Sep 80 (Reference 1) to: (1) licensees of operating plants; (2) applicants for operating licenses; and (3) holders of construction permits; we issued a summary listing of all the approved TMI Action Plan Requirements. In November of 1980 we issued NUREG-0737, Clarification of TMI Action Plan Requirements (Reference 2), which specifies TMI Action Plan Items approved by the Commission for implementation. This Safety Evaluation (SE) addresses three of the TMI Action Plan Items, II.F.1.4,5,6.

2.0 SCOPE OF REVIEW

This SE addresses all the requirements of II.F.1.4,5,6 except the following:

- (1) Clarification (1) of Each Item.
This clarification is the equipment qualification described in Appendix B of NUREG-0737. The staff's review of this clarification of each item will be performed separately.
- (2) Implementation Schedule.
NUREG-0737 requires that three items addressed in this SE be implemented by 1 Jan 82. Verifying that the implementation schedule is acceptable is not part of this SE, but will be handled separately.

3.0 II.F.1.4: CONTAINMENT PRESSURE MONITOR SYSTEM (CPMS)

3.1 NUREG-0737 CPMS POSITION

A continuous indication of containment pressure shall be provided in the control room of each operating reactor. Measurement and indication capability shall include three times the design pressure of the containment for concrete, four times the design pressure for steel, and -5 psig for all containments.

3.2 NUREG-0737 CPMS CLARIFICATION

- (1) Design and qualification criteria are outlined in Appendix B of NUREG-0737. [As stated in section 2.0, this clarification will be reviewed separately.]
- (2) Measurement and indication capability shall extend to 5 psia (-10 psig) for subatmospheric containments.
- (3) Two or more instruments may be used to meet the range requirements. However, instruments that need to be switched from one scale to another scale to meet the range requirements are not acceptable.

- (4) Continuous display and recording of the containment pressure over the specified range in the control room is required.
- (5) The accuracy and response time specifications of the pressure monitor shall be provided and justified to be adequate for their intended function.

3.3 SCOPE OF CPMS EVALUATION

The licensee has described his design for the CPMS in references from 3 on. Our review of the licensee's submittals consists of the following: (1) checking for deviations from our requirements which are stated in Sections 3.1 and 3.2 above, (2) reviewing the adequacy of the accuracy specifications of the CPMS, and (3) reviewing the adequacy of the response time specifications of the CPMS. The figures quoted herein for system accuracy are the root-sum-square of the module accuracies quoted by the licensee. The accuracy figures are expressed as a percentage of full scale. The figures quoted for response time are the 100% response values. For linear transfer functions we are using the convention that the time for 100% response is four time constants.

3.4 LICENSEE COMPLIANCE WITH NUREG-0737 CPMS REQUIREMENTS

After reviewing the licensee's submittals, we find that the CPMS design meets all the requirements of Sections 3.1 and 3.2, except the following: Section 3.1 requires that the CPMS readout devices be located in the control room. The CPMS indicator is located in the control room, but due to lack of space the CPMS recorder-indicator is located in the Emergency Feedwater Initiation and Control (EFIC) room, which is two floors below the control room in the control complex. The recorder-indicator is at eye level so that it can easily be continually observed, and there is a phone located just outside the EFIC room, so that a person in the EFIC room can alert the control room operator of any significant changes in containment pressure. In addition the CPMS signal can be printed periodically on the control room printer by the plant process computer. We judge this arrangement to adequately satisfy the intent of Section 3.1.

3.5 EVALUATION OF CPMS ACCURACY AND TIME RESPONSE

As noted previously, the CPMS indicator is located in the control room, and the recorder-indicator is located in the EFIC room. The CPMS indicator loop has a system accuracy of 1.0% of full scale and a response time of 0.8 seconds. The CPMS recorder-indicator loop has a system accuracy of 0.7% of full scale and a system response time which varies between 0.8 and 1.7 seconds, increasing with the magnitude of the pressure transient. These values, which are consistent with the present state of the art, will provide information over the intended range of the CPMS that is sufficiently accurate and useful to allow the plant operator to adequately assess pressure conditions within containment.

4.0 II.F.1.5: CONTAINMENT WATER LEVEL MONITOR SYSTEM (CWLMS)

4.1 NUREG-0737 CWLMS POSITION

A continuous indication of containment water level shall be provided in the control room for all plants. A narrow-range instrument shall be provided for PWRs and cover the range from the bottom to the top of the containment sump. A wide-range instrument shall also be provided for PWRs and shall cover the range from the bottom of the containment to the elevation equivalent to 600,000 gallon capacity. For BWRs, a wide-range instrument shall be provided and cover the range from the bottom to five feet above the normal water level of the suppression pool.

4.2 NUREG-0737 CWLMS CLARIFICATION

- (1) The containment wide-range water level indication channels shall meet the design and qualification criteria as outlined in Appendix B of NUREG-0737. The narrow-range channel shall meet the requirements of Regulatory Guide 1.89. [As stated in section 2.0, this clarification will be reviewed separately.]
- (2) The measurement capability of 600,000 gallons is based on recent plant designs. For older plants with smaller water capacities, licensees may propose deviations from this requirement based on the available water supply capability at their plant.
- (3) Narrow-range water level monitors are required for all sizes of sumps inside the containment.
 - For BWR pressure-suppression containments, the Emergency Core Cooling System (ECCS) suction line inlets may be used as a starting reference point for the wide-range water level monitors, instead of the bottom of the suppression pool.
- (5) The accuracy requirements of the water level monitors shall be provided and justified to be adequate for their intended function.

4.3 SCOPE OF CWLMS EVALUATION

The licensee has described his design for the CWLMS in references from 3 on. Our review of the licensee's submittals consists of the following: (1) checking for deviations from our requirements which are stated in Sections 4.1 and 4.2 above, and (2) reviewing the adequacy of the accuracy specifications for the CWLMS. The figures quoted herein for system accuracy are the root-sum-square of the module accuracies quoted by the licensee. The accuracy figures are expressed as a percentage of full scale.

4.4 LICENSEE COMPLIANCE WITH NUREG-0737 CWLMS REQUIREMENTS

After reviewing the licensee's submittals, we find that the CWLMS design meets all the requirements of Sections 4.1 and 4.2, except the following: Section 4.1 requires that the CWLMS readout device(s) be located in the control room. Due to lack of space in the control room, both the CWLMS indicator and recorder-indicator are located in the Emergency Feedwater Initiation and Control (EFIC) room, which is two floors below the control room in the control complex. The indicator or recorder-indicator can easily be continually observed, and there is a phone just outside the EFIC room, so that a person in the EFIC room can alert the control room operator of any significant changes in water level. Section 4.1 requires CWLMS indicator readout only; thus the recorder-indicator installed by the licensee provides a good measure of monitoring capability beyond the requirements of NUREG-0737. We judge this arrangement to adequately satisfy the intent of Section 4.1.

4.5 EVALUATION OF CWLMS ACCURACY

The licensee has installed a narrow-range CWLMS in the sump and a wide-range CWLMS in the containment. As noted previously, both the CWLMSs have indicator and recorder-indicator readouts. The accuracy of both the narrow-range and the wide-range CWLMSs are identical. The CWLMS indicator loops have a system accuracy of 1.3% of full scale, and the recorder-indicator loops have a system accuracy of 0.9% of full scale. These values, which are consistent with the present state of the art, will provide information over the intended range of the CWLMS that is sufficiently accurate and useful to allow the plant operator to adequately assess water level conditions within containment.

5.0 5.0.1.6: CONTAINMENT HYDROGEN MONITOR SYSTEM (CHMS)

5.1 NUREG-0737 CHMS POSITION

A continuous indication of hydrogen concentration in the containment atmosphere shall be provided in the control room. Measurement capability shall be provided over the range of 0% to 10% hydrogen concentration under both positive and negative ambient pressures.

5.2 NUREG-0737 CHMS CLARIFICATION

- (1) Design and qualification criteria are outlined in Appendix B of NUREG-0737. [As stated in section 2.0, this clarification will be reviewed separately.]

- (2) The continuous indication of hydrogen concentration is not required during normal operation. If an indication is not available at all times, continuous indication and recording shall be functioning within 30 minutes of the initiation of safety injection.

5.3 SCOPE OF CHMS EVALUATION

The licensee has described his design for the CHMS in references from 3 on. Our review of the licensee's submittals consists of the following: (1) checking for deviations from our requirements which are stated in Sections 5.1 and 5.2 above, (2) reviewing the adequacy of the accuracy specifications for the CHMS, and (3) reviewing the adequacy of the hydrogen sample port placement for the CHMS. The figures quoted herein for system accuracy are the system figures quoted by the CHMS vendor. The accuracy figures are expressed as a percentage of full scale.

5.4 LICENSEE COMPLIANCE WITH NUREG-0737 CHMS REQUIREMENTS

After reviewing the licensee's submittals, we find that the CHMS design meets all the requirements of Sections 5.1 and 5.2 above, except the following: Section 5.1 requires that the CHMS readout devices be located in the control room. Due to lack of space, both the CHMS indicator and the CHMS recorder-indicator are located in the Emergency Feedwater Initiation and Control (EFIC) room. The indicator is approximately two feet off the floor, while the recorder-indicator is at eye level, so that it can easily be continually observed, and there is a phone located just outside the EFIC room, so that a person in the EFIC room can alert the control room operator of any significant change in containment hydrogen. We judge this arrangement to adequately satisfy the intent of Section 5.1.

5.5 EVALUATION OF CHMS ACCURACY AND SAMPLE PORT PLACEMENT

As stated previously the CHMS indicator and recorder-indicator are separate devices. The CHMS indicator loop and the CHMS recorder-indicator loop both have a system accuracy of 2.5% of full scale. This value, which is consistent with the present state of the art, will provide information over the intended range of the CHMS that is sufficiently accurate and useful to allow the plant operator to adequately assess the hydrogen concentration within containment. The licensee has installed 2 hydrogen sample ports within containment, which permits rapid detection of hydrogen escaping from the reactor.

6.0 CONCLUSION

Except for the review of clarification (1) and a review of the implementation schedule, the licensee has met all the requirements of NUREG-0737 for items II.F.1.4,5,6; we therefore find his design for these three items acceptable.

7.0 REFERENCES

- (1) Letter from D. G. Eisenhut (NRC) to All Licensees of Operating Plants and Applicants for Operating Licenses and Holders of Construction Permits, dated 5 Sep 80. Subject: Preliminary Clarification of TMI Action Plan Requirements.
- (2) NUREG-0737, "Clarification of TMI Action Plan Requirements," U. S. Nuclear Regulatory Commission, Nov 1980.
- (3) Letter from David G. Mardis (FPC) to Darrell G. Eisenhut (NRC), 30 Dec 81. Subject: System descriptions of the CPMS, CWLMS and CHMS.
- (4) Letter from John F. Stolz (NRC) to John A Hancock (FPC), 12 May 82. Subject: Transcript of phone conversations to gather information about the CPMS, CWLMS and CHMS.
- (5) Letter from David G. Mardis (FPC) to John F. Stolz (NRC), 11 Jun 82. Subject: FPC's response to Reference 4.