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Waterford 3

W3F1-2004-0094

October 8, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Revised response to Waterford 3's response letter to Generic Letter 2003-01, Control Room Habitability
Waterford Steam Electric Station, Unit 3 (Waterford 3)
Docket No. 50-382
License No. NPF-38

Reference Letter Number W3F1-2004-0080, dated September 30, 2004, Follow-up Response to NRC Generic Letter (GL) 2003-01, Control Room Habitability

Dear Sir or Madam:

The purpose of this letter is to supersede the original response to Waterford 3's follow-up to Generic Letter 2003-01, as documented in letter W3F1-2004-0080 dated September 9, 2004. This letter contains the revised response which is necessary to correct errors in the above referenced letter.

Specifically, on page 7 of 8 of attachment 1 and page 1 of attachment 2 of letter W3F1-2004-0080, it was stated that "A new section will be added to the Technical Specification Section 5.5, "Programs and Manuals," that will specify the scope of the Control Room Integrity Program." The reference to Technical Specification Section 5.5 "Programs and Manuals is incorrect and should have been listed as Technical Specification Section 6.5 "Programs."

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These corrections are now incorporated within this letter. This occurrence has been entered into Waterford 3's corrective action program and was communicated to Waterford 3's NRR Project Manager on October 4, 2004.

New commitments contained in this submittal are summarized in Attachment 2.

Sincerely,

K. J. Peters
Director, Nuclear Safety Assurance

KJP/GCS/ssf

Attachment(s): 1. Follow-up Response to Generic Letter 2003-01
2. List of Regulatory Commitments

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Attachment 1

Follow-up Response to Generic Letter 2003-01, Control Room Habitability
W3F1-2004-0094

Response to Generic Letter 2003-01 Control Room Habitability

Background

On June 12, 2003, the NRC issued Generic Letter 2003-01, "Control Room Habitability." This letter requested licensees to submit information demonstrating that control rooms comply with the current licensing and design bases, and applicable regulatory requirements, and that suitable design, maintenance and testing control measures are in place for maintaining this compliance. The Letter requested that we provide responses to the following:

1. "Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases. Emphasis should be placed on confirming:

    a That the most limiting unfiltered inleakage into your CRE (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for control room habitability. Describe how and when you performed the analyses, tests, and measurements for this confirmation.

    b That the most limiting unfiltered inleakage into your CRE is incorporated into your hazardous chemical assessments. This leakage may differ from the value assumed in your design basis radiological analyses. Also, confirm that the reactor control capability is maintained from either the control room or the alternate shut down panel in the event of smoke.

    c That your technical specifications verify the integrity of the CRE, and the assumed inleakage rates of potentially contaminated air. If you currently have a delta P surveillance requirement to demonstrate CRE integrity, provide the basis for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your delta P surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable surveillance methodology (e.g., ASTM E741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.

    If your facility does not currently have a technical specification surveillance requirement for your CRE integrity, explain how and at what frequency you confirm your CRE integrity and why this is adequate to demonstrate CRE integrity.

2. If you currently use compensatory measures to demonstrate control room habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures.

3. If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principal Design Criteria" regarding control room habitability, in addition to responding to 1 and 2 above, provide documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence) of the basis for this conclusion and identify your actual requirements."

The generic letter requested that this information be provided within 180 days of the date of the letter or if unable to meet this schedule, notification of the proposed plans for completion within 60 days of the date of the letter.

On August 7, 2003, Waterford 3 SES submitted a response to GL 2003-01 that proposed an alternate (180 day) course of action. As a proposed alternate course of action, Entergy committed to complete each of the initial "one time actions" described in Section 3 of NEI document 99-03, Revision 1, Control Room Habitability (CRH), for Waterford 3 to facilitate the responses to the above requests. These actions were to:

- "Assemble CRH licensing and design bases for control room emergency ventilation systems
- Assemble CRH analyses
- Document CRH bases and analyses
- Assess and evaluate licensing/design bases and operator dose analyses
- Confirm that limiting DBA has been used to assure adequacy of CRH design
- Verify that the potential effects of hazardous chemical release on control room operators have been addressed and that surveys of onsite and offsite hazardous chemicals have been conducted
- Assess and evaluate control room in leakage
- Assess and evaluate control room habitability during smoke events
- Assess and evaluate the adequacy of existing control room emergency ventilation system technical specifications "

All of the above actions have been completed. In addition, tracer gas testing was conducted to ensure compliance with Waterford's licensing and design basis for control room unfiltered inleakage assumptions.

The following provides the responses to the NRC requested information.

1. "Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases. Emphasis should be placed on confirming:

a. That the most limiting unfiltered inleakage into your CRE (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for control room habitability. Describe how and when you performed the analyses, tests, and measurements for this confirmation."

Response

The unfiltered inleakage to the control room envelope was measured using the ASTM 741 and the ASTM Standard E2029-99 tracer gas methodology. The Tracer Gas testing was performed during the period of April 12, 2004 through April 17, 2004. The testing was performed by Lagus Applied Technology, Inc. in conjunction with NCS Corporation. Results from this testing are as follows:

Testing was performed in the Recirculation mode of emergency operation in combination with a Safety Injection Actuation Signal (SIAS) as would exist for the large break LOCA. This mode of operation is the automatic equipment line up that results from a high radiation signal from the control room outside air inlet areas. This equipment line up isolates the entire control room envelope, starts the emergency filter systems, recirculates the air through the heating / cooling system and directs a portion of the air through the emergency filters. The control room is not pressurized in this mode of operation. The measured unfiltered inleakage in this mode of operation was 79 cfm. The existing design basis unfiltered inleakage limit for control room dose analysis during a radiological event is 13 cfm. The leakage sources included in this analysis were the normal egress and ingress value (3 cfm for a type II control room with airlock doors) and 10 cfm limit imposed on the outside air inlet valves. This test indicated that the design limits were not being met.

Testing was performed in the Pressurization mode of operation. This mode of operation starts with the automatic equipment line up identical to the recirculation mode of operation. The operators then take manual actions to select the outside inlet location (north inlet or south inlet) with the lowest radiological conditions. The operator will open the selected outside air inlet and utilize up to 200 cfm of air to pressurize the entire control room envelope. The measured unfiltered inleakage in this mode of operation was 36 cfm. The existing design basis unfiltered inleakage limit for control room dose analyses during a radiological event is 13 cfm. This test indicated that the design limits were not being met.

Testing was performed in the Isolation mode of operation. This mode of operation is the automatic equipment line up that results from a toxic gas event actuation. This equipment line up isolates the entire control room envelope and recirculates the air through the heating / cooling system. The control room is not pressurized in this mode of operation.

The measured inleakage in this mode of operation was 59 cfm. The existing design basis inleakage limits, incorporated into toxic chemical hazard analysis, for this mode of operation is 220 cfm. This portion of the testing verified that the actual measured inleakage meets the design basis for maintaining the control room habitability during toxic chemical events.

During the ASTM 741 tracer gas testing, it was discovered that a statement in the UFSAR is not valid for the present plant configuration. The ventilation systems were designed to ensure that all areas adjacent to the control room were at a lower pressure than the control room envelope itself and therefore there would only be out-leakage from the control room envelope during an event. The testing identified that certain areas adjacent to the control room were at a higher pressure given automatic equipment operation that occurs due to a SIAS. The discovery that some areas adjacent to the control room are at a higher pressure than the control room, removed one of the barriers that limit unfiltered inleakage. Our analysis of the tracer gas test results, as documented below, demonstrated that the unfiltered inleakage is acceptable with these conditions. This issue has been entered in to the Waterford 3 corrective actions process and the ventilation systems in these adjacent areas are being evaluated.

Prior to the performance of the control room tracer gas testing, the current radiological dose analysis calculations were reanalyzed to determine maximum unfiltered inleakage values. These calculations were performed as a contingency to address the potential of the Tracer Gas Test results not meeting the original unfiltered inleakage design basis requirements. The containment spray removal coefficient was revised consistent with guidance in Standard Review Plan 6.5.2 to increase the allowed unfiltered inleakage used in the post LOCA dose analysis. This reanalysis yielded an acceptance limit of 120 cfm unfiltered inleakage for the events for which control room dose is currently documented in the FSAR (Loss of Coolant Accident and Fuel Handling Accident). These calculations demonstrate that acceptable radiological dose results are obtained with an assumed unfiltered inleakage greater than that measured via the tracer gas test for any mode of operation.

The Control Room Habitability evaluations have also identified that control room dose calculations have only been performed for a large break LOCA and a fuel handling accident. The LBLOCA was assumed to bound other non LOCA accidents due to the large source term. However, this review has determined that because of the close location of the Atmospheric Dump Valve to a control room intake, steam generator releases during non LOCA events may be more limiting. Events other than LBLOCA were evaluated for impact on control room dose as part of the Waterford 3 corrective action program and found to be acceptable on an interim basis. As a result of this finding, Waterford

3 has submitted a License Amendment Request to utilize the Alternate Source Term methodology in Regulatory Guide 1.183 for applicable accidents.

Waterford 3 SES is in the process of implementing an Extended Power Uprate project that will utilize the Alternative Source Term (AST) dose analysis guidelines in Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." The radiological design basis calculations for all LOCA and non LOCA events are being updated to include the information from the power uprate and the alternative source term analysis. The inleakage assumptions of these analysis are greater than the inleakage results of the Tracer Gas Testing and provide adequate margin. These analyses have been submitted for NRC approval via Waterford 3 letters W3F1-2004-0053 dated July 7, 2004, W3F1-2004-0071 dated August 8, 2004 and W3F1-2004-0076 dated September 1, 2004.

The analyses conclude that the Waterford 3 control room meets GDC 19 with regard to radiological dose, demonstrating that the 10CFR50.67 dose acceptance criteria are met for all licensing basis events. Specifically, control room dose analyses have been performed and demonstrate acceptable consequences for events for which control room dose was not previously documented in the FSAR, such that applicable FSAR Chapter 15 events for which offsite dose is explicitly evaluated are also evaluated for control room dose. Upon approval of these new dose analyses and in conjunction with the power uprate, the licensing basis dose analysis results will be updated in the UFSAR.

b. "That the most limiting unfiltered inleakage into your CRE is incorporated into your hazardous chemical assessments. This leakage may differ from the value assumed in your design basis radiological analyses. Also, confirm that the reactor control capability is maintained from either the control room or the alternate shut down panel in the event of smoke."

Response

The Waterford 3 design/licensing basis includes provisions for the protection of control room personnel from toxic gas hazards in the vicinity of the Waterford 3 plant site. Waterford 3 employs chlorine monitors for detection of chlorine and a Broad Range Gas Detection System (BRGDS) for detection of a variety of toxic gases that could pose a potential threat to control room habitability. Surveys and analyses of major industries in the vicinity of Waterford 3, which could have significant inventories of toxic chemicals, are performed every four years in accordance with Technical Specification 6.9.1.9. These surveys also include assessments of toxic chemicals transported by road, rail, or river traffic in the vicinity of the Waterford 3 site.

As stated in Item a above, a toxic chemical event results in the automatic initiation of the Isolation mode of operation. The resultant equipment line up isolates the entire control room envelope and recirculates the air through the heating / cooling system. The control room is not pressurized in this mode of operation. The measured inleakage in this mode of operation was 59 cfm. The existing design basis inleakage limit used in the toxic gas hazard analysis is 220 cfm. This portion of the testing verified that the actual measured inleakage meets the design basis for maintaining the control room habitability during toxic events.

Smoke Events

The Control Room is provided with exhaust fans (toilet exhaust fans and the conference room exhaust fans) designed for purging smoke and products of combustion when the need arises. These fans exhaust smoke to outside atmosphere.

Smoke venting for each fire area / zone is described in the Fire Area-By-Fire Area Analysis (Pre-fire Strategies). In addition to the fixed exhaust capability, portable smoke purge exhaust fans (smoke ejectors) are provided for use by the fire brigade.

If an unmitigated fire in the control room is assumed, loss of safe shutdown components would be limited to the Control Room Proper. Alternate shutdown, as required by 10CFR50, Appendix R, is provided for this zone. Manual operation of selected plant equipment, control and monitoring of plant parameters can be performed at the auxiliary control panel LCP-43, which is located at elevation +21 feet mean sea level. The capability for safe plant shutdown is provided at the panel, such that control of radioactive releases to the environment is maintained.

In the event that there is a fire external to the control room (whether it is in the reactor auxiliary building or off site) that generates enough smoke to challenge the conditions in the control room, operations would take manual actions to put the control room in the isolation mode (Toxic Gas line up). In this mode of operation, the control room staff would be protected from smoke conditions.

c. "That your technical specifications verify the integrity of the CRE, and the assumed inleakage rates of potentially contaminated air. If you currently have a delta P surveillance requirement to demonstrate CRE integrity, provide the basis for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your delta P surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable

surveillance methodology (e.g., ASTM E741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.

If your facility does not currently have a technical specification surveillance requirement for your CRE integrity, explain how and at what frequency you confirm your CRE integrity and why this is adequate to demonstrate CRE integrity."

Response

Waterford 3 SES has a positive pressure control room design and a Technical Specification requirement for CRE integrity, Surveillance Requirement 4.7.6.5, which demonstrates that the Control Room Emergency Ventilation System can maintain the control room envelope at a positive pressure relative to outside atmosphere. The results from the ASTM E741 Tracer Gas Testing has demonstrated that the control room pressurization surveillance, although a good indication of the control room integrity, is not an accurate predictor of unfiltered air inleakage to the control room envelope.

Waterford 3 SES will submit a proposed licensing amendment request within six months following approval of TSTF-448, or if the TSTF is processed through the Consolidated Line Item Improvement Process (CLIIP), within 6 months after the CLIIP is published in the Federal Register. The amendment request will include a new Technical Specification Surveillance Requirement to determine inleakage in accordance with the Control Room Integrity Program. A new section will be added to the Technical Specification Section 6.5, "Programs and Manuals," that will specify the scope of the Control Room Integrity Program. The Control Room Integrity Program will rely on the use of ASTM 741 tracer gas or other suitable inleakage testing. Waterford 3 SES does not anticipate that modifications to the control room envelope will be required to demonstrate compliance with new surveillance requirements.

2. "If you currently use compensatory measures to demonstrate control room habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures."

   Response

   Waterford 3 does not use compensatory measures to demonstrate control room habitability. This is because the reanalysis of the radiological dose calculation discussed in response to question 1a (see page 4 of 8) bounded the results of the tracer gas testing.

3. "If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principal Design Criteria" regarding control room habitability, in addition to responding to 1 and 2 above, provide documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence) of the basis for this conclusion and identify your actual requirements."

Response

Currently Waterford 3 is required to comply with the requirements of the GDC, specifically GDC 19 as documented in chapter 9 of the Waterford 3 UFSAR.

Attachment 2

W3F1-2004-0094

List of Regulatory Commitments

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check One)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
Upon approval of these new dose analyses* and in conjunction with the power uprate, the licensing basis dose analysis results will be updated in the UFSAR. *Specifically, control room dose analyses have been conducted and demonstrated to have acceptable consequences for events for which control room dose was not previously documented in the FSAR, such that all FSAR Chapter 15 events for which offsite dose is explicitly evaluated are also evaluated for control room dose			Within 6 months of completion of RF-13
Waterford 3 SES will submit a proposed licensing amendment request within six months following approval of TSTF-448, or if the TSTF is processed through the Consolidated Line Item Improvement Process (CLIIP), within 6 months after the CLIIP is published in the Federal Register. The amendment request will include a new Technical Specification Surveillance Requirement to determine inleakage in accordance with the Control Room Integrity Program. A new section will be added to the Technical Specification Section 6.5, "Programs and Manuals," that will specify the scope of the Control Room Integrity Program. The Control Room Integrity Program will rely on the use of ASTM 741 tracer gas or other suitable inleakage testing			N/A