August 19, 2005

Mr. Paul D. Hinnenkamp
Vice President - Operations
Entergy Operations, Inc.
River Bend Station
5485 US Highway 61N
St. Francisville, LA 70775

SUBJECT: RIVER BEND STATION, UNIT 1 - REQUEST FOR ADDITIONAL INFORMATION RELATED TO USE OF THE FUEL BUILDING CASK HANDLING CRANE FOR DRY SPENT FUEL CASK LOADING OPERATIONS (TAC NO. MC6327)

Dear Mr. Hinnenkamp:

By letter dated March 8, as supplemented by letter dated April 19, 2005, Entergy Operations, Inc. requested an amendment to the River Bend Station operating license for use of the fuel building cask handling crane for dry spent fuel cask loading operations.

After reviewing your request, the U.S. Nuclear Regulatory Commission staff has determined that additional information is required to complete the review. We discussed this information with your staff by telephone and they agreed to provide the additional information requested in the enclosure within 30 days of receipt of this letter.

If you have any questions, please call me at (301) 415-1480.

Sincerely,

/RA/

N. Kalyanam, Project Manager, Section 1
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-458

cc: See next page

Encl.: Request for Additional Information

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REQUEST FOR ADDITIONAL INFORMATION

ENTERGY OPERATIONS, INC. RIVER BEND STATION, UNIT 1

USE OF THE FUEL BUILDING CASK HANDLING CRANE

FOR DRY SPENT FUEL CASK LOADING OPERATIONS

DOCKET NOS 50-458 AND 72-49

Plant Systems Group

1. The Fuel Building Cask Handling Crane (FBCHC) is described in Section 3.1 of the application, dated March 8, 2005, as a "non-safety-related, commercial grade crane," and "a bridge-and-trolley design that is not single-failure-proof."

   Section 5.1.4 of NUREG-0612 states that in order to provide assurance that the evaluation criteria of Section 5.1 are met, one of two options should be met in addition to satisfying the guidelines of section 5.1.1. Please indicate which of the two options apply to the use of the FBCHC during Dry Spent Fuel Cask Loading Operations, and discuss in detail how the requirements set forth in the option chosen are met.

2. In section 4.0 of attachment 1 of the application, it is stated that the classification of the FBCHC is being upgraded to "Quality Assurance Program Applicable" in the RBS configuration management control systems. Please identify the difference in the requirements for equipment that is designated safety-related as opposed to "Quality Assurance Program Applicable."

3. In section 4.4 of attachment 1 of the application, it is stated that the load test performed included testing of the redundant rigging appurtenance design modification, which is relied upon to preclude having to postulate load drops during lateral moves of the crane. Describe how testing of the redundant rigging appurtenance was performed to verify the load carrying capability of the redundant crane links, and discuss in detail the inspection that will be performed, and criteria to be met to assure proper application of the redundant rigging prior to its use.

4. In section 4.4 of attachment 1 of the application, it is stated that load testing of the indoor portion of the FBCHC was performed during initial construction, and because the load-bearing components of the inside portion of the crane structure have not been modified since original installation, another 125 percent load test is not required. In the NUREG-0612 and NUREG-0554 comparison matrix provided by the applicant, it is stated that the actual indoor test lift was performed in September 1983, and the FBCHC outdoor test lift was performed at a minimum temperature of 74.5 EF. The applicant then states, in the notes, that cask loading procedures will require an ambient temperature $ 70 EF.

   a) In section 2.4 of NUREG-0554, it is stated that in regards to the cold proof testing that "If the desired minimum operating temperature cannot be achieved during the test, the minimum operating temperature should be that of the test until the crane is retested at a lower temperature." Please provide the basis for selection of the minimum ambient temperature of 70 EF to be used in the procedures.

b) When the cold proof testing was performed for the indoor portion of the crane during the original installation of the crane, at what temperature was the test performed and what minimum temperature of operation is currently used for the indoor portion of the crane.

c) In section 2.4 of NUREG-0554, it is stated that following the proof-test "the nondestructive examination of critical areas should be repeated at 4-year intervals or less." Please indicate whether nondestructive tests were performed after the proof test of the indoor portion of the crane during the original installation, and describe at what interval and to what extent nondestructive examinations have been conducted for critical areas.

5. Section 4.7.2.1 of attachment 1 of the application discusses how the redundant crane rigging is used. In this section, in reference to the successful engagement of the redundant rigging, it is stated that "successful engagement of the redundant rigging is visually confirmed."

a) Please identify and discuss any other means that are used to confirm the successful engagement of the redundant rigging.

b) Explain why visual confirmation is considered sufficient.

c) Inclusion of the inspection requirement in the cask loading procedures is listed in attachment 3 to the application. Please describe what criteria will be used to verify that the redundant rigging is properly engaged, and discuss how it has been incorporated in the training.

6. In section 4.7.6.5 of attachment 1 of the application, a drop is postulated to occur while the loaded transfer cask is suspended above the impact limiter on the pedestal at elevation 98'-1". In the Updated Safety Analysis Report (USAR), figure 9.1-9, this area is identified as the "spent fuel cask washdown area," and the drawing indicates that a pipe tunnel is located on the elevation directly below the washdown area. The USAR also states that safety-related electrical cables and one safety-related pipe are among the structures, systems, and components contained in the pipe chase area. The discussion in the LAR only discusses the impact the drop would have on the structural integrity of the transfer cask. Please discuss the impact of the postulated drop on the structural integrity of the facility and any potential impact to safety-related pipes and electrical equipment located in the pipe chase on the elevation below.

7. Appendix A to attachment 1 of the application gives a step-by-step list of the operational activities required for spent fuel pool cask handling operations when using the fuel building cask handling crane. Please specify what, if any, new procedures will be required, identify what current procedures require updating, what inspections are planned, how operators will be trained and qualified on the new equipment configurations and procedures, and what administrative controls if any will be utilized prior to or during cask handling.

8. In response to the compliance to NUREG-0554 Section 4.1, item 6, on page 20 of the attachment to the supplement dated April 19, 2005, it is indicated that the crane does not have a dual load path rope reeving system, and that for most horizontal load movements, redundant rigging is engaged to the lift yoke to provide single failure protection against drops. In section 4.7.2.1 it is stated that " After initial engagement of the lift yoke, the slings have some slack in them." In section 4.7.2.2, "Load Transfer during Postulated Failure Scenarios", the load path slings are assumed to have no slack. The assumption is based on the use of operating administrative controls to

ensure that the slings in the load path have a minimal amount of slack without carrying any significant portion of the load.

a) Please discuss how balancing and distribution of the load is accomplished with redundant rigging engaged.

b) Since the assumption that load path slings have no slack is based solely on administrative controls which relies on visual conformation that all slack has been removed, the possibility that some slack will remain still exists. Please discuss the sensitivity of the redundant links to changes in slackness, including results of analyses which were performed to demonstrate the impact that variation in slack would have on load transfer during postulated failures.

Mechnical and Civil Engineering Branch

9. It is stated that the previous seismic analysis was performed with no load on the crane hook, and a re-analysis was performed, and the analysis results indicated that the crane system is qualified to hold the maximum critical load during a design basis seismic event, except two welds were upgraded. Please provide response to the following:

(a) Define the boundary of the crane system.
(b) Have the beams and columns that support the crane been qualified in the re-analysis?
(c) Provide the magnitude of the maximum critical load and the governing load combinations.
(d) Describe the re-analysis procedures.
(e) Describe the method(s) you used to verify that all components of the crane system are qualified except the two welds.

10. It is stated that, if outdoor cask handling is underway and weather conditions unexpectedly deteriorate rapidly, sufficient time exists to move the suspended cask to a safe location in a controlled, deliberate manner. Please provide the basis that supports your conclusion of “sufficient time exists.”

Spent Fuel Pool Organization (SFPO)

Holtec Report No. HI-2022956, “HI-TRAC Impact Limiter Qualification at River Bend,” Revision 1

SFPO reviewed structural performance of the impact limiter to ensure that the cask is protected such that the maximum cask deceleration is less than 64.8 g for which the HI-TRAC transfer cask, Multi-Purpose Canister (MPC), and fuel assemblies have been demonstrated to be structurally adequate during a cask vertical drop accident.

11. Submit a copy of Reference 11 on relevant crush strength for the General Plastic Last-a-Foam FR-3700 polyurethane foam to demonstrate that appropriate stress-strain curve is considered in evaluating impact limiter lock-up effects.

Background: The crush strength of the 13 pounds per cubic foot (pcf) foam, as reported in Reference 11 and Figure 5 of the report, is markedly different from that based on the 9/92 edition of the Last-a-Form FR-3700 data sheet available to the staff. For instance, Figure 5 lists crush strengths of 819 pounds per square inch (psi) and 10,936 psi for strains at 30 percent and 80 percent, respectively. However, the corresponding strengths available to the staff are 582 psi and 5,206 psi. Use of the Figure 5 crush strength will underestimate impact limiter vertical deformation, which, in turn, may render the calculation incapable of evaluating impact limiter lock-up effects.

Holtec Report No. HI-2043278, "Evaluation of Postulated HI-TRAC 125D Transfer Cask Drop Accidents at River Bend Station," Rev. 2

12. Submit finite element modeling details for the lid-to-shell partial penetration weld joint and the gap interface between the MPC closure lid and the shell body. With respect to the weld, provide justification for using directly the uniaxial stress-strain material properties for evaluating the calculated von Mises stress, which is primarily biaxial in nature.

    Background: In Figure 9 of the report, the lid-to-shell weld is shown to be subject to material yielding while the lower shell near the bottom plate of the MPC remains elastic, for a 7-inch vertical drop of the loaded transfer cask. In a separate calculation package for the MPC subject to a 25 foot drop, the most critically stressed and strained location, however, is shown to be at a lower shell section near the bottom plate. It's unclear whether any modeling anomalies have been introduced to the weld finite element scheme, such as type, size, number of elements, and order of integration for determining stress/strain performance of the weld. Holtec should provide information to show that the weld details are adequately modeled so as not to invalidate the reported stress/strain results.

Holtec Report No. HI-2043276, "Analysis of a Postulated MPC Drop Accident during MPC Transfer Operation," Rev. 0

13.1 Considering true stress and true strain, perform a supplemental LS-DYNA analysis of the MPC to demonstrate that the strains at the lid-to-shell weld and the lower shell section near the bottom plate remain to be bounded by the material failure strains.

Background: Contrary to that required by the LS-DYNA to use true stress and true strain in its large-strain computation algorithm, engineering stress-strain relationship appears to have been considered in modeling the elasto-plastic drop analysis of the MPC. The staff notes that the materials at both the top and bottom parts of the MPC are subject to major yielding and resulting stress relaxation at the lid-to-shell weld may affect appreciably the stress state change for the lower shell. Proper account of stress-strain relationship is essential for evaluating maximum strains at critical locations of the MPC.

13.2 Discuss why an irregular stress state in the circumferential direction, as displayed in Figure 4 of the report, should result in a uniform plastic strain state, shown in Figure 5.

Background: The irregular light green/yellow stress contours near the closure lid end do not suggest that uniform plastic strain state is attainable in the upper MPC shell.

River Bend Station

cc:

Winston & Strawn
1700 K Street, N.W.
Washington, DC 20006-3817

Manager - Licensing
Entergy Operations, Inc.
River Bend Station
5485 US Highway 61N
St. Francisville, LA 70775

Senior Resident Inspector
P. O. Box 1050
St. Francisville, LA 70775

President of West Feliciana
Police Jury
P. O. Box 1921
St. Francisville, LA 70775

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Ms. H. Anne Plettinger
3456 Villa Rose Drive
Baton Rouge, LA 70806

Mr. Michael E. Henry, State Liaison Officer
Department of Environmental Quality
Permits Division
P.O. Box 4313
Baton Rouge, Louisiana 70821-4313

Wise, Carter, Child & Caraway
P. O. Box 651
Jackson, MS 39205

Executive Vice President and
Chief Operating Officer
Entergy Operations, Inc.
P. O. Box 31995
Jackson, MS 39286-1995

General Manager - Plant Operations
Entergy Operations, Inc.
River Bend Station
5485 US Highway 61N
St. Francisville, LA 70775

Director - Nuclear Safety
Entergy Operations, Inc.
River Bend Station
5485 US Highway 61N
St. Francisville, LA 70775

Vice President - Operations Support
Entergy Operations, Inc.
P. O. Box 31995
Jackson, MS 39286-1995

Attorney General
State of Louisiana
P. O. Box 94095
Baton Rouge, LA 70804-9095

Brian Almon
Public Utility Commission
William B. Travis Building
P. O. Box 13326
1701 North Congress Avenue
Austin, Texas 78701-3326