Entergy

F. G. Burford

RBG-46493

November 14, 2005

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

Subject: River Bend Station
Docket Nos. 50-458 and 72-49
License No. NPF-47
Supplement to Revised License Amendment Request (LAR) 2004-26, "Use of the Fuel Building Cask Handling Crane for Dry Spent Fuel Cask Loading Operations"

References:

1. License Amendment Request (LAR) 2004-26, "Use of the Fuel Building Cask Handling Crane for Dry Spent Fuel Cask Loading Operations," dated March 8, 2005

2. Supplement to License Amendment Request (LAR) 2004-26, "Use of the Fuel Building Cask Handling Crane for Dry Spent Fuel Cask Loading Operations," dated April 19, 2005

3. Supplement to License Amendment Request (LAR) 2004-26, "Use of the Fuel Building Cask Handling Crane for Dry Spent Fuel Cask Loading Operations," dated July 12, 2005

4. Revised License Amendment Request (LAR) 2004-26, "Use of the Fuel Building Cask Handling Crane for Dry Spent Fuel Cask Loading Operations," dated September 21, 2005

Dear Sir or Madam:

In Reference 1, Entergy Operations Incorporated (Entergy) requested an operating license amendment for River Bend Station (RBS). The proposed license amendment requested approval for the use of the Fuel Building Cask Handling Crane (FBCHC) for dry spent fuel cask handling operations. Specifically, consistent with the requirements of 10 CFR 50.59 and the guidance in NUREG-0612 and Bulletin 96-02, Entergy had determined that certain heavy load drop events required NRC review and approval prior to implementing dry storage cask operations at RBS. The original request was also supplemented in References 2, 3, and 4. This submittal contains additional information as requested by the NRC Staff as noted in Attachment 1. New commitments are included as summarized in Attachment 2.

Add: B. Vaidya

NMSS01
A001

The proposed amendment was evaluated in accordance with 10 CFR 50.90(a)(1) using criteria in 10 CFR 50.92(c) and it was determined to involve no significant hazards considerations. The bases for these determinations are included in the attached submittal. The No Significant Hazards Considerations are not affected by the responses to the RAIs.

Entergy requests approval of the proposed amendment as soon as practicable but no later than December 1, 2005 to allow loading casks this year. Entergy is requesting this date due to the impact on preparation activities for our refueling equipment to support our scheduled outage in April, 2006. Additionally, numerous ancillary components used for Dry Fuel Storage activities are shared with Grand Gulf Nuclear Station. These components are required to be at Grand Gulf early in 2006 to support their required demonstrations prior to cask loading later in 2006. River Bend Station is required to implement Dry Fuel Storage in order to maintain full core offload capability. Once approved, the amendment will be implemented prior to using the FBCHC for the loading of dry spent fuel casks.

If you have any questions or require additional information, please contact Mr. Bill Brice at 601-368-5076.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 14, 2005

Sincerely,

FGB/WBB
Attachments:

1. Response to Additional RAIs for LAR 2004-26
2. List of Regulatory Commitments

cc: (See Next Page)

cc: U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

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

U. S. Nuclear Regulatory Commission
Attn: Mr. N. Kalyanam
Attn: Mr. B. Vaidya
MS O-7D1
Washington, DC 20555-0001

LA Dept. of Environmental Quality
Office of Environmental Compliance
Emergency and Radiological Services Div.
P. O. Box 4312
Baton Rouge, LA 70821-4312

Attachment 1

RBG-46493

Response to Additional RAIs for LAR 2004-26

Response to Mechanical and Civil Engineering Branch Comments

as Discussed in Teleconference of October 7, 2005

1. Clarification of response to Mechanical and Civil Engineering Branch question 1.

(c) The crane and crane rope were evaluated for a load of 250K (125 tons) at various heights and with the trolley at various locations on the runway. The interaction ratio calculated for all structural members, including the crane rope, and connections were less than or equal to 1.0 except for trolley member connections which were 1.615. The calculated safety factor for the crane rope was 1.475. These trolley member connections were physically modified. After the modification, the interaction ratios are less than 1.0 for the connections. These were evaluated for the load combination:

D + SSE + 250 k (lifted)

2. Explanation of the deletion of the paragraph providing "Key input data..." from Section 4.7.6.3 of the LAR.

This information was deleted because most of it was not used in the reanalysis. A reanalysis of the maximum drop height was required due to a non-conservative consideration of the stiffness of the concrete target (slab at el. 93') in the original analysis. This model considered softer concrete layered on an elastic rock sub grade. The model used in the reanalysis considered much stiffer concrete with no rock sub grade. This was viewed as a more realistic model of the target since the target is the edge of a 4 ft thick concrete wall rather than a 30 in. thick slab and results in higher stresses in the cask.

Response to RAIs from the Plant Systems Branch Received on October 7, 2005

In a letter dated September 21, 2005, Entergy Operations Incorporation submitted additional information on the license amendment request for approval for the use of the Fuel Building Cask Handling Crane for dry spent fuel cask handling operations. The additional information provided included responses to NRC Request for additional information, and corrections and clarifications to the original submittal. The NRC SPLB staff has reviewed the newly submitted information, and finds that some concerns with the proposed use of the FBCHC for this application have not been fully addressed. The staff therefore, is issuing the following supplemental RAIs.

1. In Attachment 4 to RBG-46478, the staff requested in RAI 4c that the licensee provide information on nondestructive examinations performed on the indoor portion of the crane after the proof test conducted during the original crane installation in 1983. No new load test was performed on the indoor portion of the crane, and the failure of load bearing members of the crane inside the fuel building could result in a heavy load drop. The NDE data would help provide confirmation as to current condition of the crane. In the response provided by the licensee to RAI 4c, no specific information on NDE was provided. Please discuss what NDEs, if any, have been performed on the crane since its installation in 1983.

Response:

Regular non-destructive examination of the crane, runway and appurtenances includes both visual examination and surface examinations.

Visual inspections are performed on mechanical and structural parts associated with crane load path as follows: gearbox, runway rails, runway rail anchors, the crane structure including bridge girders, shelf angles, truck flanges, truck webs and bolted fasteners, crane wheels, hoist and drive brakes, chain drive, coupling, sheaves, drum, pillow block bearing, wire rope, and hook. In addition, panel inspections and drive and hoist operational tests are performed. Inspections also include verifications of operator safety readiness, operational readiness and labeling of crane rated loads.

Non-destructive surface examinations are performed on the crane hook.

Non-destructive examinations performed on crane following the April, 2004, load test included surface examination of added and modified parts to assure the quality and adequacy of the modifications. Surface examinations were performed on the surfaces of the redundant link plates attached to the underside of the crane drive girt and the welded connections, and the modified welds between the crane drive girt and the end trucks.

Cold proof testing, allowed under NUREG-0554 as an alternative to establish a margin of safety against brittle fracture of ferritic, load-carrying members in the absence of impact testing of crane materials, has not been performed on the RBS crane. However, it is recognized that if this test becomes necessary or desirable, it will be followed by surface examination of welds whose failure could result in the drop of a critical load. The population of inspection targets would include at least those items surface examined following the April, 2004, load testing, as well as other items based on a review of operating experience for such testing and consultation with the crane manufacturer, if any. Additional information on crane NDE is provide in the response to item 2 to the Plant Systems Branch question of November 2, 2005 (see page 8 of this attachment).

2. In Attachment 4 to RBG-46478, the staff requested in RAI 5a that the licensee identify any means other than visual confirmation to confirm the successful engagement of the redundant rigging, and in RAI 5b the licensee is asked to explain why visual confirmation is considered sufficient. The response provided indicates that there are no means of confirmation other than the visual confirmation relied upon and that visual indications of achieving tautness in the redundant slings are clear and unambiguous. Visual confirmation is based on a subjective determination as to when an adequate degree of tautness is obtained, please clearly state why it is reliable and discuss why more objective means of confirmation are not used.

Response:

Visual confirmation is the only means used to confirm the successful engagement of the redundant rigging. Visual confirmation is reliable because the observer is within a short distance with an unobstructed view of the activity. The visual observation confirming the satisfactory completion of each step is made by the personnel performing the lift and then independently confirmed by their supervisor. This is considered adequate and more objective means are not necessary. Visual confirmation is used to verify 1) the lower crane links are appropriately locked into the lift yoke and 2) the slack has been removed from the slings. These verifications confirm that the lift slings are engaged and ready to provide their function as the redundant load path.

The slings are passive devices designed to support the maximum critical load carried by the crane. The slings provide a second load path which would prevent a drop of the load in the event of a failure of the main hook or other failure of the main lift system (cable, drum, etc).

Engineering analyses have demonstrated the passive slings are capable of performing their function provided they are taut. The requirement to lower the lift yoke to remove the slack in the slings assures the crane is in a configuration consistent with its design.

Based on the passive design of the slings (and on the safety margin in the load carrying ability), visual verification of the tautness of the slings is a reliable means of confirming the availability of the load path. Each load path has been tested to demonstrate its capability in carrying the design load. As long as there is no obvious slack in either the slings or the main cable, the load can be supported by either of two systems, each capable of supporting 100% of the design load.

3. In Attachment 4 to RBG-46478, the staff requested in RAI 6 that the licensee discuss the impact of a cask drop in the washdown area and its potential impact on safety-related SSCs. The licensee's response states the 125-ton drop in RBS USAR Section 9.1.4.3 bounds the cask drop. In the USAR cask analysis, the cask pool was assumed to be flooded and thus the cask falls through water. In the drop in section 4.7.6.5 of this LAR the drop analysis assumes that a loaded transfer cask falls through air onto an impact limiter. Please explain why the USAR drop is bounding.

Response:

RBS USAR Section 9.1.4.3, Safety Evaluation, Fuel Handling System states in part that "(t)he cask pool is assumed to be flooded during the cask-handling process." This section remains silent on the assumptions for the Spent Fuel Cask Washdown Area. This area is not part of the cask pool and is not flooded. Accordingly, the original analysis was done with the consideration that the area is dry. The USAR did not explicitly reflect the drop in the cask washdown area being a dry drop. The results of that original analysis include drops over the flooded cask pool as well as over the dry cask washdown pit. Therefore, the existing cask drop analysis bounds drops in all critical areas. The RBS USAR will be clarified in this regard.

4. In Attachment 4 to RBG-46478, the staff requested in RAI 8a&b that the licensee discuss how the load is balanced and distributed with the redundant rigging and the sensitivity of the redundant links to variations in slack. The licensee's response does not address the balancing and distribution of load if the main hoist fails and the load is transferred to the redundant rigging, nor does it discuss the sensitivity for cases where the rigging is not completely taut. Please provide a response that addresses the above concerns.

Response:

Section 4.7.2.1 of LAR 2004-26 states that the RBS redundant rigging system (links/slings) will be engaged for unanalyzed horizontal movements of loaded casks.

The redundant rigging system engagement is verified prior to proceeding with these horizontal movements. This task is administratively controlled by sign off steps in procedures. Engagement of the redundant rigging system involves visual confirmation of inter-dependent operational actions. That is, each action must be successfully accomplished sequentially to achieve overall engagement of the system.

The redundant rigging engagement process has two steps performed sequentially:

a.) mechanical engagement of the latch links, and

b.) tightening (to tautness) of the redundant slings.

These actions are governed by specific steps contained in procedures governing the operation. Each step is confirmed by visual observation at the time of step completion and documented in the plant procedure.

The visual indications confirming satisfactory completion of both steps are easily discernable and unambiguous. Cask handling personnel performing the engagement have been trained on, and have reliably performed the redundant rigging engagement process. The visual observation confirming the satisfactory completion of each step is made by the personnel performing the lift and then independently confirmed by their supervisor. If visual observation of the first step (mechanical engagement of the latch links), cannot verify acceptable link engagement, then the procedure step cannot be signed off and the second step, tightening of the slings, is administratively prohibited from being performed.

Once engaged and verified to be taut, the links/slings provide positive, on demand, no delay redundant load carrying capacity of the lifted load at all times. Both the primary load path (crane hook/wire rope) and the back-up load path (links/slings) have been demonstrated to be capable of independently holding the load. Engineering analyses have shown that the dynamic loads associated with transfer of the load by either system to the other can be accommodated. The basis for these analyses is initial tautness of the slings of the redundant rigging system with and without carrying significant initial load.

RBS procedures use the crane hook/wire rope as the primary load path to handle the load with the redundant links/slings charged (taut) and in standby. Analyses have been performed to demonstrate the capability of the crane hook/wire rope system to accept a load transferred from the redundant links/slings system as well, even though this is not part of the design basis for the lifting system. This satisfies the potential need for an equalizer (for stretch) to balance or distribute the load between the two load handling systems and to hold the load on sudden transfer (ref. NUREG-0554, Section 4.1).

Response to Plant System Branch RAIs Received on November 2, 2005

NUREG-0612 guidelines for heavy load handling activities in the fuel building call for either heavy load drop analyses verifying the consequences of a load drop are acceptable or use of a single-failure-proof crane designed to criteria contained in NUREG-0554 and the supplementary guidelines for upgrades of existing cranes contained in Appendix C to NUREG-0612.

Entergy Comment

NUREG-0612, in Section 5.1.6, notes that "for certain areas, to meet the guidelines of Sections 5.1.2, 5.1.3, 5.1.4, or 5.1.5, the alternative of upgrading the crane and lifting devices *may* [emphasis added] be chosen." It goes on to suggest that the purpose of that upgrade would be to improve the reliability of the crane through increased factors of safety and through redundancy or duality in certain components. Section 5.1.5 more pointedly notes that for any safe shutdown equipment are beneath or adjacent to a potential travel path, the guidelines of Section 5.1.1 and one of the following methods should be satisfied:

- Install or upgrade to a single failure proof crane, OR
- Limit the load path with mechanical stops or electrical interlocks, OR
- Analyze the effects of postulated load drops and demonstrate that effects would not preclude operation of sufficient equipment to achieve safe shutdown.

RBS has elected not to upgrade the cask handling crane to a single-failure proof handling system. There are no safe shutdown components or any other safety related equipment in the load path of the crane during cask handling operations that have not been analyzed. RBS has performed load drop evaluations to revise or incorporate additional load drop analyses not addressed in the original licensing basis. Note that the only safety related equipment which is within the load path of the crane during cask handling operations is the piping and cables in a pipe tunnel under the cask pit. As noted in the response to RAI 1 provided in letter RBG-46478, in addressing NUREG-0612, Section 5.1 Criterion IV, no damage to this equipment was predicted for a design basis load drop in this area.

1. Entergy has proposed the use of a hoisting system that provides redundant rigging during horizontal movements of the loaded cask between the cask pool and outdoor truck bay. The crane is designed to common industrial standards rather than to the rigorous design criteria for a single-failure-proof handling system. The redundant rigging provides a static load path from the special lifting device to the crane bridge structure. If properly designed and engaged, the redundant rigging provides a second load path that reduces the probability of a cask drop due to certain static failures of the main hoist and reeving system. Based on the use of this hoisting system enhancement for horizontal movements of the cask, no load drops were postulated during the horizontal movements of the loaded cask.

   The proposed configuration of the secondary rigging lacks a method to ensure the tension in the redundant rigging remains within a range where the redundant rigging has been evaluated to withstand the load transfer shock associated with a static failure of the crane hoist and reeving system components. A single-failure-proof crane as defined in NUREG-0554 automatically maintains the analyzed balance between redundant load paths such that the shock of load transfer is within analyzed limits and maintains this safe configuration following inadvertent hoist motion or control system failures. Describe how the proposed alternative redundant rigging system will be operated and tested to provide an integrated capability equivalent to that described in Sections 3.3 and 4.1 and 6.1 of NUREG-0554 with regard to maintaining the load in a safe configuration suspended from balanced and redundant load paths following inadvertent hoist motion or control system failures. Otherwise, provide justification that the objectives of NUREG-0612 guidelines, as listed in Section 5.1, would be satisfied with a less capable handling system.

Response:

Section 3.3 of NUREG-0554 states that it may be necessary to include special features and provisions to preclude system incidents that would result in release of radioactivity. It goes on to discuss automatic controls and limiting devices that, when disorders due to inadvertent operator action, component malfunction, or disarrangement of control functions occur singly or in combination, and assuming no failures, these disorders will not prevent the handling system from stopping and holding the load.

As noted above, RBS has elected not to upgrade the cask handling crane. Therefore, in order to accommodate the safe lifting of Dry Fuel Storage (DFS) equipment containing spent nuclear fuel, a load handling methodology was developed.

The load handling methodology is a combination of load drop analyses, a dual load path crane system (redundant rigging), and positive controls over crane operation to ensure safe, efficient load handling. The DFS loads handled at RBS can be divided into two categories, as follows:

- Load drops have been postulated, analyzed, and the consequences determined to be acceptable. Impact limiting devices and carry height restrictions are applied to ensure that the consequences of a load drop remain acceptable.

- Where load drop analyses have not been performed, dual load path crane system (redundant rigging) is engaged.

These methodologies are used in combination to ensure that DFS heavy load handling activities satisfy the objectives of NUREG - 0612 section 5.1 or assure that the potential for a load drop is extremely small (redundant rigging). These methods are in addition to the operator training, system design, and regular crane system inspections already in place.

Sections 3.3 and 6.1 of NUREG-0554 both deal with crane electric control systems. As cited in the NUREG, in some instances, crane design includes special features to preclude system incidents that would result in release of radioactivity. At RBS the DFS load handling methodology is accomplished by the integration of the redundant rigging system, analyzed load drops, and positive controls over crane operation. The design rated load and the maximum critical load are the same for this configuration.

The redundant rigging system will be employed during most of the horizontal movements of a loaded DFS cask (i.e., a HI-TRAC). This system is a passive system that is engaged prior to the horizontal movement. Once engaged and positive controls over crane operation effected, there is no operator action or control system malfunction that could result in inadvertent hoist movement or result in an uncontrolled lowering of the load.

In load movements where the redundant rigging is not engaged, load drops are analyzed in accordance with the methodology described in NUREG-0612, Appendix A. The analyses conclude in all cases that the postulated load drop will meet the evaluation criteria of NUREG-0612 Section 5.1 and will not damage safe shutdown equipment.

In order to ensure that disorders due to inadvertent operator action, component malfunction, or disarrangement of subsystem control functions will not result in inadvertent load movement that could lead to an unanalyzed lift system configuration, crane movement will be positively controlled to allow only singular motion. That is, during hoisting of the load, positive controls will be in place to prevent trolley movement and during trolley movement, positive controls will be in place to prevent hoist movement. These positive controls will act to prevent load movement outside the bounds of any of the governing analyses. The positive controls ensure that lift height restrictions and redundant rigging load sharing requirements are maintained. Operator actions to remove power to the hoist or trolley motors as applicable will be employed initially. Entergy will determine the most appropriate long terms means to incorporate positive controls used during hoisting to prevent trolley movement within 1 year, and implement the most appropriate method within 3 years.

The crane cab includes a "reset-stop" pushbutton station with a red stop button that opens the main line electrical contactor. Opening this contactor will stop all motion of the bridge trolley and hoist. The radio remote control system has the same operational features for bridge, trolley, and hoist operation as the bridge-mounted control panel, including an emergency stop button. These switches fulfill the guidance for an emergency stop button at the control station to stop all motion, as described in section 3.3 of NUREG-0554.

Therefore, the RBS Spent Fuel Cask Crane and the DFS load methodology meet the intent of NUREG 0554, sections 3.3 and 6.1.

RBS maintains the analyzed balance between redundant load paths such that the shock of load transfer is within analyzed limits. Hoist motion, resulting from equipment or control system failures or inadvertent operator action, is prevented during the horizontal load movement.

During cask handling operations that involve lateral movement, redundant load carrying capability (redundant rigging) provides a passive means of assuring that the load will not drop. This redundant load path transfers the load directly to the crane main girt in the event of a failure in the crane hoist load path. The redundant rigging is engaged by hoisting the load up to permit installation of the rigging. Once the rigging is visually verified to be engaged, the load is lowered to remove any slack from the rigging. This movement transfers a minimal load to the redundant rigging and ensures that the load is being carried within the boundary conditions of the dynamic load transfer analysis. The analysis concludes that the maximum dynamic load in the event of a main hoist failure is developed when there is no load in the redundant rigging. Removing the slack in the rigging and providing a minimal load ensures that this boundary condition is maintained. Also, minimal loading in the redundant rigging system results in minimal dynamic load transfer to the main hoist system in the event of a failure of the redundant rigging system.

After removing the slack from the redundant rigging and before beginning horizontal movement of the load, the hoist drive motor will be electrically isolated from its power source. This prevents the possibility of hoist motion resulting from equipment or control system failures or inadvertent operator action during the horizontal transfer. This action ensures that the hoist system and redundant rigging loads remain stable during horizontal load movements and are bounded by the dynamic load transfer analysis. Thus, inadvertent operator action, component malfunction, or control function disarrangement will not result in a load drop. There would be no resultant release of radioactivity.

Therefore, the redundant means of precluding a load drop are provided and the integrated capability of the RBS redundant rigging system affords protection equivalent to that described in NUREG – 0554 Section 4.1.

Therefore, the proposed alternative redundant rigging system will be operated to provide an integrated capability to maintain the load in a safe configuration suspended from balanced and redundant load paths. Positive controls will be in place to prevent inadvertent hoist motion or control system failures from having an adverse impact on the analysis governing that particular aspect of movement.

The combination of: (1) a design that meets the applicable criteria and guidelines of Chapter 2-1 of ANSI B30.2-1976, "Overhead and Gantry Cranes," and CMAA-70, "Specifications for Electric Overhead Traveling Cranes," (2) a positive means to prevent energizing the drive motor(s) from it's power source so as to prohibit inadvertent load movement (in one plane while moving the load in the other plane) resulting from inadvertent operator action, component malfunction, or disarrangement of subsystem control functions, and (3) acceptable load drop analyses (for all load movements that do not utilize redundant rigging), or (4) a static (redundant rigging) load path that bypasses the hoisting load path such that the load is transferred to and maintained in a safe configuration suspended from the redundant rigging following any postulated failure within the hoisting load path (for all load movements that are not evaluated for a load drop), provides an integrated capability equivalent to that described in Sections 3.3 and 4.1 and 6.1 of NUREG-0554.

2. Entergy has indicated that regular testing of the crane, runway, and appurtenances includes both visual inspection and surface examinations, and that non-destructive surface examinations are performed on the crane hook. The licensee also stated that non-destructive examination (NDE) was performed on the crane following the April 2004 load test, but the scope was limited to added and modified parts. Describe the basis for concluding that NDE performed on the crane structure since its installation is adequate to ensure the crane's structural integrity during cask movement. The response should address the degree of conformance with NDE specified in Section 2.6 of NUREG-0554 and the alternative method of satisfying Section 2.8 of NUREG-0554 specified in Appendix C to NUREG-0612. If the NDE is inadequate to ensure the structural integrity of the crane, provide justification that the objectives of NUREG-0612 guidelines, as listed in Section 5.1, would be satisfied with a less thorough examination of the structure.

Response:

Sections 2.6 and 2.8 of NUREG-0554 refer to the performance of NDE for welds whose failure could result in a drop of a critical load. Section 2.6 cites the consideration of lamellar tearing; Section 2.8 cites consideration of welding procedures, in particular post-weld heat treatment (PWHT).

For PWHT issues, Appendix C of NUREG-0612 (page C-3, item 3) provides for the use of NDE as an acceptable substitute to PWHT for critical welds. NDE inspections of critical RBS crane welds have been accomplished by surface examination using the magnetic particle (MT) technique. Critical welds for the RBS fuel building cask handling crane (FBCHC) include the following welds:

a) construction of the plate girder end trucks (2 girders),

b) construction of the plate girder main girt (1 girder),

c) connections between the main girt and the end trucks (2 connections),

d) connections between the drive girt and the end trucks (2 connections),

e) connection of redundant link plates to the main girt flange (4 plates) and

f) connection of the anti-derailment lugs to the main girt (2 lugs for each of 4 crane wheels).

Note: the drive girt is a rolled W24 wide flange section and has no welds of construction.

With the exception of the anti-derailment lug welds, critical welds were identified by following the load path from the redundant link plates back to the crane wheels. Welds associated with the hoist subsystem were excluded since, for all load movements, RBS provides redundant load carrying capability or has load drop analyses in accordance with NUREG-0612.

NDE (magnetic particle testing, MT) performed in April, 2004, included 100% of the welds in items (c), (d) and (e), and 50% (of the length) of the welds in items (a) and (b). Welds associated with item (f) were not surface examined but were visually inspected. The total length of welds associated with items (a) and (b) is approximately 130 feet. Each of these welds was MT examined to 50%, for a total MT inspection length of ~65 feet. The remaining weld length was visually inspected. No volumetric (radiographic or ultrasonic) examinations were performed. The scope of the NDE inspections also included certain other non-critical welds but are not included in reported totals.

Based on the above, NDE inspections were performed on ~65-75% of all welds, whether measured by total weld length or by the number of weld segments. There were no incidences of weld failures found in any critical welds. In one case, non-critical welds on a gusset plate on the crane structure were repaired. The results of the NDE of the critical welds are considered strong evidence that the welds are acceptable. This supports the conclusion that the handling system satisfies the objectives of NUREG-0612, Section 5.1. The crane has been load tested twice (September, 1983 and April, 2004).

Regarding lamellar tearing, industry information (from The Welding Institute (TWI)) indicates that the use of volumetric examinations (RT and UT) does not assure that internal lamellar tearing can be distinguished from material inclusion bands. Discovery is more readily made through surface examination after internal tearing breaks the surface of the base material. NUREG-0577, Rev. 1, *Potential for Low Fracture Toughness and Lamellar Tearing in PWR Steam Generator and Reactor Coolant Pump Supports,* addresses issues related to lamellar tearing. It concluded that lamellar tearing is generally detected and corrected during the construction of components, and that reasonable safety factors on strength can bound experimental results on torn joints. The NUREG also concluded that the lamellar tearing aspects of the Unresolved Safety Issue A-12 were resolved.

Based on the above, the amount and nature of NDE performed on FBCHC critical welds is considered to provide a high level of confidence about the quality of all critical welds and of the base material subject to lamellar tearing, ref. Sections 2.6 and 2.8 of NUREG-0554.

Attachment 2

RBG-46493

List of Regulatory Commitments

List of Regulatory Commitments

This table identifies actions discussed in this letter for which Entergy commits to perform. Any other actions discussed in this submittal are described for the NRC's information and are not commitments.

COMMITMENT	TYPE (Check One)		SCHEDULED COMPLETION DATE (If Required)
	ONE-TIME ACTION	CONTINUING COMPLIANCE	
From Page 7 of Attachment 1: During hoisting of the load, positive controls will be in place to prevent trolley movement and during trolley movement, positive controls will be in place to prevent hoist movement.		X	Prior to first cask loading campaign
From Page 7 of Attachment 1: Operator actions to remove power to the hoist or trolley motors as applicable will be employed initially. Entergy will determine the most appropriate long terms means to incorporate positive controls used during hoisting to prevent trolley movement within 1 year, and implement the most appropriate method within 3 years.	X		Employment of Operator actions will be done prior to first cask loading campaign. Make determination of most appropriate means within 1 year and implement within 3 years
From Page 4 of Attachment 1: (t)he existing cask drop analysis bounds drops in all critical areas. The RBS USAR will be clarified in this regard.	X		Within one year of implementation