TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

January 6, 1984

Director of Licensing
Attention: Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch No. 2
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Vassallo:

In the Matter of the	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
		50-296

By your letter to H. G. Parris dated May 26, 1983 subject, "Control of Heavy Loads," TVA was requested to provide the final results of our analysis for compliance with section 2.1 of NUREG-0612. Enclosure 1 details our review of each guideline of section 5.1.1 of NUREG-0612 and our compliance methodology. Enclosure 2 details our review of special lifting devices. This submittal should complete the requirements of section 2.1 of NUREG-0612. If you have any questions, please call Jim Domer at FTS 858-2725.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills

L. M. Mills, Manager
Nuclear Licensing

Sworn to and subscribed before me
this 6th day of January 1984.

Paulette D. White
Notary Public
My Commission Expires 9-5-84

Enclosures
cc (Enclosures):
U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Mr. R. J. Clark, Project Manager
Browns Ferry Nuclear Plant
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, Maryland 20814

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ENCLOSURE 1

	NRC GUIDELINE	TVA COMPLIANCE METHODOLOGY
1.	Guideline 1, Section 5.1.1(1)	MMI-119 has been revised and implemented to meet Guideline 1 requirements
2.	Guideline 2, Section 5.1.1(2)	Administrative controls have been implemented for the truck crane and 4 ton manual chain hoist
3.	Guideline 3, Section 5.1.1(3)	Compliance complete
4.	Guideline 4, Section 5.1.1.(4)	Results of review are in enclosue 2
5.	Guideline 5, Section 5.1.1(5)	The 125-ton reactor building crane (i.e., main and auxiliary hoist) is used in conjunction with the slings in question. The maximum dynamic load of the main and auxiliary hoist is 2-1/2 percent and 10 percent of the static load, respectively. This is based on section 3.3 of Industrial Standard CMAA-70. The latest response to the NRC TER C5506-337/338/339 states that a dynamic load range of 5-15 percent need not be considered in the process of sling selection. These slings meet this criteria and fully comply with guideline 5 of TER C5257-61-62/63.
6.	Guideline 6, Section 5.1.1(6)	TVA complies with ANSI B30.2, B30.5, B30.16
7.	Guideline 7, Section 5.1.1(7)	Compliance complete

ENCLOSURE 2

Response to Question 4a TER C5257-61/62/63
Spent Fuel Cask Rotator - Compliance with ANSI N14.6-1978

Discussion

The cask rotator with lift eye and lock nut was procured under a nonquality assurance contract (71C33-74803-1), but because of interface problems with the cask yoke supplied by General Electric, modifications to the lifting eye and lock nut were required. These were identified by ECN L1385.

During the course of resolving ECN L1385, a preliminary Regulatory Guide 1.104 was released by NRC which required redundancy in the block and hook. The change to the block for redundancy and the changes required by the ECN were incorporated into a QA contract (76K64-87276). The following table will use specifications from both the above cited contracts to establish compliance with ANSI N14.6-1978.

Response to Question 4a of TER C5257-61/62/63
EN DES-Designed Spent Fuel Cask Rotator

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.1.1	E	a) No design specification was written; however, procurement specifications 1241 and 2628 satisfy the requirements of a design specification. b) No limitations on the use of the rotator with respect to temperature, corrosive environment, etc., exist in the RB for the cask rotator's intended use.
3.1.2	E	The critical items list is as follows: 1) main pin, 2) housing, 3) lifting eye, 4) lock nut, 5) bearings. Procurement specification 1241 and 2628 satisfy the remaining requirements of this section for these items.
3.1.3	C	Verification of stress analysis (BWP 830329 102) is available.
3.1.4	E	A criteria for acceptable repair and testing procedures will be written.
3.2.1	C	
3.2.4	C	
3.2.5	NA	No wire rope is used in the cask rotator assembly.
3.2.6	E	This material cannot be exempted by the methods mentioned in this section. A cold proof test will be performed for compliance prior to initial use in "heavy load" applications.
3.3.1	C	
3.3.4	NA	There is but a single load bearing assembly for the cask rotator assembly.
3.3.5	C	

Response to Question 4a of TER C5257-61/62/63
EN DES-Designed Spent Fuel Cask Rotator

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.3.6	NA	No actuating mechanism is used in the cask rotator assembly.
4.1.3	C	
4.1.4	C	
4.1.5	C	
4.1.6	E	A QA program had not been implemented when this assembly was procured. However, the procurement specifications do control the majority of the requirements in this section.
4.1.7	E	As indicated in the discussion on page 1 of this report, the purchase contract for this rotator was non-QA, therefore, material certifications are not available for this device. However, the modifications identified were performed under a QA contract and material certifications are available for the new components. Performance of the recommended proof test should establish compliance with the intent of this section.
4.1.9	C	
5.2.1	C	
5.2.2	E	Processing a replacement part from the same lot of material as the original component cannot be guaranteed. However, any replacement parts would be subject to design, material, heat treatment, fabrication, inspection testing, and quality control requirements equivalent to, or more severe, than the original specification.

Response to Question 4a of TER C5257-61/62/63
EN DES-Designed Spent Fuel Cask Redundant Link Assembly

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.1.1	E	a) No design specification was written, however, procurement specification 2628 satisfies the requirements of this section. b) No limitations on the use of the link with respect to temperature, corrosive environment, etc., exist in the RB for the redundant link intended use.
3.1.2	E	No critical items list was written. However, all items of the redundant link assembly are considered critical and each requirement in this section is satisfied.
3.1.3	C	Verification of stress analysis (MEB 830809 951) is available.
3.1.4	E	A criteria for acceptable repair and testing procedures will be written.
3.2.1	C	
3.2.4	C	
3.2.5	C	
3.2.6	E	This material cannot be exempted by the methods mentioned in this section. A cold proof test will be performed for compliance prior to initial use in "heavy load" applications
3.3.1	C	
3.3.4	C	
3.3.5	C	

Response to Question 4a of TER C5257-61/62/63
EN DES-Designed Spent Fuel Cask Redundant Link Assembly

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.3.6	NA	No actuating mechanism is used in the redundant link assembly.
4.1.3	C	
4.1.4	C	
4.1.5	NA	No welding exists in this assembly.
4.1.6	C	
4.1.7	C	
4.1.9	C	
5.2.1	E	The assembly will be proof tested to 150% of rated load by a nondestructive test performed in accordance with section 5.5 of ANSI N14.6-1978.
5.2.2	E	Processing a replacement part from the same lot of material as the original component cannot be guaranteed. However, any replacement parts would be subject to design, material, heat treatment, fabrication, inspection, testing and quality control requirements equivalent to, or more severe, than the original specification.

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed RPV Head Strongback

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.1.1	E	No design specification was prepared for the RPV head strongback; however, the intent of this criteria was met as follows: 1. General Electric (GE) Purchased Part Drawings provide: (1) material specifications, proof load, magnetic particle, and ultrasonic testing requirements, heat treatment requirements (where necessary), and fabrication procedures for designed components of the strongback; (2) purchasing information including vendor and catalog numbers for non-designed components (i.e., turnbuckles, anchor shackles, etc.); (3) name-plate information. 2. The GE Quality Control Program as invoked by the Purchased Part Drawings and the purchase order, provides additional requirements for fabrication processes, welding qualification, in-process inspection, ultra-sonic, magnetic particle and proof load testing, material certification, drawings and record retention. 3. The equipment purchase order invokes the design requirements of the Purchased Part Drawings and the GE Quality Control Program and identifies any additional fabrication, inspection, testing or quality control requirements. 4. No limitations on the use of RPV head strongback with respect to temperature, corrosive environment, etc., were identified as none are necessary provided the device is used only for its intended lifts within the reactor building environment.

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed RPV Head Strongback

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.1.2	E	No design specification or critical component list was prepared for the RPV head strongback, however, the intent of these criteria were met as follows: 1. The previously discussed GE Purchased Part Drawings, GE Quality Control Program and purchase order provide material identification, fabrication practices, in-process testing and inspection requirements and procedures, final product testing and inspection requirements and quality assurance requirements for all designed load bearing (i.e., critical) components of the RPV head strongback. 2. The nondesigned load bearing components (turnbuckles, anchor shackles, etc.) were selected for their load carrying capability and were explicitly defined on the Purchased Part Drawings. 3. A critical components list including as imposed material, testing and inspection requirements has been prepared. A copy of this list was included in GE's report to TVA (NEB 830623 615).

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed RPV Head Strongback

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.1.3	E	A stress analysis report was not provided at the time of the RPV head strongback delivery, however, the intent of this requirement was met as follows: 1. At the time of the design of the RPV head strongback, stress analyses were done for all load bearing components of the strongback when subjected to its maximum design load. These stress analyses are maintained in GE design record files and are subject to customer (TVA) audit. These analyses demonstrate the minimum design safety factors for these components. 2. A discussion of these stress analyses and a summary of the minimum stress design factors for each load bearing component of the RPV head strongback was provided to TVA in Appendix B of GE's report (NEB 830623 615).
3.1.4	E	No indication of permissible repair procedures was provided, other than during the fabrication process. Repairs should be done in accordance with the original fabrication requirements. For the RPV head strongback it has been recommended by the vendor, General Electric Company that permissible repair procedures be based on the requirements of ANSI N14.6-1978 section 5.4. Specifically repairs or modifications to designed components of the lifting devices shall be governed by the same requirements applied during the initial fabrication of the devices, and nondesigned components (i.e., turnbuckles, anchor shackles, slings, etc.) and load bearing pins shall be replaced rather than repaired. In order for TVA to be in compliance on this item, TVA will implement repair and testing procedures consistent with sections 5.4 and 5.5 of ANSI 14.6-1978 by completion of unit 1, cycle 6 refueling outage.

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed RPV Head Strongback

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.2.1	E	Designed components of the RPV head strongback were designed to provide a minimum safety factor of 4.0 with respect to material of construction minimum yield stress. Nondesigned components (i.e., turnbuckles and anchor shackles) were selected to maintain the overall safety factor of 4.0 based on their load carrying capability. The stress analysis presented to TVA by GE illustrates that all load bearing components of the RPV head strongback comply with the stress design criteria of this section with one exception. The cruciform structure of the RPV head strongback provides a minimum stress design factor relative to ultimate strength of 4.8 not 5.0 as required. As this structures does provide a minimum stress design factor relative to yield strength of 3.0 as required, it is felt that the intent of the ANSI N14.6-1978 design stress criteria are adequately met.
3.2.4	C	
3.2.5	C	
3.2.6	C	
3.3.1	C	
3.3.4	C	

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed RPV Head Strongback

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.3.5	C	
3.3.6	C	
4.1.3	C	
4.1.4	C	
4.1.5	C	
4.1.6	C	
4.1.7	C	
4.1.9	C	

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed RPV Head Strongback

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
5.2.1	E	A proof load test of the RPV head stongback was required and performed. The specified load for this test was 125 tons or 130 percent of the maximum load to which it is to be subjected. Following the test, all load bearing welds were magnetic particle inspected per GE specification and the entire structure was examined for dimensional deformation. It is not considered necessary to repeat this test at 150 percent rather than 130 percent of maximum load. Considering the infrequent usage of this device and that it will be used only for the lifts for which it was designed, it is concluded that the 130 percent load test is adequate.

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed Steam Dryer/Moisture Separator Sling

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.1.1	E	No design specification was prepared for the steam dryer/moisture separator sling, however, the intent of this requirement was met as follows: 1. GE Purchased Part Drawings provide: (1) material specifications, proof load and magnetic particle testing requirements, heat treatment requirements (where necessary), welder and welding procedures qualification requirements, and fabrication procedures for all designed components of the dryer/separator sling assembly; (2) purchasing information including dimensions, approved vendors and vendor catalog numbers for nondesigned components (i.e., wire rope, sleeves, thimbles, turnbuckles, etc.); and (3) nameplate information and mounting instructions. 2. The GE Quality Control Program as invoked by the purchase order, provides requirements for fabrication processes, welding qualification, in-process inspection, ultrasonic, magnetic particle and proof load testing, material certification, drawings and record retention. 3. The equipment purchase order invokes the design requirements of the Purchased Part Drawings and the GE Quality Control Program and identifies any additional fabrication, inspection, testing or quality control requirements.

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed Steam Dryer/Moisture Separator Sling

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
		4. No limitations on the use of the dryer/separator sling with respect to temperature, corrosive environment, etc., were identified as none are necessary provided the device is used only for its intended lifts within the reactor building environment.
3.1.2	E	No design specification or critical component list was prepared for the dryer/separator sling, however, the intent of these requirements were met as follows: 1. The GE Purchased Part Drawings, GE Quality Control Program, and the purchase order provide material identification, fabrication practices, in-process testing and inspection requirements and procedures, final product testing and inspection requirements, and quality assurance requirements for all designed load bearing (i.e., critical) components of the dryer/separator sling. 2. The nondesigned load bearing componets (wire rope, sleeves, thimbles, turnbuckles, etc.) were selected for their load carrying capability and were explicitly defined on the Purchased Part Drawings. 3. A critical components list, including imposed material, testing, and inspection requirements has been prepared and is included in Appendix A of GE's report (NEB 830623 615).

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed Steam Dryer/Moisture Separator Sling

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.1.3	E	A stress analysis report was not provided at the time of the dryer/separator sling delivery, however, the intent of this requirement was met as follows: 1. At the time of the design of the dryer/separator sling, stress analyses were done for all load bearing components of the sling assembly when subjected to its maximum design load. These stress analyses are maintained in GE design record files and are subject to customer (TVA) audit. These analyses demonstrate the minimum design safety factors for these components. 2. A discussion of these stress analyses and a summary of the minimum stress design factors for each load bearing component of the dryer/separator sling was provided for TVA in Appendix B of GE's report.
3.1.4	E	No indication of permissible repair procedures was provided, other than during the fabrication process. Repairs should be done in accordance with the original fabrication requirements. For dryer/separator sling it has been recommended by the vendor, GE, that permissible repair procedures be based on the requirements of ANSI N14.6-1978 section 5.4. Specifically repairs or modifications to designed components of the lifting devices shall be governed by the same requirements applied during the initial fabrication of the devices, and nondesigned components (i.e., turnbuckles, anchor shackles, slings, etc.) and load bearing pins shall be replaced rather than repaired. In order to TVA to be in compliance in this item, TVA will implement repair and testing procedures consistent with sections 5.4 and 5.5 of ANSI 14.6-1978 by completion of unit 1, cycle 6 refueling outage.

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed Steam Dryer/Moisture Separator Sling

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
3.2.1	C	
3.2.4	C	
3.2.5	C	
3.2.6	C	
3.3.1	C	
3.3.4	C	
3.3.5	C	
3.3.6	C	
4.1.3	C	
4.1.4	C	
4.1.5	C	

Response to Question 4a of TER C5257-61/62/63
General Electric-Designed Steam Dryer/Moisture Separator Sling

NA - Not Applicable
E - Equivalency
C - Compliance

ANSI N14.6 - 1978 - Specific Section	TVA's Position	Corrective Action or Equivalency
4.1.6	C	
4.1.7	C	
4.1.9	C	
5.2.1	C	
5.2.2	C	

Response to Question 4b TER C5257-61/62/63

Sling	Minimum Safety Factor	Present Proof Test (%)	Comments and Recommendations
44N334-1	8.5	231	Use as furnished
44N334-2	8.9	240	Use as furnished
44N334-3	10.9	275	Use as furnished
44N334-4	6.4	155	Proof test to 4000# *
44N334-11	4.4	112	Redesign, procure, and proof test replacement wire rope and fittings *
44N334-13	4.5	124	Redesign, procure, and proof test replacement wire rope and fittings *
44N334-13-1	3.24	184	Replace hooks on sling and reproof test legs to 74,100# and links to 100,000# *
44N334-14	5.7	152	Reproof test sling legs to 5600# *
44N334-16	5.7	143	Reproof test legs to 7800#
44N246	6.42	170	Reproof test legs to 16,500#, * links to 33,000#
44N232-1	6.4	185	Reproof test legs to 8200#, links * to 11,600#

Minimum factor of safety (5.0 to 1.0) and minimum proof test load (200%) are directly from ANSI B30.9.

* To be performed by completion of unit 1, cycle 6 refueling outage.