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SUBJECT: Provides info & assessment re containment integrity,per 900808 telcon w/NRC.

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August 15, 1990

U.S. Nuclear Regulatory Commission
Attention: Allen R. Johnson
Project Directorate I-3
Document Control Desk
Washington, D.C. 20555

Subject: Containment Integrity
R. E. Ginna Nuclear Power Plant
Docket No. 50-244
Reference: August 8, 1990 Conference Call
RG&E with USNRC

Dear Mr. Johnson:

As a follow up to the August 8, 1990 telephone conference call, RG&E is providing the following information and engineering assessment on the integrity of the connection of the Containment Building to its foundation.

Since the July 9, 1990 NRC Request for Additional Information, RG&E has reviewed all currently available original design documents. The review has provided a good understanding of the original design intent of all components of the joint. The following is a description of RG&E's findings of the design basis for each of the components in the connection (see Attachments 1 and 2).

Tendon/Rock Anchors

The tendon consists of 90-1/4" high strength steel wires conforming to ASTM A421-59T, Type BA. The tendon system provides sufficient vertical prestress force so there are no net meridional membrane tensile forces in the concrete shell under application of design load combinations.

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Bellows

The bellows are 6-inch diameter, stainless steel pipe bellows complying with requirements of ASA B31.1 Code for Pressure Piping. They provide movement capability for the rigid tendon conduit at the hinged joint in order to ensure a sealed tendon enclosure which retains the grease corrosion protection around the tendon and also seals against contaminants gaining access to the tendons. The bellows also provides essentially no resistance across the hinged joint to the movements. The inside diameter of the bellows is approximately 5.6 inches and the diameter of the tendon bundle is approximately 3 inches. With 1.3 inches clearance and maximum predicted horizontal movement at design loads of 0.2 inch, margin is available to preclude contact.

Neoprene Pad

The neoprene pads used in the design were specified to conform to standard of the American Association of State Highway Officials. This material is used extensively in U.S. and European bridge construction. The purpose of the pad was to prevent moments from being developed in the cylinder wall.

Tension Bars

The tension bar assemblies are approximately 20 feet long and consists of a 1 3/8 inch diameter bar with two anchor plates. The bar conforms to ASTM A322-64a and ASTM A29-64. The anchorages plates conform to AISI C-1040 and shall develop 100% of the bars ultimate strength. The assemblies are oriented radially at about 1 foot 1 inch centers tying the base of the cylindrical wall to the mat concrete. The bars were designed to transfer horizontal loads from the cylindrical containment shell into the base mat. They transfer loads from internal pressure and earthquake. The design of the containment was based on an equivalent static seismic analysis. In conjunction with containment design, a dynamic modal analysis was performed. The modal analysis showed that the horizontal seismic loads were approximately half those used in the design.

In the design of these bars, the assumption was made that the total seismic load is transferred by only half of the total number, which is a conservative assumption. Further, no credit was taken for the fact that the cylinder caps a two-foot thick

mat and the true horizontal load transfer would be by a combination of tensile and compressive loads. Additionally, at the vertical joint where the rod exists from the cylindrical section into the base slab, the bars are encased in the same grease as the tendons.

In 1990, RG&E conducted the required tendon surveillance testing, which tests the tendon/rock anchor system. The results of the lift off tests have shown that the required prestress continues to meet all design requirements. As part of the tendon testing program, a sacrificial tendon wire was extracted, examined and tested. That wire extended the full height of the Containment down to the tendon/rock anchor coupling. The wire showed no evidence of corrosion and tested out to its specified yield and ultimate strengths. The grease which surrounds the tendon was also analyzed and showed no evidence of water or unacceptable levels of chlorides, nitrates or sulfides.

RG&E performed chemical analysis of the water in the vicinity of the joint and found it to have a pH of 7.5, 125 PPM chlorides and 120 PPM sulfate, values well within acceptable limits.

RG&E is performing a detailed finite element stress analysis of cylindrical wall to base mat connection to obtain a better understanding of the inherent conservatism. The work has begun and will be completed by mid-December, 1990.

RG&E is in the process of making repairs and/or modifications to the foundation area to assure that no standing groundwater will be in contact with this joint. A number of materials are being investigated. At this time, a definitive schedule for completing the modifications/repair is dependent on these investigations, but we are striving for a completion date of November 30, 1990. This period will permit a detailed investigation of potential materials to ensure that the selected approach will be effective.

In light of the above discussion, RG&E believes that the existing condition is not a safety concern and that there is no reason to suspect that the joint will not perform its designed function for the following reasons:

- The results of the tendon lift-off tests confirm that the tendon/rock anchor system are performing as designed. It also confirms that the neoprene pads have not deteriorated, otherwise tendon forces would be lower than required.

- The examination of the sacrificial wire showed no signs of corrosion present.
- No moisture or unacceptable levels of chlorides, nitrates, or sulfides were found in the tendon grease.
- The chemistry of the groundwater is basic and contains low levels of chlorides and sulfates.
- There is no evidence of grease leaking from the joint, implying that the bellows are functioning as designed.
- The tension bar system and the cylinder/base mat configuration provide diverse load transferring mechanisms.
- The materials of the critical components are not susceptible to stress corrosion cracking.

Based on a review of the design calculations, our best engineering judgement is that the system as a whole is substantially conservative.

Very truly yours;

Robert C. Mecredy

LAS/154

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Washington, D.C. 20555

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Ginna Senior Resident Inspector

CONTAINMENT VESSEL FOR R. E. GINNA POWER PLANT

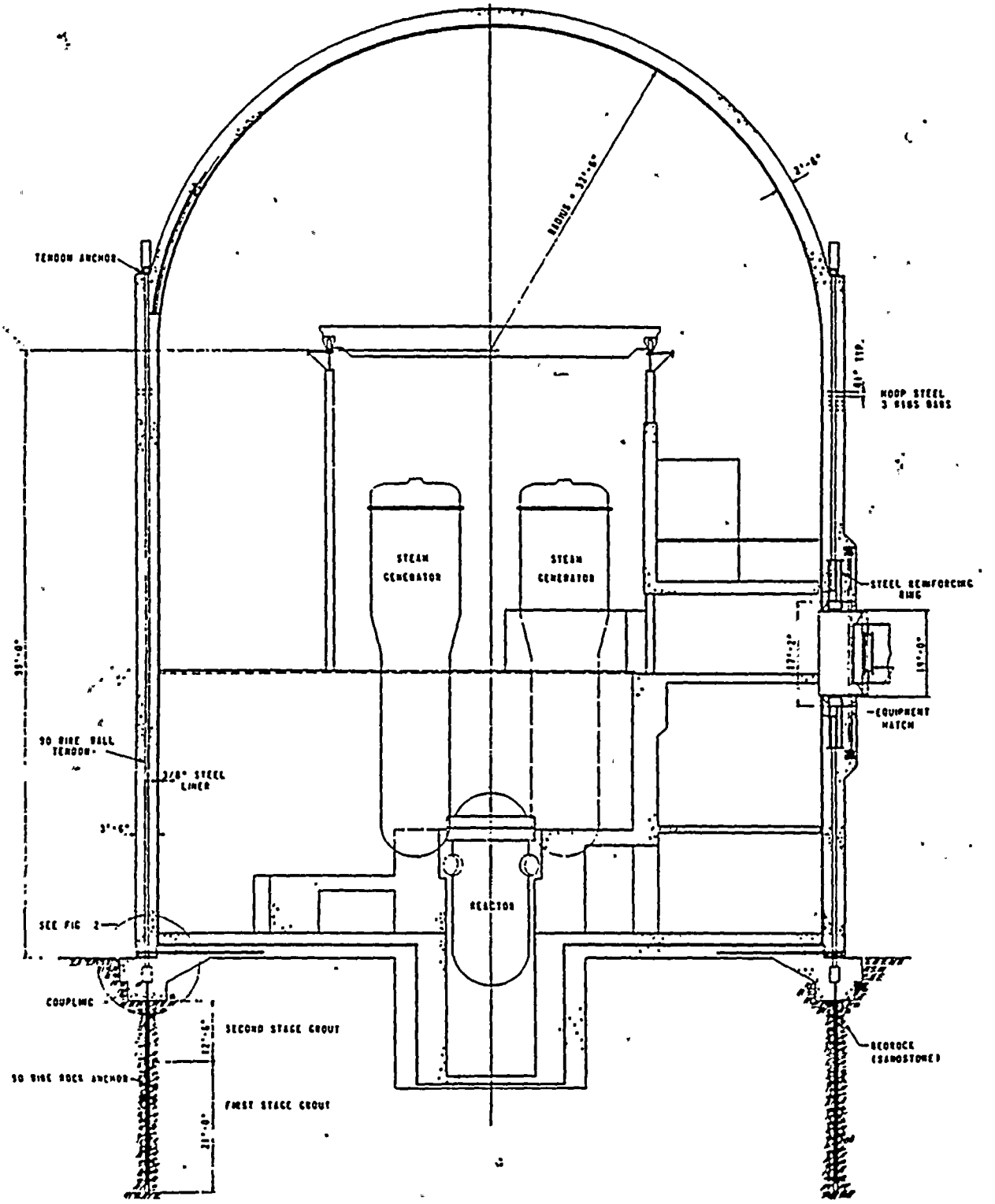
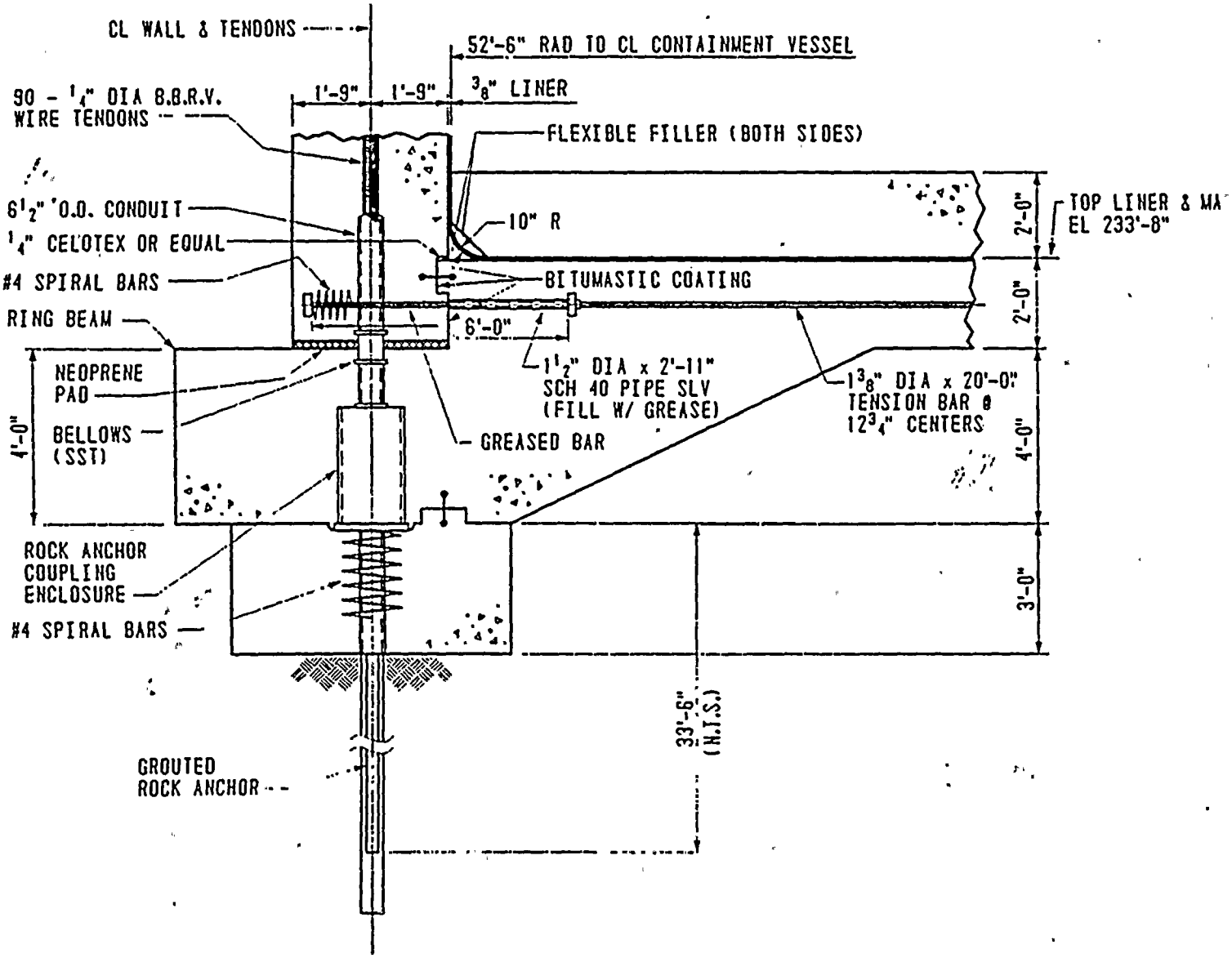



Fig. 1. Cross section of containment vessel.

ATTACHMENT 1




ATTACHMENT 2