TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
500C Chestnut Street Tower II

APR 5 1979

Director of Nuclear Reactor Regulation
Attention: Mr. S. A. Varga, Chief
Light Water Reactors Branch No. 4
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Varga:

In the Matter of the Application of	)	Docket Nos. 50-390
Tennessee Valley Authority	)	50-391

At the request of J. Menz, the NRC Radiological Assessment Branch reviewer for the Watts Bar Nuclear Plant, TVA has reviewed the accessibility of the fuel transfer tube. During a telephone conference call on February 27, 1979, with Mr. Menz and other NRC representatives, TVA confirmed that the Watts Bar design precluded inadvertent access to the fuel transfer tube. Enclosed are revisions which will be made in the next amendment to the Watts Bar Final Safety Analysis Report (FSAR) documenting this position. These revisions include changes to FSAR pages 12.3-13 and 12.3-14 and a new figure 12.3-12, "Fuel Transfer Tube Shielding Details."

Very truly yours,

J. E. Gilleland
Assistant Manager of Power

Enclosure

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A small access opening is provided through the shielding in the annulus to allow inspection of the fuel transfer tube. This opening is normally filled with solid concrete blocks which are removed only when access for inspection purposes is required.

whole body dose rate in the passageway is approximately 210 mrem/hr. The minimum shielding inside the primary containment between fuel assembly and personnel on the floor at elevation 716.0 feet is 1 foot of water and over 5 feet 6 inches of ordinary concrete. The corresponding maximum whole body exposure level is about 5 mrem/hr. During fuel assembly transfer, the region in the annulus between the steel containment and the shield building is protected from the fuel assembly by concrete and water equivalent to more than 6 feet of concrete. A radiation streaming gap between the steel containment and the concrete on each side of it in the vicinity of fuel transfer tube is avoided by offsetting the concrete and attaching to each side of the steel containment a steel ring. Similarly, offsets in the Shield Building concrete and in the Auxiliary Building wall in the vicinity of the transfer tube are used to avoid a direct streaming path between these two structures.

When the spent fuel assembly is outside the Shield Building, during passage through the Auxiliary Building wall and fuel transfer canal to the spent fuel pool, it is shielded by a minimum of 6 feet of concrete or by a minimum of 10 feet 6 inches of water. Spent fuel pool concrete walls which separate spent fuel assemblies in their storage locations from the Auxiliary Building access area at elevation 692.0 feet are 7 feet thick.

Turbine Building and Service Building

Activity in the Turbine Building occurs only in the event of steam generator primary-to-secondary leakage. Almost the entire Turbine Building is an access type I area. For an extreme case of primary-to-secondary leakage of 1 gpm per unit, some accessible areas immediately adjacent to the condenser vacuum exhaust system, including the HEPA filters and charcoal adsorber train, could be access type III areas.

Also located in the Turbine Building are condensate demineralizers and associated regeneration equipment. This equipment is adequately shielded to maintain maximum dose rates in unlimited access areas to 1.0 mrem/hr. Cubicles in which condensate demineralizers and associated equipment are located are generally designed for Type III or IV access (see Figures 12.3-5 and 12.3-6).

There are several areas of low activity level in the Service Building, such as the waste baler room, dirty laundry room, health physics laboratory, and radiochemical laboratory filter room. Enclosures about these areas furnish necessary shielding, but their principal purpose is to minimize the spread of contamination

737.0 feet. A concrete partition in this pipe chase along the A-8 line, between units, inhibits the spread of contamination from one unit to the other should a pipe rupture occur.

Fuel Transfer Shielding

During fuel transfer operations, the refueling canal and the region above the open reactor vessel are filled with borated water to elevation 749.12 feet. The water level in the fuel transfer canal and spent fuel pit, which are in the Auxiliary Building, is also at elevation 749.12 feet. The bottom of the refueling canal is at elevation 709.23 feet in the fuel assembly tilting device area and at elevation 713.87 feet elsewhere. A fuel assembly is transferred from the reactor vessel through the refueling canal toward the Auxiliary Building. It travels in a fuel transfer tube from the containment to the fuel transfer canal in the Auxiliary Building, and it is then moved into a storage location in the adjacent spent fuel pool. After a decay period, the spent fuel assembly is transferred under water to a shielded shipping container for shipment to a reprocessing plant.

After the fuel transfer has begun, the principal radioactive sources in the proximity of the fuel assembly transfer path are the following: (1) activity in the water which is a mixture of reactor coolant and water from the refueling water storage tank and (2) the fission product inventory in the fuel assembly being transferred. The activity in the water will not normally be above 0.01 uCi/cc of nontritium activity when a fuel assembly is moved from the vessel. A concentration of 0.01 uCi/cc of Cs-137 produces, via Ba-137m gamma decay, a calculated radiation level of approximately 2.5 mrem/hr at 3 feet above the water surface and less than this at occupied locations in the refueling areas. If the activity is above this level, it will be reduced to this level with the spent fuel pool cooling system equipment.

The minimum water shield above the active fuel region of a spent fuel assembly as it moves from the reactor vessel to the storage position in the spent fuel pool is 10.5 feet except when the assembly is in the fuel transfer tube. The design of the transfer equipment incorporates restraints to assure that this minimum water shield is maintained. The calculated exposure rate to a person at the water surface resulting from a fuel assembly at its maximum elevation during transfer is less than 1 mrem/hr. Except for an emergency passageway under the fuel assembly tilting device in the refueling canal, the transfer of spent fuel assemblies does not generate any high radiation areas in accessible plant areas. The maximum shielding between the fuel assembly and the emergency passageway is 3 feet 0 inch of heavy concrete (density = 21[illegible] lb/ft^3). The

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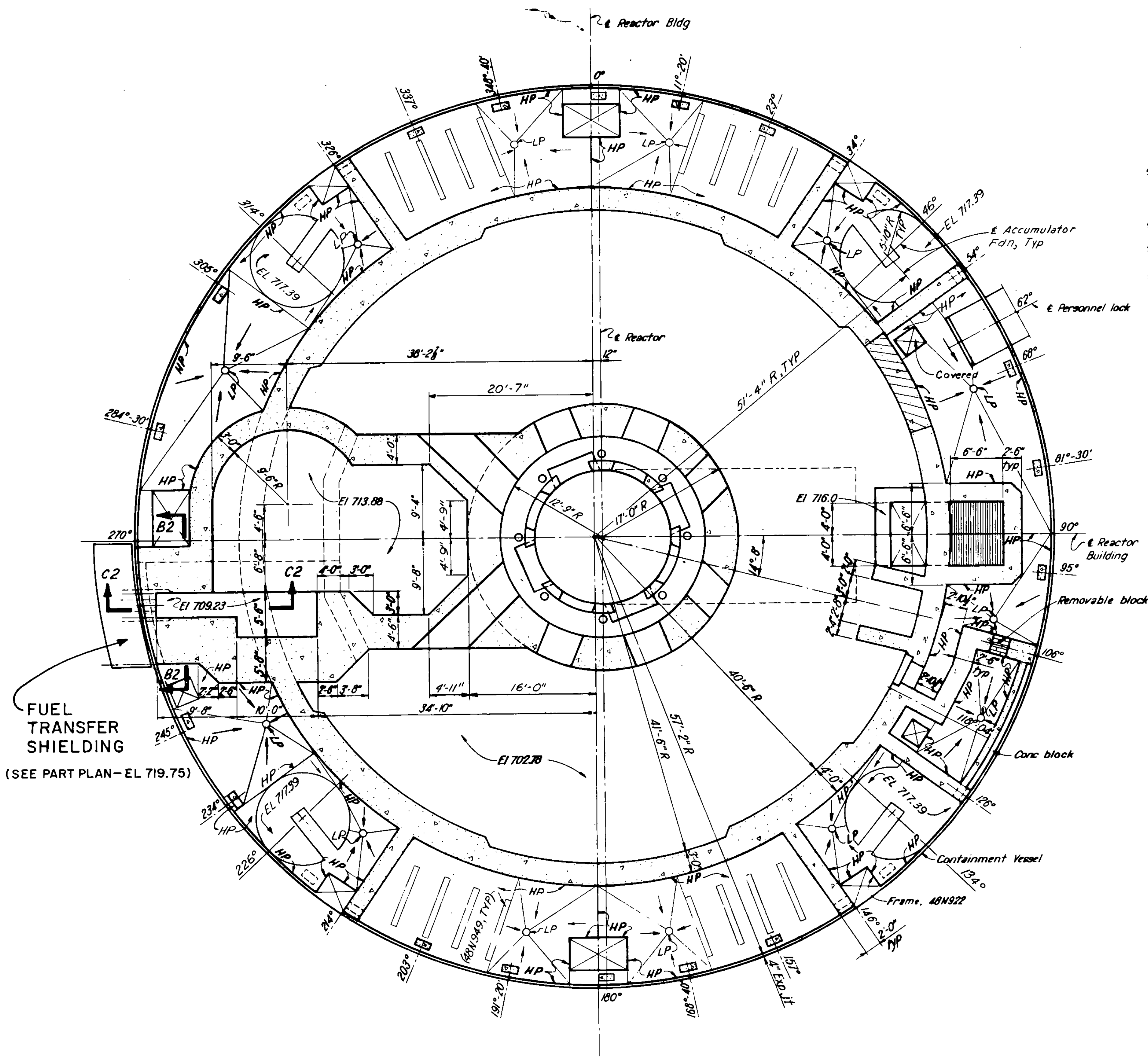
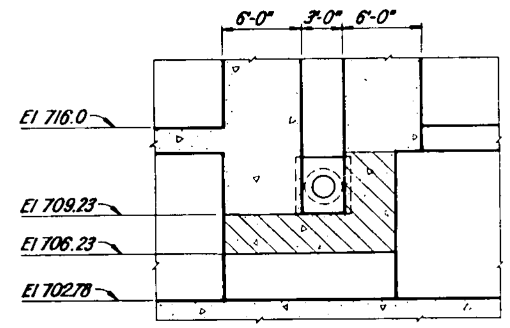
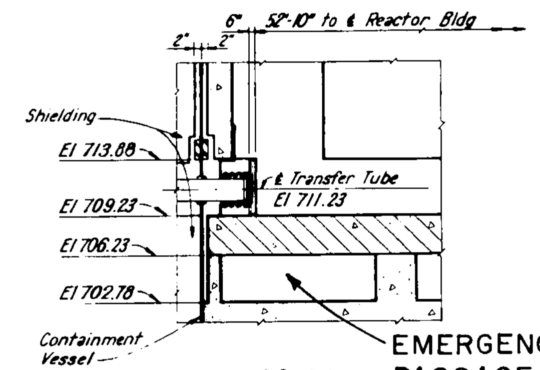
(See figure 12.3-12)



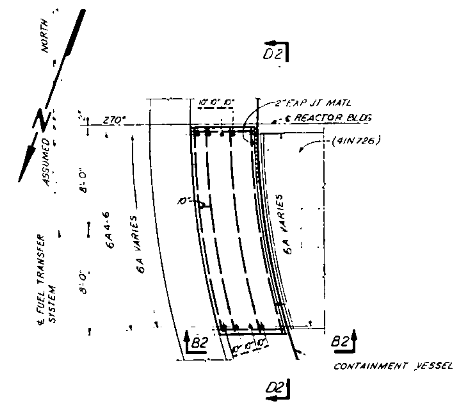
PLAN
HIGH POINT (HP) EL 716.0
LOW POINT (LP) EL 715.83
UNIT 1 AS SHOWN
UNIT 2 OPP HAND EXCEPT AS NOTED



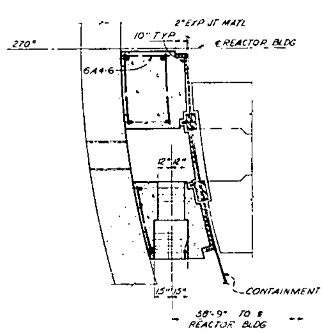
B2-B2



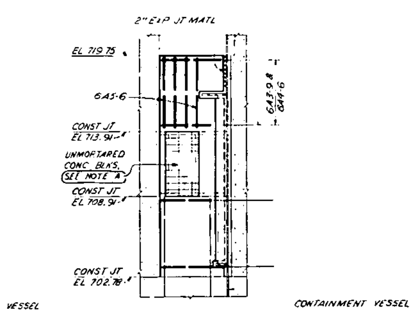
C2-C2



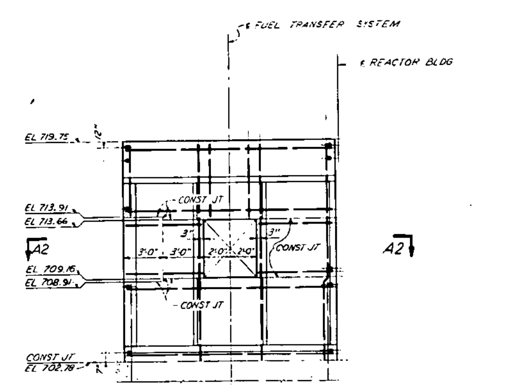
PART PLAN - EL 719.75
UNIT 1 AS SHOWN
UNIT 2 OPP HAND



A2-A2



B2-B2



D2-D2
SHOWN OUTSIDE CONTAINMENT VESSEL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

FUEL TRANSFER TUBE
SHIELDING DETAILS
FIGURE 12.3-12