DmB

Docket No. 50-346

License No. NPF-3

Serial No. 1-466

September 27, 1984

TOLEDO EDISON

RICHARD P. CROUSE
Vice President
Nuclear
(419) 259-5221

Mr. James G. Keppler, Regional Administrator
Region III
United States Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler:

This is in response to your August 24, 1984 letter, IE Bulletin 84-03 (Log No. 1-1021), concerning Refueling Cavity Water Seal. Specifically, Toledo Edison has evaluated the potential for, and consequences of, a refueling cavity water seal failure at the Davis-Besse Nuclear Power Station and this letter provides a summary of that evaluation.

The seal ring arrangement at Davis-Besse is a passive system. There are no active components, such as pressurized seals, involved in the design. A cross sectional sketch of the seal ring configuration is provided in Figure 1.

The seal ring is a continuous ring of stainless steel plate wide enough to span the gap between and overlap the reactor vessel flange and the refueling canal floor. The seal ring sits in a depression on the vessel flange and the canal floor. A rubber gasket is placed between the seal ring and a groove in each seating surface. The rubber gasket is designed to accommodate any difference in elevation between the vessel flange and canal floor. The seal plate is held in place by 36 adjustable clamps, which are torqued in a specified sequence to apply a downward pressure on the seal ring. An additional seal is provided by applying a commercial sealant to the inner and outer edges of the seal ring after the holddown clamps have been adjusted. Toledo Edison considers a gross seal failure of this arrangement to be an extremely low probability event.

Figures 2 and 3 illustrate the configuration of the Davis-Besse Fuel Handling equipment and the areas flooded during fuel handling activities. The refueling canal inside containment is connected to the Auxiliary Building by two fuel transfer tubes. At either end of the transfer tubes are the upender mechanisms for the fuel transfer system. These devices rotate fuel assemblies between the vertical and horizontal positions necessary for fuel handling or fuel transfer between buildings.

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In containment, the upender mechanisms are located in the lowered section of the refueling canal, such that the top of a fuel assembly located in an upender mechanism in the vertical position will be approximately level with the vessel flange and main refueling canal floor.

The upender mechanisms in the Auxiliary Building are located in a separate pool area which can be isolated from the spent fuel storage area by a movable gate. Additional isolation between the containment and Auxiliary Building can be provided by large gate valves on the Auxiliary Building end of the fuel transfer tubes. The gate valves are manually actuated from the top of the pool.

During refueling operations, the refueling canal, spent fuel storage area, and the fuel transfer pool in the Auxiliary Building are all inter-connected and flooded to within about two feet of the top of the refueling canal. There are no active components, such as pressurized seals, in this configuration.

If a gross seal ring failure is assumed during refueling activities and no operator action is taken, the refueling canal, spent fuel storage pool, and fuel transfer pool water level would drain to the level of the reactor vessel flange. Fuel assemblies located in the reactor vessel would continue to be cooled by the decay heat removal system.

Any fuel assemblies located in the fuel handling mast of any of the three fuel handling bridges would be completely uncovered and could not be cooled. In such a condition, an estimate of the time to cladding failure, from the time the assembly is exposed, is approximately 30 minutes.

Any fuel assemblies located in the spent fuel storage [illegible], in any of the upender mechanisms, or in the temporary holding racks located in the deep end of the refueling canal along side the upender mechanisms (not shown on drawings), would be immersed in water to a depth of approximately three inches over the top of the fuel pins. Cooling of these assemblies would be limited to heat transfer to the surrounding water.

While Toledo Edison does not believe that gross seal ring failures are a realistic concern, the fuel handling bridge operators have been given instructions to deal with a decreasing refueling canal level. The objective of the instructions is to maximize the level of water over any spent fuel assembly. The instructions include:

Fuel assemblies in the masts of fuel bridges inside containment are to be placed in an upender mechanism or in the reactor vessel.

Fuel assemblies located in the upender mechanisms are to be placed in the horizontal position.

Fuel assemblies located in the temporary racks in the refueling canal are to be moved to the reactor vessel or to the upender mechanism.

Fuel assemblies in the mast of the fuel transfer bridge in the spent fuel area are to be lowered into the spent fuel storage area rack.

The gate between the spent fuel storage area and the adjoining pool in the auxiliary building is to be put in place.

If time permits, the cables which drive the transfer mechanisms are to be removed to allow complete closure of the gate valves on the Auxiliary Building end of the transfer tubes. In any case, the gate valves are to be closed as tightly as possible.

At those times during a refueling outage when the refueling canal is filled but no fuel handling activities are in progress, operator instructions exist to minimize the risks associated with a loss of water level and no operator action. These instructions include:

Fuel assemblies are not to be left in the fuel handling masts of an unattended fuel handling bridge.

Fuel assemblies are not be be left unattended in an upender mechanism in the vertical position.

If fuel handling activities are to be suspended for a period in excess of 24 hours, the gate between the spent fuel storage area and the adjacent pool is to be installed and the gate valves on the transfer tubes are to be closed as far as possible without damaging the transfer equipment cable.

Additional protection against the unattended drop in refueling canal level is provided by the spent fuel pool level annunciator in the control room, which alarms on decreasing spent fuel pool level with a set point approximately half a foot below normal refueling level.

In the event of a decreasing water level in the refueling canal, make up water can be injected from the borated water storage tank. Technical Specifications require a minimum of 70,700 gallons of water to be maintained in the borated water storage tank. This water can be injected into the refueling canal through the reactor vessel via the decay heat pumps at a rate of more than 3,000 gpm.

During the 1984 refueling outage the reactor vessel internals will be removed for modification. Prior to their removal, the entire core will be transferred to the spent fuel pool storage racks. Once the internals are removed, each reactor coolant system cold leg will be plugged with an inflatable seal. This will allow the internals modification work to proceed underwater while the reactor coolant system cold legs can be drained to perform reactor coolant pump work.

The failure of one of the inflated seals could lead to the draining of the refueling canal. However, since no refueling activities will be in progress, the gate between the spent fuel pool and the adjoining pool in the Auxiliary Building will be in place and the gate valves on the transfer tubes will be closed as far as possible. Toledo Edison believes that these precautions will provide adequate protection of the spent fuel in the spent fuel pool.

Very truly yours,

RPC:JRL:SGW:nlf/bc
encl.
cc: DB-1 NRC Resident Inspector

ATOMIC ENERGY ACT OF 1954

SECTION 182a

SUBMITTAL IN RESPONSE

FOR THE

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NO. 1

FACILITY OPERATING LICENSE NO. NPF-3

This letter is submitted in conformance with Atomic Energy Act of 1954, Section 182a, in response to IE Bulletin 84-03 (Log No. 1-1021). This deals with the potential for and consequences of a refueling cavity water seal failure at the Davis-Besse Nuclear Power Station, Unit No. 1.

By _____
R. P. Crouse
Vice President, Nuclear

Sworn to and subscribed before me this 27th day of Sept. , 1984.

_____
Notary Public, State of Ohio

NORA LYNN FLOOD
Notary Public, State of Ohio
My Commission Expires Sept. 1, 1987

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Figure 1

CROSS SECTION OF DAVIS-BESSE

REFUELING CANAL SEAL PLATE

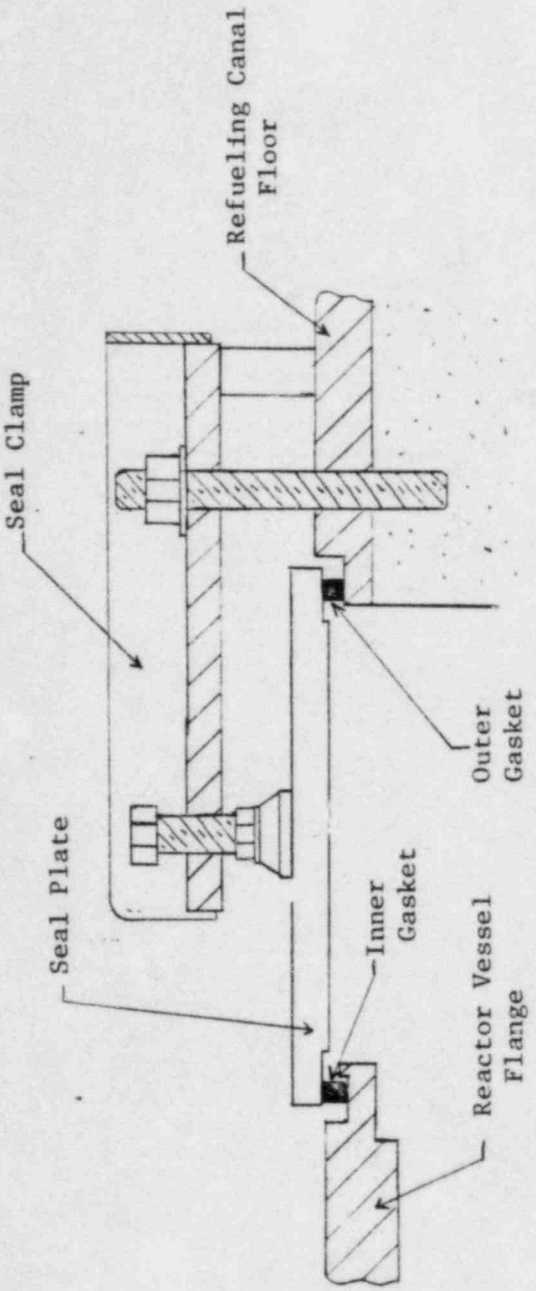

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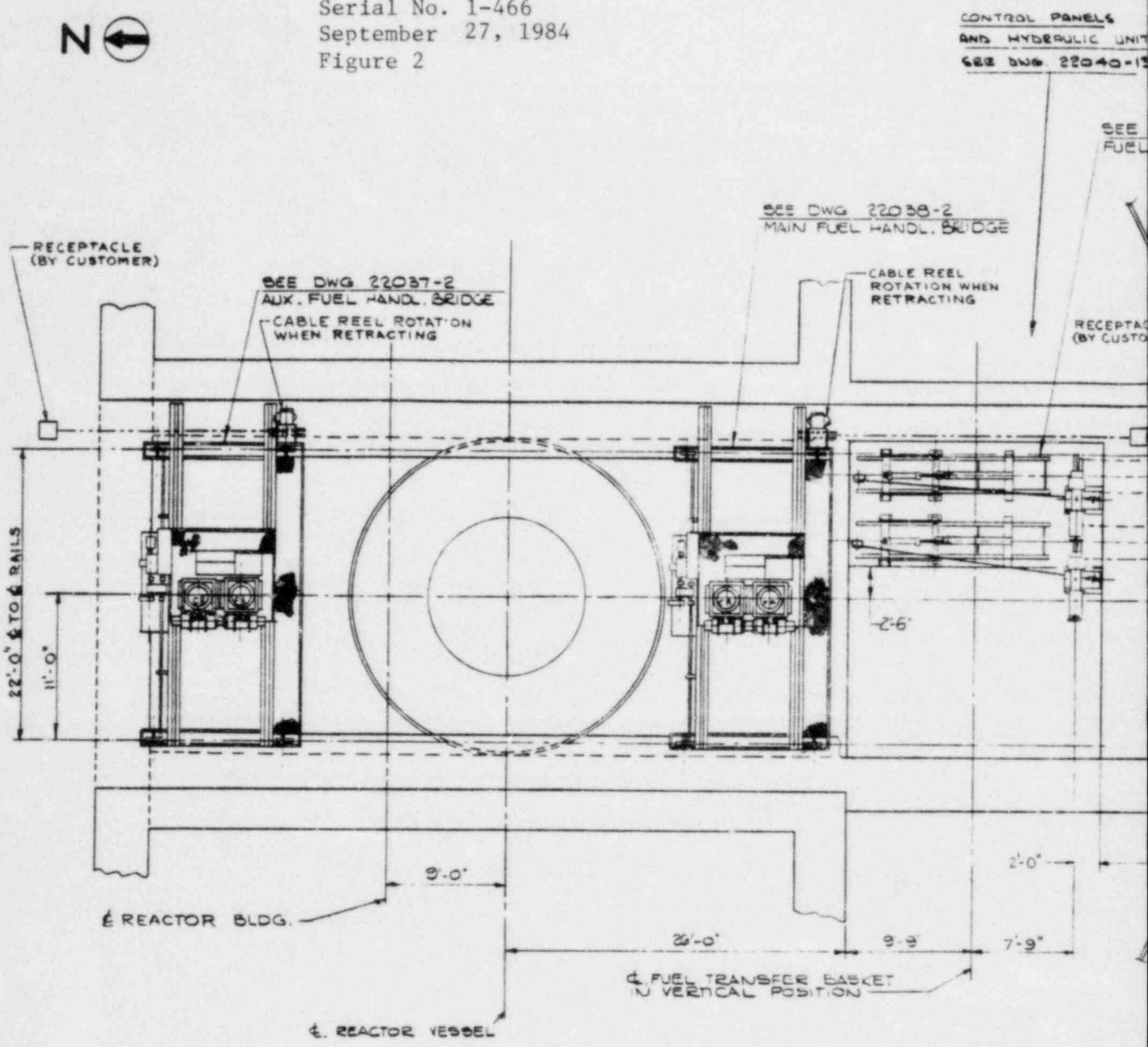
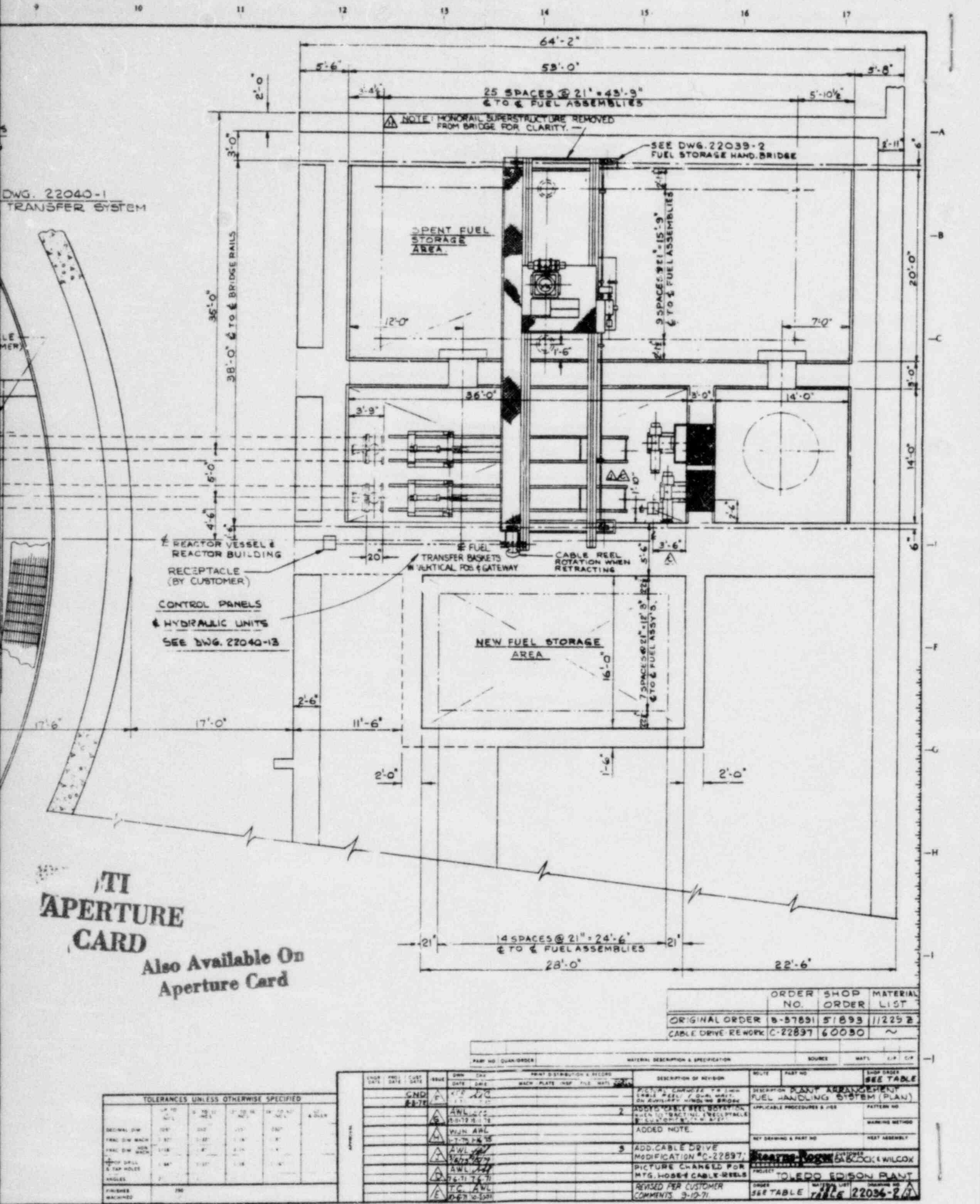
Figure 2



NOTES:
1.) FOR ELEVATION SEE DWG. 22036-1
2.) UPPER STRUCTURE NOT SHOWN IN BRIDGE PLAN VIEWS.
3.) REF. DWG'S BY W. DWG. NO. 136186E REV. 3
136187E REV. 3
136188E REV. 3



TI APERTURE CARD

Also Available On Aperture Card

8410050265-01

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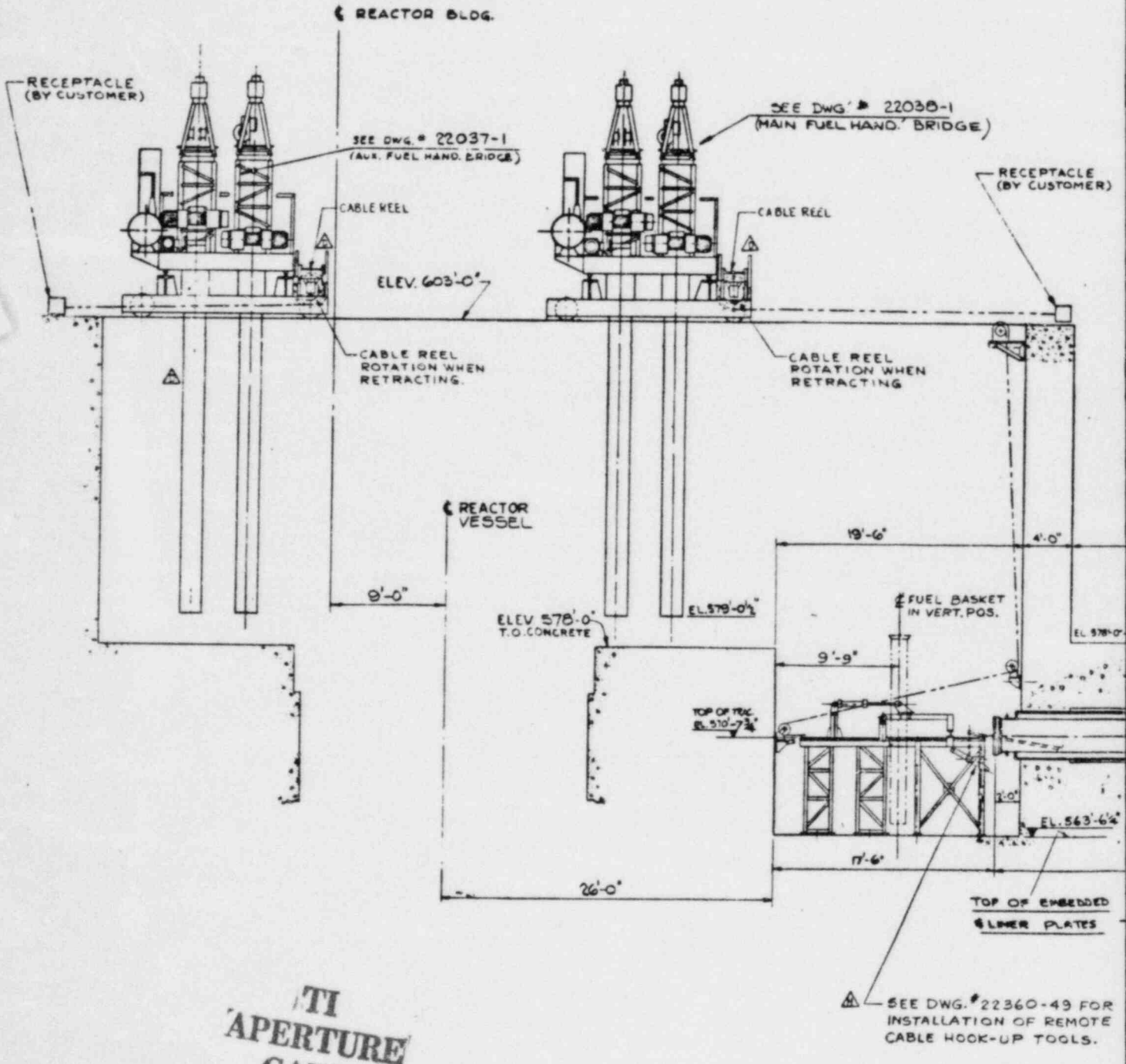
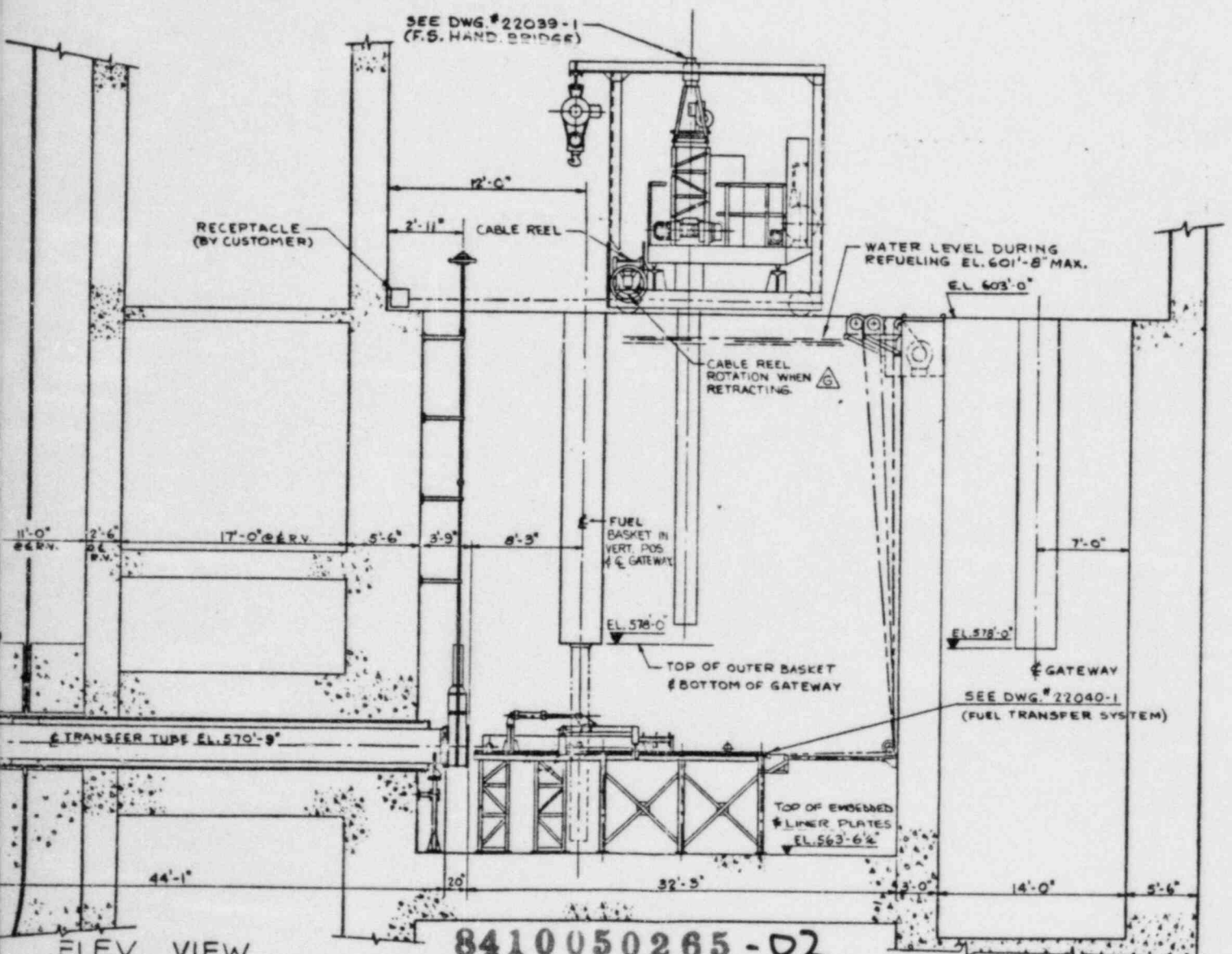
Figure 3



	ORDER NO.	SHOP ORDER	MATERIAL LIST
ORIGINAL ORDER	B-37891	51893	11223 2
CABLE DRIVE-REWORK	C-22897	60030	~

NOTES:

1. FOR PLAN VIEW SEE DWG.# 22036-2.
2. FUEL T. MECH. ANCHOR BOLT LAYOUT DWG.# 22036-3 & 22036-8;
3. FUEL HAND. BRIDGES ANCHOR BOLT LAYOUT (REACTOR) DWG.# 22036-4;
4. SPENT FUEL F.S.H. BRIDGE ANCHOR BOLT LAYOUT DWG.# 22036-5;
5. REF. DWG'S B&W NO. 136186 E REV. 3
   136187 E REV. 3
   136188 E REV. 3
6. FOR "CABLE DRIVE INSTALLATION ASS'Y ARRANGEMENT," SEE DWG.# 22040-38;
7. FOR "CABLE HOOK-UP INSTALLATION" SEE DWG.# 22360-49.
8. FOR "CARRIAGE RAIL MODIFICATION ASS'Y" SEE DWG # 22040-40.



ELEV. VIEW
LOOKING EAST

MARK	DESCRIPTION OF REVISION
F	ADDED MONORAIL SUPERSTRUCTURE
G	COUNTER-CLOCKWISE ROTATION WAS CLOCKWISE
3	ADD. CABLE DRIVE MOD.# C-22897.
	REVISED NOTE 8
E	ADDED CABLE REEL ROTATE WHEN RETRACTING & DESCRIPTION BY CUSTOMER" TO CLARIFY

SHOP ORDER	SEE TABLE
PLANT ARRANGEMENT FUEL HANDLING SYSTEM ELEV.	
CUSTOMER	TOLEDO EDISON PLANT
SEE TABLE	SEE TABLE 22036-1