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ILLINOIS POWER COMPANY

CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

December 20, 1984

Docket No. 50-461

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

Subject: IE Bulletin 84-03 "Refueling Cavity Water Seal"

Dear Mr. Keppler:

In response to IE Bulletin 84-03, a study was conducted to evaluate the potential for and consequences of a refueling cavity water seal failure at Clinton Power Station (CPS). This study evaluated the likelihood of gross seal failure, maximum leak rates due to seal failure, potential effects on stored fuel and fuel in transfer, and emergency operating procedures. The results of this study are enclosed for your review.

To briefly summarize, this study determined the following:

1) The stainless steel refueling bellows at CPS are of a different design than the inflatable refueling cavity seal that failed at the Haddam Neck plant. All bellows welds were nondestructively examined, and were found to be acceptable, so such a gross failure is considered unlikely.

2) If a gross failure of the refueling bellows we[illegible]ccur, no damage to the fuel would result because of CPS a[illegible] features.

3) The only fuel bundle that has the potential to become uncovered during a gross bellows failure would be one in transit between the reactor and containment storage racks. For the single most limiting weld failure there will be sufficient time for the bridge operator to place this bundle either back in the reactor or in the containment spent fuel racks prior to the bundle being uncovered.

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I hereby affirm that the information in this letter and enclosure are correct to the best of my knowledge. Please let us hear if you have any further questions on this matter.

Sincerely yours,

D. P. Hall
Vice President

RTR/lm

Attachment

cc: B. L. Siegel, NRC Clinton Licensing Project Manager
NRC Resident Office
Illinois Department of Nuclear Safety
NRC Document Control Desk, Washington, D. C. 20555

RESPONSE TO IE BULLETIN 84-03

REFUELING CAVITY WATER SEAL

Clinton Power Station (CPS) utilizes a Mark III containment design. The refueling pools in the containment are prevented from draining into the drywell by a refueling bellows that occupies the annular space between the reactor vessel flange and the top of the drywell (see Figure 1). The bellows allows for differential expansion of the reactor relative to the drywell.

Unlike the inflatable refueling cavity seal which failed at the Haddam Neck Station, the refueling bellows at CPS is made of stainless steel, is permanently welded into place, and has no active components. All bellows welds were nondestructively examined and found to be acceptable. Because of these examinations and because the refueling bellows at CPS does not rely on pneumatic seals, it is unlikely that a gross failure of the CPS bellows, such as occurred to the refueling cavity seal at Haddam Neck, can occur.

If a failure of the refueling bellows were to occur during refueling, no damage would occur to the fuel in the reactor because the water could not drain below the reactor vessel flange. No damage would occur to the fuel temporarily located in the containment fuel storage racks, as these racks are located in the steam dryer pool adjacent to the reactor pool at an elevation lower than the curb separating these pools. This curb

prevents drainage of the steam dryer pool below the top of the fuel racks. Adequate water coverage also exists for any bundles in the upender for the inclined fuel transfer tube which is used to transfer spent fuel from the containment refueling area to the long term spent fuel storage pools in the Fuel Building. These bundles are at a lower elevation than the curbs separating the containment fuel transfer pool from the reactor pool (see Figures 2 and 3).

The only bundle that has the potential to become uncovered during a bellows failure would be a bundle in transit between the reactor and the containment storage racks. For any plausible weld failure of the bellows, there will be sufficient time for the refueling bridge operator to place the fuel bundle in a position (either back in the reactor or in the containment spent fuel racks) where it could not become uncovered. In addition the bundle will not become uncovered during the transit and water coverage will provide adequate shielding for the operator while taking such action.

Once the pool had drained down, immediate access to the refueling area in the containment may be impossible due to the reduced shielding of the spent fuel and the uncovering of the steam dryer which would result in higher "shine" radiation fields in the containment. However no damage to the fuel due to high temperatures will occur because of the continued coverage of the fuel by water. This would prevent the release of radioactive materials into the environment. Once the pools are refilled, access to the refueling area would be regained.

The effects of this large volume of water on equipment in the drywell, although possibly requiring repair and clean up, are not considered a safety concern because they are considered to be bounded by the effects of a LOCA event on the drywell equipment.

AJH/lm

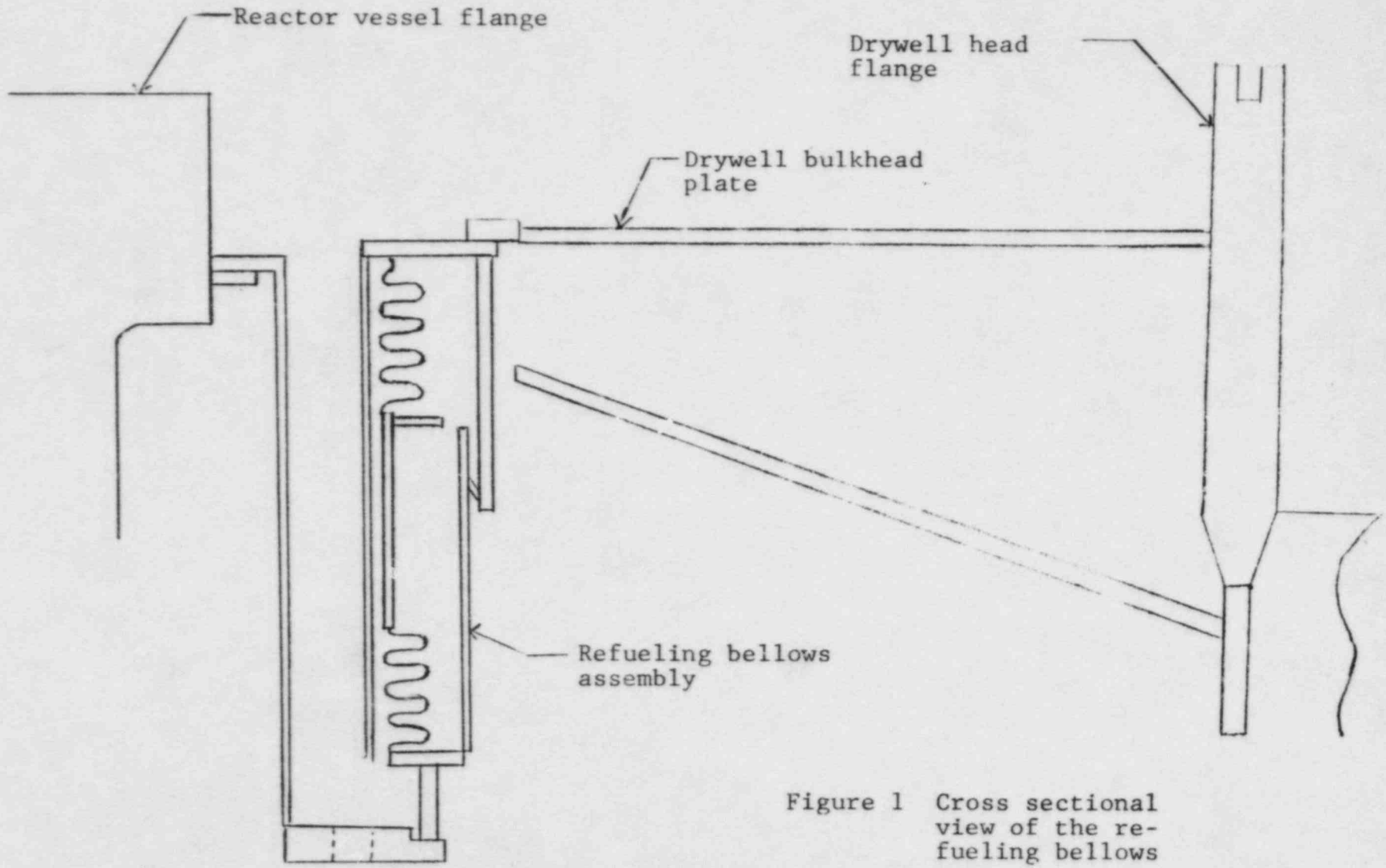

Figure 1 Cross sectional view of the refueling bellows

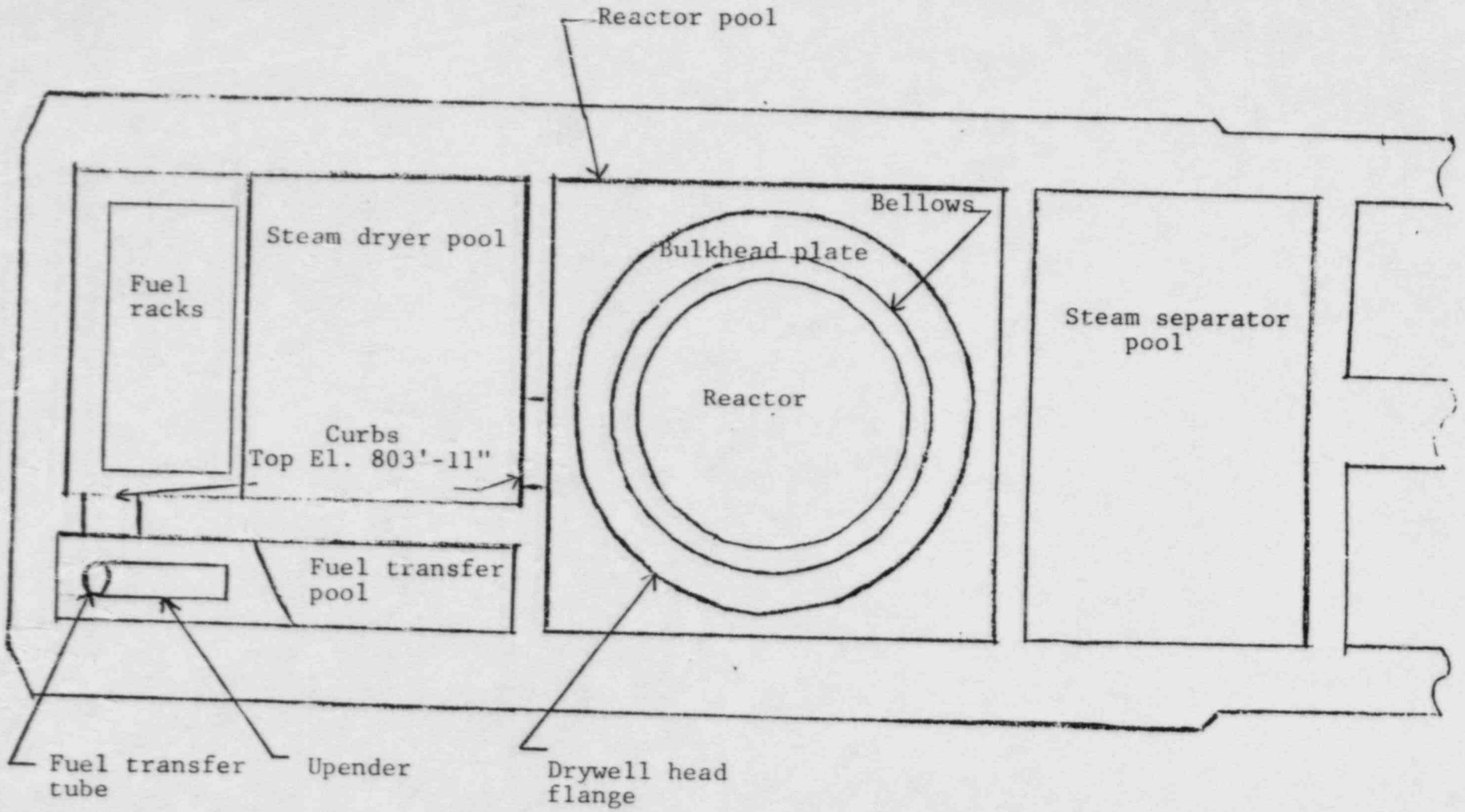

Figure 2 View of the refueling pools from above

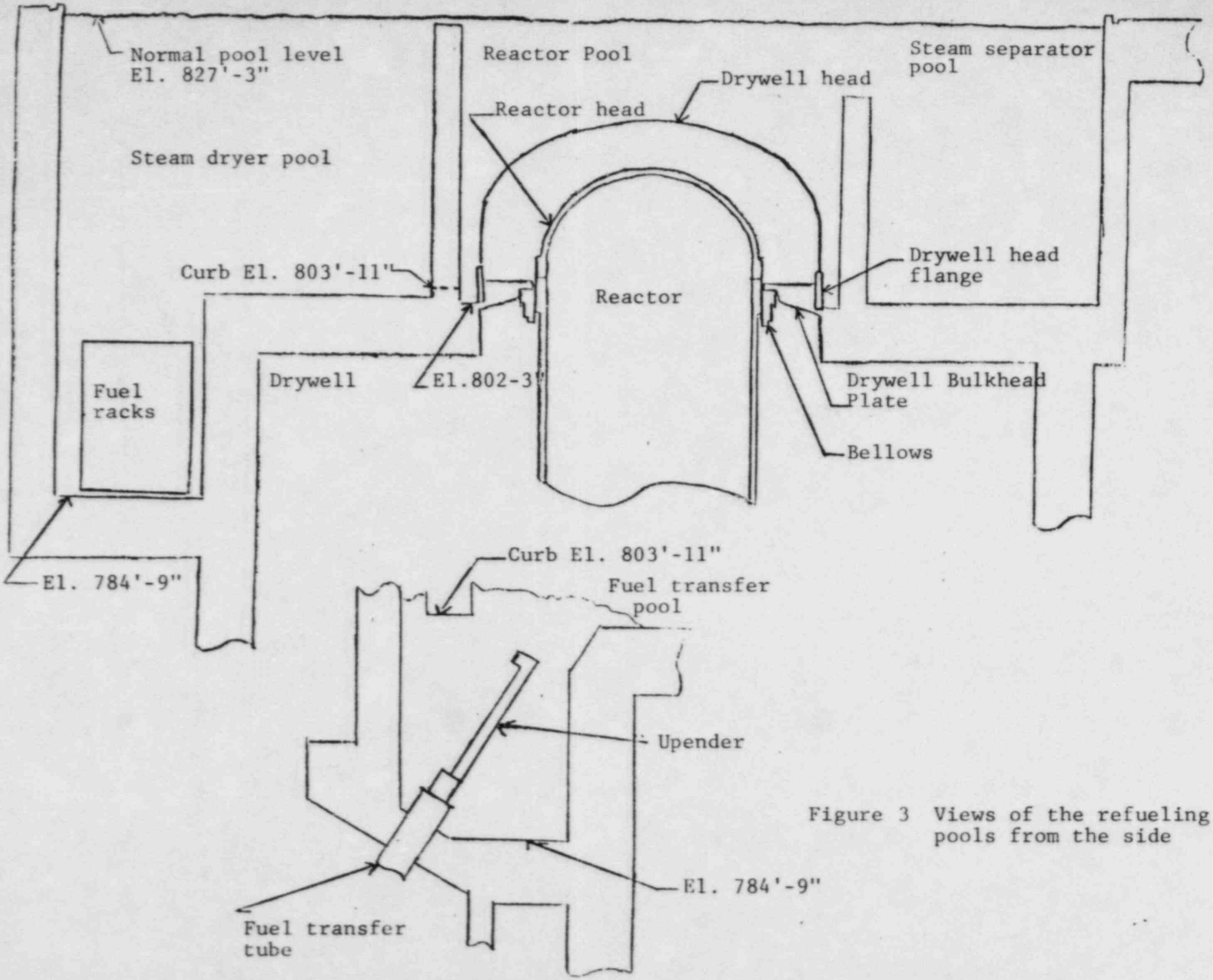

Figure 3 Views of the refueling pools from the side