

QA Regulation Report on Reactor Pedestal Fabrication for Fourth Nuclear Power Plant

Nuclear Regulation Department
May 30, 2002

1. Introduction of the Reactor pedestal

The reactor pressure vessel pedestal of the fourth nuclear power plant is a vertical hollow cylindrical annular thick steel structure filled with concrete in-between. The structure has an overall height of 20 meters, and outside diameter of 14 meters (see attached figure). The main function of this structure is to support the reactor pressure vessel, and also provides the paths for the safety piping systems. The total weight of the reactor pedestal structure is about 938 metric tons. And it belongs to the seismic class I structure category. The fabrication work has been contracted to New Asia Construction Company. The steel portion of the reactor pedestal has been subcontracted to China Shipbuilding Company for fabrication in Kaohsiung. For the convenience of shipping of the parts, manufacture process has been divided the support structure into five ring layers. After all completed parts arrived at the site, the parts will be assembled by welding and concrete will be poured to complete the structure.

2. Quality Deficiency at the Fabrication

On April 24, 2002, AEC noticed some quality deficiencies of the weld electrodes used for the unit 1 reactor pedestal ring structure fabricating at China Shipbuilding Company in Kaohsiung. The higher strength of the weld electrodes supposed to be applied at the 2 to 5 ring layers were replaced by the lower strength weld electrodes. Such condition could affect the safe operation of the fourth nuclear power plant in the future. AEC immediately dispatched staff to investigate the situation. After examining the welding QA records, in-situ weld visual inspection records, and taking weld samples from the completed parts for chemical analysis, it is certain that the weld quality deficiency does exist and has been found in many different locations.

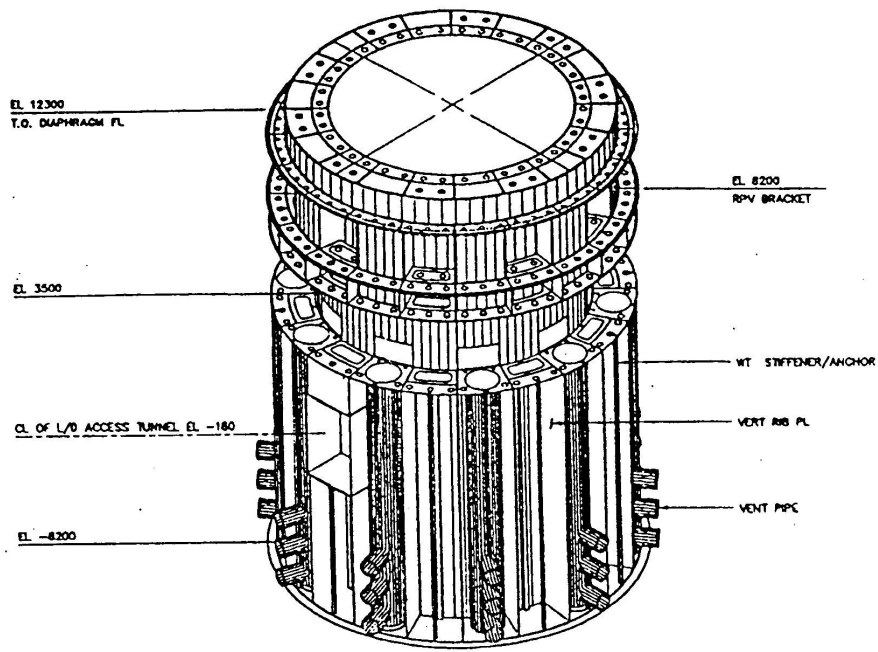
3. Safety Regulation

(1) For the safety importance of the reactor pedestal structure, it must

meet the seismic class 1 structure requirements and no discount in quality can be tolerated in the manufacturing process. If there were fabrication deficiencies in quality were found, the parts can no longer be used in the plant for the sake of safety. After the circumstances of the 2~5 ring layer with weld deficiencies were made certain, AEC expressed the regulation position to TPC asking for corrective action. Subsequently, TPC has decided to re-fabricate this whole reactor pedestal assembly.

- (2) Superior fabrication quality for components and equipment is the key to link toward the total nuclear safety. The nuclear industry has achieved top QA and QC systems to assure the quality of the products. However, the fabrication deficiencies of the unit 1 reactor pedestal indicate TPC still has weak spots in implementing the QA and QC systems. As a result, the weld deficiency case has not been prevented from happening during the construction phase. AEC has charged a level 3 violation against TPC for this case, and asked the personnel involved in this case be punished for their negligence. AEC wishes that this safety regulation would assure that no similar situation could happen again at the fourth nuclear power plant during the construction phase in the future.

Note: Any question concerning the above information, please contact Mr. Niu, Shaio-Chung, branch chief of nuclear regulation. Tel. No. (02) 23634180 Ext. 350



Reactor Pedestal Steel
Structure Configuration



Quadrant View of the Third Layer
of the Reactor Pedestal