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APPENDIX 5I

CONTAINMENT STRUCTURE INSTRUMENTATION

The purpose of instrumenting and testing the structure of a prestressed concrete containment structure is to provide a means for comparing the actual response of the structure to the loads induced during post-tensioning and pressure testing with the predictions of the design calculations. If the response is as predicted, the design techniques are assumed to have been verified.

The containment structure is very similar to the Turkey Point, Palisades and Oconee structures. The design and construction are the same. The structures for Turkey Point and Palisades will be completely instrumented. The Turkey Point instruments will provide approximately 400 strain measurements at 55 locations throughout the structure and liner. In addition, about 25 optical measurements of structural deformation will be made. The Palisades and Oconee instrumentation will be comparable. This amount of data will permit a detailed comparison between design calculations and observed response. The basic structural response and the accuracy of the calculation procedures used by the engineer will, therefore, be verified by these tests.

Since the detailed confirmation of the design techniques will be available, instrumentation of the structure is not required and no additional confirmation of design techniques is necessary. For these reasons, no provisions for strain gage instrumentation of the structural members of the containment structure will be made.

Optical measurement of the containment vessel structural response will be made as follows:

> The required level of structural prestress will be obtained by jacking the post-tensioning tendons.

Prior to reactor fuel loading and operation, the integrity of the containment structure will be demonstrated by a pressure proof test. The post-tensioning and the pressure test will permit verification that the structural response due to the induced loads is consistent with the predicted behavior. This will be accomplished by optical measurements of the structure's deformation using a surveyor's theodolite.

The measurement technique will require attaching targets to the surface of the containment structure at appropriate elevations and azimuths and around the access openings. It is expected that measurements of displacement to within .01 inch can be made. These deflections, in turn, will be correlated with measurements made on the Turkey Point and Palisades containment structures for verification of structural behavior.

The intended program of containment proof testing is given in Section 5.5. The proof testing of each tendon is achieved at the time of post-tensioning when the tendon will be stressed to the maximum value occurring during its life.