

DONALD C. COOK NUCLEAR PLANT UNIT NOS. 1 AND 2  
ATTACHMENT NO. 1 TO AEP:NRC:00500A.  
SECOND QUARTERLY REPORT ON HYDROGEN MITIGATION AND CONTROL

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## 1.0 Containment Evaluation - Summary

Phase 1 of the evaluation of the containment shell ultimate capacity is complete. Our consultant, Dr. J. D. Stevenson of SMA, has completed the evaluation of the containment ultimate capacity. The results show that the maximum pressure capacity varies for different segments of the Containment Building. Based on a purely elastic analysis and considering the lowest as-built material properties, the ultimate capacity of the containment is as follows: Concrete mat 49.6 psig; Concrete Shell 61.2 psig; Equipment Hatch 42.6 psig; Personnel Hatch 42.6 psig. These values will be higher if use is made of the "mean value" properties of the as-built material.

The limiting failure modes considered for the equipment hatch and the personnel hatch are in the bending mode. Both hatches are plate/shell type structures, rectangular in cross section. Considering the ductility in the steel components for which the plastic modulus is at least 1.5 times the elastic modulus, the plate and shell elements behave essentially elastically until the plastic modulus is reached. A finite element plastic analysis of the hatch cover plate was done based on the minimum as-built material property ( $F_y=50.3\text{Ksi}$ ). In this analysis the limiting pressure capacity of the equipment hatch cover plate is comparable to that of the concrete shell, i.e. 54.5 psig. At this pressure the maximum deflection of the plate is still linear and the maximum plastic strain was 1.5 times the elastic strain at yield.

The details of the ultimate pressure capacity of the containment are attached.

Phase 2 of the evaluation involves Probabilistic Analysis. In this phase, the impact of the variability of the "as-built" material parameters on the best estimate capacity of the containment to resist uniform internal static pressure will be analyzed. The work is in progress, and is planned for completion by May 15, 1981.

Phase 3 of the evaluation involves the analysis of the containment shell structure for localized Dynamic Loads. The evaluation is in progress and is anticipated to be complete by May 31, 1981.