

TOPICAL REPORT EVALUATION

Report Identification: BAW-10007, Rev. 1;
BAW-10029
Report Title: Control Rod Drive Mechanism Test Program
Report Dates: June 1971 and January 1972
Originating Organization: Babcock & Wilcox
Reviewed By: Mechanical Engineering Branch, AEC Directorate of Licensing
November 1972

SUMMARY OF TOPICAL REPORT:

Control rod drive mechanism tests were carried out under operating coolant flow, temperature, pressure and water chemistry conditions and varying the equipment alignment from optimum to the maximum amount of misalignment expected with the most adverse combination of design tolerances. In addition, a test was completed to confirm the motor's ability to provide for forced insertion in the event of a stuck rod. Life testing was carried out under the misalignment conditions and duplicating the stroke, travel and reactor trips expected during 20 years of service life. Trip times, deacceleration rates and component wear were measured in conjunction with the life tests, and insertion force was measured under the stuck rod conditions. All test results were judged to comply with the performance criteria specified and were considered satisfactory.

SUMMARY OF REGULATORY EVALUATION:

We have reviewed the subject reports and find that the three specific versions of a basic roller nut drive mechanism designated "A", "B" and "C" by B & W exhibit satisfactory trip, wear, acceleration, and forced insertion characteristics in operation. However, the reports are considered acceptable only if the provisions stated below in the regulatory position are satisfied.

Pressure boundary design criteria and stress limits except for the OBE and DBE under various operating conditions are not presented for the type "A" mechanism. Zero period ground accelerations of 0.25 g horizontal and 0.3 g vertical equivalent static accelerations were used for seismic analysis. Type "C" components are designed and manufactured to the Class A vessel requirements of Section III. However, specific stress limits for emergency and faulted operating conditions, and the seismic design input loadings are not specified. The design criteria used for the design of type "B" mechanisms which are hybridized version of types "A" and "C" mechanisms are also not described.

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REGULATORY POSITION:

The subject reports provide a satisfactory basis for accepting the operating performance of B & W control rod drive mechanisms Type "A", "B", or "C" and may be referenced in future case applications provided that: (a) the purpose of reference is limited to only mechanism operating characteristics and (b) the analytical methods, criteria and stress limits used in the design of the mechanisms and (c) life testing or equivalent procedures are used to confirm service life beyond the 20 years demonstrated by the test program are submitted. Items (a), (b) and (c) must be evaluated on a case-by-case basis.