

BNL ALARA Center Data Base

U.K.

R-366

MAXIMUM ALLOWABLE CHLORIDE LEVELS ON STAINLESS STEEL COMPONENTS AT THE SIZEWELL "B" PWR

Keywords: COMPONENT RELIABILITY; STRESS CORROSION CRACKING; INTERGRANULAR ATTACK; CHLORIDE; PITTING

Principal Investigator:

S. Allan
NNC Ltd, Booths Hall
Chelford Road
Knutsford, CHESHIRE WA16 8QG
U.K.

Phone: +44 565 633800

Project Manager:

W. Lawson
Nuclear Electric plc
Chelford Road
Knutsford, CHESHIRE WA16 8QG
U.K.

Phone: +44 565 682659

Objectives: Assess the environmental conditions and chloride contamination levels under which corrosion (stress corrosion cracking, intergranular attack, and pitting) could occur at the Sizewell "B" PWR.

Comments: There are two distinct sets of conditions where a stainless steel plant could experience corrosion, namely those associated with storage when the plant is part-constructed and stored on site before final fabrication, and those which would be experienced by the plant during operation. As Sizewell is a coastal location, it was anticipated that the vendor-specified maximum chloride level of $0.015 \mu\text{g}/\text{cm}^2$ would be difficult to achieve and maintain during construction and operation. In order to define what levels could be allowed, work was commissioned to establish levels of chloride that could initiate corrosion on typical Sizewell "B" stainless steel material over a range of typical conditions simulating storage and plant operation.

Remarks/Potential for dose limitation: The level of chloride contamination allowed on PWR stainless steel is governed by requirement to avoid corrosion associated with chlorides, including stress corrosion cracking, intergranular attack, and pitting. Based on the results of this study, a maximum chloride level of $0.1 \mu\text{g}/\text{cm}^2$ would be appropriate for Sizewell "B". This will give a margin of safety and is attainable with appropriate care.

References: Allan, S.J., Atherton, D. and Lawson, W.F., "Maximum Allowable Chloride Levels on Stainless Steel Components at the Sizewell 'B' PWR," *Water Chemistry of Nuclear Reactor Systems* 6, Vol. 1, pp. 210-211, British Nuclear Energy Society, London, 1992.

Duration: from: 1991 to: 1992

Funding: N/A

Status: Completed

Last Update: June 14, 1993