MAY 20 1985

AEOD/E506

MEMORANDUM FOR: Denwood F. Ross, Deputy Director
Office of Nuclear Regulatory Research

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

FROM: Thomas A. Ippolito, Deputy Director
Office for Analysis and Evaluation
of Operational Data

SUBJECT: VALVE STEM SUSCEPTIBILITY TO IGSCC DUE TO IMPROPER HEAT TREATMENT

Enclosed is an Engineering Evaluation Report on the above subject recently completed by this office. Our evaluation indicates that valve stems made of 400 series stainless steel and heat treated to high hardness are highly susceptible to intergranular stress corrosion cracking (IGSCC). The excessive hardness can result from improper heat treatment. Since discrepancies in hardness between the actual measurement and the expected value based on heat treatment records existed in all four events evaluated, we conclude that excessive hardness may not be detected in either the licensee's or the supplier's QA programs. Also, the existing code requirements regarding actual testing to verify the hardness for the stem material after heat treatment may not be adequate.

The stress corrosion cracking on valve stems described in this evaluation were discovered by close inspection after disassembly of the valves during refueling outages. None of the cracked stems were detected by the routine valve operability test programs for the identified plants. This indicates that the IGSCC on a valve stem could go undetected until failure occurs with a sudden shear of the stem upon actuation of the valve during system operation. Such failure can prevent the system from performing its safety function.

Therefore, we suggest the following:

1. RES should consider the adequacy of the existing code requirements with regard to assurance of proper hardness of martensitic stainless steel following the heat treatment process. If appropriate, RES should attempt to have such requirements included in the applicable code.

OFFICE ▶						
SURNAME ▶						
DATE ▶						

2. IE should issue an IE Information Notice to inform licensees of the potential generic problem concerning improper heat treatment of stem material made of 400 series stainless steel which could lead to IGSCC. This Information Notice should indicate that the gland packing section is the most likely location for the initiation of valve stem IGSCC.

Original signed by
Thomas A. Ippolito

Thomas A. Ippolito, Deputy Director
Office for Analysis and Evaluation
of Operational Data

Enclosure:
As stated

DISTRIBUTION:
PDR
AEOD CF
ROAB SF
ROAB CF
CHsu
MChiramal
KSeyfrit
TIppolito
CHeltemes
AEOD SF

OFFICE	ROAB:AEOD	SC:ROAB:AEOD	BC:ROAB:AEOD	DD:AEOD	D:AEOD		
SURNAME	CHsu:as	MChiramal	KVSeyfrit	TIppolito	CHeltemes		
DATE	5/8/85	5/8/85	5/8/85	5/13/85	5/20/85		