



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 07 1989

MEMORANDUM FOR: C. Y. Cheng, Chief
Materials and Chemical Engineering Branch
Division of Engineering Technology

FROM: Stephen Koscielny, Corrosion Engineer
Chemical Engineering Section
Materials and Chemical Engineering Branch
Division of Engineering Technology

SUBJECT: SUMMARY OF MEETING WITH THE BWROG/GE/EPRI ON UPDATE ON
HYDROGEN WATER CHEMISTRY AND RELATED ISI ISSUES

INTRODUCTION:

This meeting was held in Rockville, Maryland October 10, 1989, at the request of NRC for the BWROG/GE/EPRI to inform the staff and to discuss with the staff the program concerning Hydrogen Water Chemistry Status, current field experience and proposed ISI credit in order to relax inspection requirements as a result of installation and operation of a Hydrogen Water Chemistry system. The agenda for the meeting is attached as Enclosure (1). The attendees are identified in Enclosure (2). The BWROG/GE/EPRI presentation is attached as Enclosure (3).

BACKGROUND:

Boiling water reactors have experienced stress corrosion cracking in the reactor coolant system piping resulting in forced shutdowns, reduced plant availability and additional personnel radiation exposure for repairs and pipe replacement. Results of research conducted in the area of stress corrosion cracking show that the likelihood of cracking depends on reactor water chemistry, in particular, on the concentrations of ionic impurities and oxidizing radiolysis products such as oxygen as well as on material condition and stress level. Tests have demonstrated that the concentration of oxidizing radiolysis products in the recirculating water of a BWR can be reduced substantially by injecting hydrogen into the feedwater. Further the BWROG states that recent plant data indicate that the rate of intergranular stress corrosion cracking of sensitized austenitic stainless steel in reactor recirculation system can be reduced to levels which are not measurable by injection of hydrogen into the feedwater if the concentration of ionic impurities (e.g. conductivity less than 0.3 us/cm at 25°C) is kept sufficiently low and the electrochemical potential is less than -230 mv (Standard Hydrogen Electrode). As a result of this information the BWROG/GE/EPRI are proposing relaxation of the inservice inspections requirements of reactor coolant system piping for stress corrosion cracking for plants which have implemented a Hydrogen Water Chemistry Program.

Plant experience was discussed during the meeting by Commonwealth Edison, Carolina Power and Light, and the New York Power Authority. GE and EPRI presented the current research being conducted on the subject. The BWROG provided a summary of recommended inspection schedules for BWR piping weldments for plants with an operational Hydrogen Water Chemistry program.

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NOV 07 1989

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- 2 -

CONCLUSION:

The Hydrogen Water Chemistry program concept has potential as a method for reducing or eliminating stress corrosion cracking. Some areas of concern were discussed with the BWROG. The staff will consider the BWROG request for relief from ISI requirements as a result of installation of a Hydrogen Water Chemistry System when the BWROG report on the subject is formally docketed.

151
Stephen Koscielny, Corrosion Engineer
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Division of Engineering Technology

cc: Stephen D. Floyd w/o enclosure (3)
G. M. Gordon w/o enclosure (3)
Robin Jones w/o enclosure (3)

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DET:EMCB *SK*
SKoscielny:vad
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- 2 -

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ENCLOSURE 1

AGENDA FOR
NRC MEETING WITH BWROG/GE/EPRI
OCTOBER 10, 1989 - 9 AM
RM 8B11, WHITE FLINT BUILDING
ROCKVILLE, MARYLAND

UPDATE ON HWC AND RELATED ISI ISSUES

PROPOSED PRESENTERS

- | | | |
|---|------------------------------------------------------------------------------------------------------|-----------------------------------|
| ° | INTRODUCTION | BWROG/NRC |
| ° | CURRENT HWC UNDERSTANDING AND
FLEET IMPLEMENTATION STATUS | R. COWAN, GE |
| - | FUEL PERFORMANCE | |
| ° | RECENT FIELD EXPERIENCE WITH HWC | |
| - | ASSESSMENT OF DRESDEN-2
PIPING UT INDICATIONS | HIEN DO, CECO
S. RANGANATH, GE |
| - | EFFECT OF DECONTAMINATION ON ISI | R. JONES, EPRI |
| - | DUANE ARMOLD HWC
PROGRAM RESULTS | G. GORDON, GE |
| - | BRUNSWICK FLOW RATE EFFECT
ON ECP MEASUREMENT (STARTUP VS.
MINI TEST) | B. WHITE, CP&L |
| - | FITZPATRICK HWC CAVS RESULTS | J. GOLDSTEIN, NYPA |
| ° | QUANTIFYING THE BENEFIT OF HWC
IN MITIGATING IGSCC | G. GORDON/
S. RANGANATH, GE |
| - | GE/EPRI IGSCC MODEL PREDICTIONS VS.
FIELD AND LAB DATA | |
| + | PIPING AND SAFE END/NOZZLE
ATTACHMENTS INCLUDING INCONEL BUTTER
AND THERMAL SLEEVE ATTACHMENTS | |
| + | VESSEL INTERNALS AND INTERNAL ATTACHMENTS | |
| - | MONITORING/VERIFICATION OF
HWC EFFECTIVENESS | |

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- | | |
|----------------------------------------------------------------------------|-----------------|
| ° EPRI HWC GUIDELINES/FUTURE PLANS | R. JONES, EPRI |
| ° BWROG PLAN FOR PROACTIVE INTERNALS
INSPECTION AND CONTINGENCY REPAIRS | S. FLOYD, BWROG |
| ° BWROG PLAN FOR OBTAINING GENERIC
ISI CREDIT FOR HWC OPERATION | S. FLOYD, BWROG |
| ° NRC FEEDBACK | NRC |

ENCLOSURE (2)

ATTENDANCE LIST

Robert Hermann	NRR/EMCB	301-492-0911
Stephen Koscielny	NRR/EMCB	301-492-0826
Kris Parczewski	NRR/EMCB	301-492-3252
Damiano LaMastra	PSE&G	609-339-5058
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Tim Long	Georgia Power/Hatch	205-877-7409
Hien Do	Commonwealth Ed.	312-294-4397
Star Walker	EPRI NDE Center	704-547-6081
Ben White	CP&L Brunswick	919-457-2538
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GM Gordon	General Electric Co.	408-925-6421
Lynn Connor	The NRC Calendar	301-229-6553
Robert Lilorenzo	GPU Nuclear	201-316-7205
John Fox	TVA	615-751-4964
Sam Ranganath	GE Nuclear Energy	408-925-6825
Peter Ford	GE Corp. R&D Center	518-387-5821
Barry Gordon	GE Nuclear Energy	408-925-2559
Robin Jones	EPRI	415-851-2791
Jeffrey Goldstein	New York Power Authority	914-681-6285
Ron Grover	New York Power Authority	914-681-6284
Robert L Layman	GE Nuclear Energy	408-925-6472
Stephen D. Floyd	Carolina Power & Light Co.	919-546-6901
James R. Hall	NRC Duane Arnold PM	301-492-1391
Byron L Siegel	NRC/NRR/PD 3-2	301-492-3019
Alan Small	BECC	508-747-8746