ELECTRIC POWER RESEARCH INSTITUTE

Alloy 690/52/152 Collaborative Research Program

Working Group #3: Data Application ("A")

Steve Fyfitch
AREVA NP, Inc. (USA)

NRC/Industry Meeting
Rockville, MD
August 6-7, 2009

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- **Scope:** WG#3 will focus on data application for PWSCC of Alloys 690/52/152
- **Leader:** *S. Fyfitch (AREVA NP Inc., USA)*
- **Membership:**
  - *P. Efsing (Ringhals, Sweden)*
  - *C. Marks (DEI, USA)*
  - *C. Moyer (NRC-RES, USA)*
  - *E. Willis (EPRI, USA)*
  - *T. Yonezawa (Tohoku University, Japan)*
  - *G. Young / E. Richey (KAPL, USA)*

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Vision for the Group:

- **Initial Task—**discuss and decide what materials and material conditions still need to be tested to ensure that the experimental data generated (for both initiation and growth) are properly understood
- **Later—**group will take the lead in assessing the practical relevance of PWSCC data for thick-walled Alloy 690 and its weld metals

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Questions to be addressed:

- Microstructure (grain size, banding, etc.)
- Heat treatments (annealing, thermal treatments)
- Chemical composition (C, Cr, Fe, Ni, Al, etc.)
- Cold-rolling (e.g., 1D, 2D, 10%, 20% and higher)
- Material form (plate, rod/bar, extrusions, forgings, etc.)
- Weld metals (52, 52M, 52MS, 152, etc.)
  - Weld defects (DDC, LAF, etc.)
- Welding processes (TIG, SMAW, narrow groove, etc.)
- Weld configurations, overlays, and inlays
  - Representative mockups and configurations
  - HAZ

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Needs:

- Compile information
  - Materials and configurations that have been tested
  - Materials and configurations that still need to be tested
- Identify relevant materials and configurations to ensure current plans are adequate to properly understand initiation and growth or provide listing of additional work to be conducted

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Review Of Action Item List Currently Assigned To WG#3

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WG#3 Action Items (Data Application)

ACTION	LEAD	STATUS
Send information on welding concerns and conditions that should be tested to P. Andresen, S. Bruemmer, and B. Alexandreanu. Ask for info on evolution of weld composition changes and associated microstructural characterization for Alloy 52M from Special Metals.	E. Willis	*In progress*
Develop final list of information for site access team to evaluate by obtaining feedback on preliminary DEI list.	E. Willis	*In progress*
Contact vendors/manufacturers to request CRDM fabrication information and/or conduct site visit at a utility to review documentation; determine pertinent information that may be available for WG#3 use.	C. Marks	*In progress, but approach on site visits is abandoned.*
Locate EMCC reports of CRDM fabrication practices and determine availability for dissemination to WG#3.	C. Marks	*Chuck will create a version of the report to share*
Consolidate weld material characterization data from previously tested specimens and identify gaps.	S. Bruemmer	*In progress*
Present characterization information on narrow-groove weld materials at experts meeting and look at possibility of providing narrow-groove weld material from KAPL.	G. Young	*In progress*
AREVA to check if it will provide CRDM mock-ups available and check whether inlay samples are available for testing (property of Owners Group). Investigate possibility of getting mock-ups from power plants (e.g., Finnish plant) that are currently under construction internationally, possibly through nuclear steam supply system vendors.	S. Fyfitch and E. Willis	*In progress*

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WG#3 Action Items (Data Application) continued

ACTION	LEAD	STATUS
Contact Peter King to ask whether B&W Canada have available CRDM mockup for characterization/testing. Investigate possibility of supplying safe-end mockup material for SCC specimens; may have preexisting agreement with EPRI.	G. Young/R. Etien	*In progress*
Follow up with Thyssen-Krupp (L. Paul) on possibility of obtaining testing material from new order	E. Willis	*In progress*
Summarize fabrication geometry and configuration for replacement steam generator nozzle welds. Identify available mockups for characterization work from Westinghouse.	R. Jacko	*In progress*
Augment Alloy 690 implementation table to include SG replacement applications, pressurizer replacement applications, and dissimilar metal weld mitigation applications.	C. Marks	*On hold pending clarification of support for DEI work.*
Thyssen-Krupp will have 52I heat available in March/April. How much do we need?	C. Willis	*Open*
Create central repository of materials that exists	C. Willis	*Report at next meeting*

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