Enclosure 19

Memo from Donald G. Naujock

To

Terence L. Chan

Dated August 26, 2008

PDI/NRC Meeting

ELECTRIC POWER RESEARCH INSTITUTE

EPRI Projects Addressing Inspection Cast SS

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Appendix VIII Performance Demonstration

PDI/NRC Meeting

May 12-14, 2008

Overview

- Provide an overview of active and proposed projects that are focused on the examination and characterization of cast components

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Project 1: Cast Stainless Steel NDE Roadmap (NDEC Project)

- Scope:
  - Develop and maintain a roadmap for NDE of cast stainless steel (CSS) components
  - Coordinate and track NDE activities
  - Align project tasks with utility license renewal commitments
- Proposed
- Deliverables
  - Annual EPRI project status reports

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Project 2: Circumferential Inspection of Large Scale Pipe Welds (Technology Innovation Project)

- Scope: Develop Guided Wave UT techniques to examine CSS and DM welds in parallel direction using high-frequency Rayleigh waves and low frequency Lamb waves
- Approved
- Deliverables
  - Report documenting results of this feasibility study

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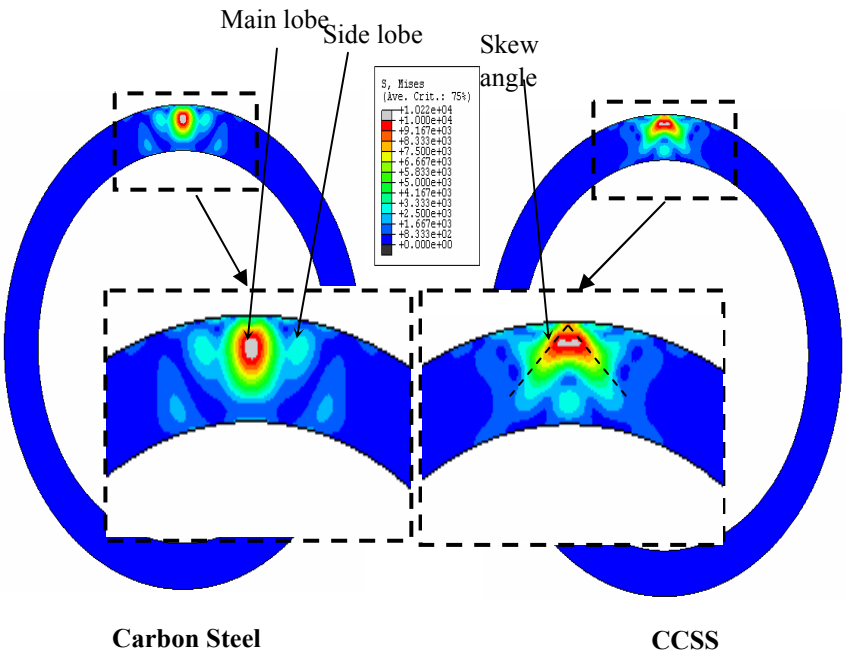
Project 3: Grain Characterization (Technology Innovation Project)

- Scope: Develop a model to simulate different grain morphologies and develop NDE technique to determine grain structure
- Approved
- Deliverables
  - Analytical and FEM models will predict wave behaviors in CCSS materials and allow characterization of CCSS grain structures using guided wave techniques.
- Report that includes modeling results and recommendations for NDE technique development
- Future Project – Results to be used in development of UT techniques for examination of specific CASS grain types.

FEM Model - UT wave propagation



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Project 4: Filmless RT of CSS (NDEC Project)

- Scope: Demonstrate that filmless RT can be used to examine CSS welds during construction and ISI
- Proposed
- Deliverables
  - Report on the results of the demonstrations
  - Procedure
  - Could eventually provide ASME Code revisions

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Project 5: Ultrasonic Materials Characterization of Cast Austenitic Stainless Steel Pipe Welds (NDEC Project)

- Scope:
  - Ultrasonic materials characterization techniques will be applied to the problem of evaluating the severity of thermal aging embrittlement in cast austenitic stainless steel (CASS) pipe welds.
- Proposed
- Deliverables (Reports)
  - EPRI Cast Austenitic Stainless Steel (CASS) Pipe Weld Project Review and Literature Search
  - Ultrasonic Materials Characterization Measurements of Thermal Aging Embrittlement in Cast Austenitic Stainless Steel Pipe Welds

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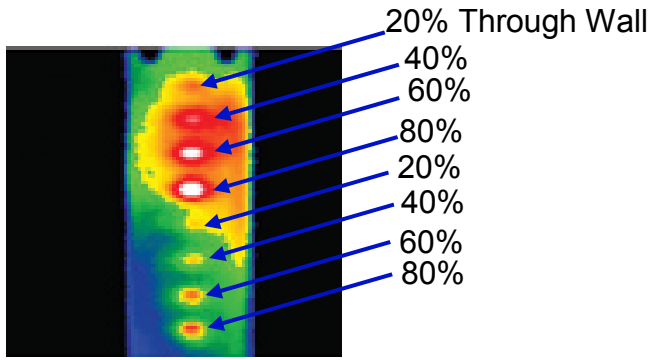
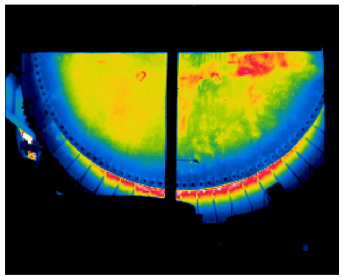
Project 6: Coupled Thermography for Flaw Detection in Cast Stainless Steels (NDEC Project)

- Scope:
  - Evaluate induction and ultrasonic thermography as techniques to characterize flaws in cast stainless steels.
- Proposed
  - Discussions with university on conducting investigations have been initiated.
- Deliverables
  - Coupled Thermography for Flaw Detection in Cast Stainless Steels Feasibility Study and Technology Transfer Reports





Above shows an IR image of a 7” diameter steam pipe with 0.3” and 0.4” diameter holes drilled into the ID at various depths.

Right shows an IR image of an industrial furnace with degraded interior thermal insulation.

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Project 7: Flaw Fabrication in Cast Stainless Components (NDEC Project)

- Scope: Develop techniques for implanting crack like flaws into CSS base material without radically changing the grain structure of the parent material
- Proposed
- Deliverables
  - A series of samples used to develop NDE techniques for the detection and sizing of flaws in CSS
  - Technical Updates summarizing the results of the this project
  - Infrastructure for a performance demonstration program for the Inspection of CSS
- In 2008 startup funding was approved for this project to conduct a search for cast material.

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Summary

- Industry is proactively working on developing methodology to address cast
  - Development of roadmaps and issue tables
  - Material purchase
  - Material characterization
  - Evaluation of various NDE techniques
  - Engineering evaluations

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Questions ?

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