


United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of:	Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 and 3)
	ASLBP #: 07-858-03-LR-BD01
	Docket #: 05000247 05000286
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	Admitted: 10/15/2012
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Other:	Identified: 10/15/2012
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	Stricken:

ENT000033
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RESUME

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PROFESSIONAL EXPERIENCE

1985 – Present Independent consultant working in the nuclear and mechanical engineering fields. Consultant to EPRI (Electric Power Research Institute) on single and two-phase flow-accelerated corrosion (FAC) also known as erosion-corrosion, cavitation, thermal-hydraulic analyses, void fraction correlation and service water corrosion.

Principal creator of CHEC, CHECMATE and CHECWORKS, the computer programs which predict single-phase and two-phase flow-accelerated corrosion. CHECWORKS is currently used to improve maintenance efficiency and enhance safety in more than 150 nuclear units worldwide.

Consultant to the CANDU Owners Group, Entergy Nuclear, Exelon Corporation, Ontario Power Generation, Inc., Pacific Gas & Electric and Southern California Edison on issues of FAC and nuclear safety.

Co-author of three books and 17 published EPRI reports. Sole author of 23 published EPRI reports.

1980 - 1984 Program Manager, U.S. Department of Energy, 9800 South Cass Avenue, Argonne, Illinois, 60439, 630-252-2000, Frank Herbaty, supervisor:

Managed substantial portions of the Industrial Co-generation, Magneto-hydrodynamics (MHD) and Ocean Thermal Energy Conversion (OTEC) Programs at the Chicago Operations Office. The annual value of the work I managed was about \$10 million.

Promoted from GS-13 to GS-14.

1977 – 1980 Mechanical Engineer, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439, 630-252-2000. Dr. Norman Sather, supervisor:

Government Technical Manager on several, multi-million dollar OTEC power systems studies and heat exchanger construction programs.

Conducted design studies, computer modeling and laboratory testing on a metal-hydride heat pump system.

Promoted from Assistant Mechanical Engineer to Mechanical Engineer.

1973 - 1977

Principal Engineer, Combustion Engineering, 1000 Prospect Hill Road, Windsor, CT 06095, 860-688-1911, Dr. Hector Guerrero, supervisor:

Lead engineer on a series of nuclear safety experiments including tests on an alternate emergency core cooling system, steam generator depressurization, re-flood heat transfer and an innovative primary system flow meter.

1972 - 1973

Nuclear Engineer, Quadrex Corporation, 477 Division Street, Campbell, California, (company now defunct), Randolph Broman, supervisor:

Conducted various nuclear safety analyses.

Wrote and modified computer programs (e.g., RELAP and CONTEMPT) related to nuclear safety. The areas of focus included boiling water reactor loss of coolant accident analysis, pipe rupture loads and effects, building pressurization and hydraulic loads resulting from valve closure.

REFERENCES

Professional and personal references available on request.

EDUCATION

ScD	Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139, 1972
Mech Eng	Mechanical Engineering, Massachusetts Institute of Technology, 1968
MS	Mechanical Engineering, Massachusetts Institute of Technology, 1968
BSME	Mechanical Engineering, Magna Cum Laude, New Jersey Institute of Technology, Newark, NJ 07102, 1966
	Bayonne High School, Bayonne, New Jersey 07002

HONORS

American Nuclear Society, Fellow
American Society of Mechanical Engineers, Fellow
Sigma Xi (Honorary Scientific Research Society)
National Science Foundation Graduate Fellowship
Tau Beta Pi (Engineering Honor Society)
Pi Tau Sigma (National Mechanical Engineering Honor Society)
Honors on Admission, New Jersey Institute of Technology

PATENTS AND PUBLICATIONS

U.S. Patent – Patent Number 4,372,376, Heat Pump Apparatus, February 8, 1983.

Books

Co-author of the EPRI book, *Pressure Drop Technology for Design and Analysis*, published 1999.

Co-author of the EPRI book, *Flow-Accelerated Corrosion in Power Plants*, published 1996 and revised in 1998.

Co-author of the EPRI book, *Void Fraction Technology for Design and Analysis*, published 1997.

Published Reports – sole author of the following EPRI Reports and CHUG Position Papers:

“Independent Review of the FAC Degradation of the High Pressure Extraction Lines at Catawba Unit 1 and Unit 2, CHUG Position Paper #13, December 2011.

“Recommendations for Inspecting Feedwater Heater Shells, Revision 1,” CHUG Position Paper #4, December 2011.

“Review of Line Correction Factor Methodology,” CHUG Position Paper #12, October 2011.

Plant Engineering: Impact of Electric Power Uprates on Flow Accelerated Corrosion, EPRI Technical Update, Product ID 1022982, July 2011.

2010 State of the Fleet Assessment of Flow-Accelerated Corrosion Program Effectiveness: State of the Fleet, Technical Update, Product, ID 1022607, March 2011.

Mentoring Guide for Flow-Accelerated Corrosion Engineers, EPRI Technical Update, Product ID 1022295, December 2010.

“Development of a Figure of Merit for Evaluating CHECWORKS™ SFA Pass 2 Results,” CHUG Position Paper #9, December 2010.

“Investigation into Combining Single and Multiple Outage Inspection Data.” *CHUG Position Paper #10, December 2010.*

Development of an Averaged Point-to-Point Method for Inspection Data, EPRI Technical Report, Product ID 1020528, May 2010.

Evaluation of Multiple-Inspection Flow-Accelerated Corrosion Data on Unequal Grids, EPRI Technical Report, Product ID 1020527, April 2010.

State of the Fleet Project to Assess Flow-Accelerated Corrosion Program Effectiveness, EPRI Technical Report, Product ID 1019177, December 2010.

Statistical Methods for the Analysis of Multiple-Inspection Flow-Accelerated Corrosion Data, EPRI Technical Report, Product ID 1019175, November 2010.

Mentoring Guide for Flow-Accelerated Corrosion Engineers: Prototype Version, EPRI Technical Update, Product ID: 1018455, December 2008.

Optimization of FAC Inspections: BWR Feedwater Systems, EPRI Technical Update, Product ID: 1018466, December 2008.

Least Squares Methods for Evaluating Inspection Data, EPRI Technical Update, Product ID: 1018456, December 2008.

BWRVIP-191: BWR Vessel and Internals Project Flow-Accelerated Corrosion in BWR Bottom Head Drain Lines: 2008 Update, EPRI Technical Update, Product ID: 1016949, July 2008.

Flow-Accelerated Corrosion – The Entrance Effect, EPRI Technical Update, Product ID: 1015072, November 2007.

Investigation into Flow-Accelerated Corrosion at Low Temperatures, EPRI Technical Update, Product ID: 1015070, November 2007.

Interim Recommendations for an Effective Program Against Erosive Attack, EPRI Technical Update, Product ID: 1015071, December 2007.

Investigation into Flow-Accelerated Corrosion at Low Temperatures, EPRI Report, 1013474, November 2006.

Computer-Based Training Module on Erosion in Piping Systems. EPRI Technical Update 1013570, November 2006.

Computer Based Training Module on Flow-Accelerated Corrosion (FAC) for non-FAC Personnel, EPRI Report 1013249, May 2006.

Determining Piping Wear Caused by Flow-Accelerated Corrosion from Single-Outage Inspection Data, EPRI Report 1013012, March 2006.

An Evaluation of Flow-Accelerated Corrosion in the Bottom Head Drain Lines of Boiling Water Reactors, EPRI Report 1013013, March 2006.

Chemistry Effects on Flow-Accelerated Corrosion – PWR: Hydrazine and Oxygen Investigations, EPRI Report 1011835, November 2005.

Chemistry Effects on Flow-Accelerated Corrosion – BWR: Dissolved Oxygen Investigation, EPRI Report 10118330, November 2005.

Recommendations for Controlling Cavitation, Flashing, Liquid Droplet Impingement, and Solid Particle Erosion in Nuclear Power Plant Piping Systems, EPRI Report 1011231, November 2004.

Flow-Accelerated Corrosion Investigations of Trace Chromium, EPRI Report 1008047, November 2003.

Selective Attack of Welds by Flow-Accelerated Corrosion, EPRI Report 1007057, July 2002.

Published Reports – co-author of the following EPRI Reports

Technical Justification for the Fabrication of Boiling Water Reactor Bottom Drain Line Mockups, Internal Report, IR-2011-475 , July 2011

Recommendations for an Effective Flow-Accelerated Corrosion Program (NSAC-202L-R3), EPRI Report 1011838, May 2006.

Recommendations for an Effective Flow-Accelerated Corrosion Program, NSAC-202L, Revision 2, April 1999.

CHECUP™, a CHECWORKS™ Application for FAC Evaluation of Fossil Power Plants – Users Guide, EPRI TR-103198-P5, November 1998.

CHECWORKS™ Computer Program Users Guide, EPRI TR-103198-P1, December 1997.

Guidelines for Controlling Flow-Accelerated Corrosion in Fossil Plants, EPRI TR-108859, November 1997.

Recommendations for an Effective Flow-Accelerated Corrosion Program, NSAC-202L, Revision 1, January 1997.

Understanding Void Fraction in Steady State and Dynamic Environments, EPRI TR-106326, August 1996.

Recommendations for an Effective Flow-Accelerated Corrosion Program, NSAC-202L, November 1993.

An Analysis of BWR Fuel Heatup During a Loss of Coolant While Refueling, NSAC-169, November 1991.

CHEC-NDE™ a Tool for Managing Non-Destructive Evaluation Data from Pipe Inspections, EPRI NP-7017-CCML, NSAC-149L, April 1991.

CHECMATE™ Computer Program Users Guide, NSAC-145L, Original May 1989, and Rev. 1, April 1991.

The Chexal-Lelouche Void Fraction Correlation for Generalized Applications, NSAC-139, April 1991.

CHEC® Computer Program Users Manual, NSAC-112L, Original July 1987 and Rev. 1, July 1989.

An Assessment of Eight Void Fraction Models for Vertical Flows, NSAC-107, December 1986.

A Full-Range Drift-Flux Correlation for Vertical Flows (Revision 1), EPRI NP-3989-SR, September 1986.

Response of a B&W Plant to Steam Generator Tube Ruptures, NSAC-101, September 1986.

EPRI R&D Contributions to the Technical Basis for Revision of ECCS Rules, EPRI NP-4146-SR, July 1985.

Technical Papers – More than 45 published technical papers on nuclear safety analysis, thermal-hydraulics, and flow-accelerated corrosion.