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Curriculum Vitae Frederick C. Anderson Materials Science Engineer

Professional History

<u>Materials Science Engineer</u> , Advantec Engineering LLC	2006 – Present
<u>Materials Science Engineer</u> , Connecticut Metallurgical, Inc.	2007 – 2012
<u>Engineering Consultant</u> , Tetra Engineering Group, Inc.	1994-2006
<u>Senior Engineer</u> , Northeast Utilities	1985-1994
<u>Nuclear Power Research Officer</u> , U.S. Navy / U.S. D.O.E. - Naval Reactors	1980-1985

Education

Bachelor of Nuclear Engineering, Georgia Institute of Technology	1979
Master of Science - Metallurgy, Georgia Institute of Technology	1980
Bettis Atomic Power Laboratory Reactor Engineering School	1981

Registrations and Certifications

Registered Professional Engineer, Commonwealth of Virginia, License Number 15235
Registered Professional Engineer, Connecticut, License Number PEN.0025680
Commercial Pilot with Instrument Rating

Professional Society Memberships

Member, American Society of Mechanical Engineers
Member, ASM International (Materials Information Society)

Areas of Expertise:

- Materials Failure Analysis
- Stress Analysis
- Corrosion
- Fitness for Service
- Forensic Engineering
- Power Plant Operations
- Mechanical Equipment
- Finite Element Analysis



Experience/Skills:

More than forty years of experience in structural analysis, corrosion and materials failure analysis associated with consumer products, commercial and industrial equipment, and power plant materials and components.

Extensive experience in analysis of structural and pressure boundary materials in engineering applications utilizing finite element analysis and other advanced techniques.

Experience with ASME Code and other international codes and standards.

Excellent communication skills, especially in translating complex technical information into something understandable by lay persons.

Excellent technical report writer.

Professional Experience

Mr. Anderson is the founder of Advantec Engineering LLC and provides expert consultation and litigation support regarding materials failure analysis, forensic investigation, corrosion, and structural analysis. He has more than forty years of professional engineering experience.

Mr. Anderson has provided engineering support and/or testimony for cases involving product liability and warranty, industrial accidents and equipment failures, bridge structures, and marine and vehicle accidents. He has performed field evaluations and accident investigations of failed components. He has utilized finite element analysis, Monte Carlo simulations, computer generated presentation, and visual aids to allow lay persons to understand complex technical issues. He has provided expert testimony and/or litigation support in cases involving flow accelerated corrosion, stress corrosion, corrosion fatigue, weld defects, and fitness for service of large industrial components and commercial products.

Mr. Anderson has extensive practical laboratory experience. He has performed numerous industrial failure analyses utilizing equipment and techniques such as scanning electron microscopy, energy dispersive spectroscopy, optical microscopy, Fourier infrared spectroscopy, tensile test and hardness test. He is well versed in specimen preparation and knowledgeable of nondestructive and destructive testing strengths and limitations.

As a member of Tetra Engineering Group, Mr. Anderson provided expert consultation to industrial and power plant owners regarding stress corrosion, flow accelerated corrosion, fatigue, and other component reliability and materials related issues. He has performed numerous root cause failure investigations incorporating metallurgical failure analyses. He developed a probabilistic methodology for assessing nuclear plant component structural integrity. He has performed numerous inspections, design reviews, and operation analyses to reduce or mitigate corrosion and improve operational reliability of industrial components.

Mr. Anderson has been extensively involved with Heat Recovery Steam Generators (HRSG) from a wide variety of manufacturers. He is co-author of two books on HRSG tube failures and HRSG inspection planning. Mr. Anderson provided expert consultation regarding steam cycle water chemistry and water treatment programs. Water treatment program consulting included all types of programs: phosphate, AVT, and oxygenated treatment for recirculating and once through systems.

Mr. Anderson has taught courses in basic corrosion mechanisms and power plant water chemistry at various types of power plants in the U.S., Canada, Europe, and Africa.



Mr. Anderson has made numerous presentations to industry and U.S. government agencies regarding materials reliability and failure analysis. Mr. Anderson has contributed to the development of a section in the ASME code regarding environmental effects on materials.

Mr. Anderson has been extensively involved with steam generator systems corrosion and reliability analysis. Activities included all phases of design, testing, and analysis of steam generator tubing and supports. Mr. Anderson has been actively involved with condition monitoring and operational assessments of steam generators and has provided outage support for the inspection and testing of steam generators.

Prior to joining Tetra Engineering Group, Mr. Anderson was a senior engineer for Northeast Utilities, a large U. S. utility. Principle assignments involved structural and corrosion assessments of nuclear plant components to ensure operational reliability. Assignments included corporate lead for the flow accelerated corrosion program, steam generator tube corrosion failure analysis, inspection, and operational assessments, assessment of the potential for flow induced vibration of steam generator tubes with degraded supports, and the radiation embrittlement analysis of reactor vessels. In addition, Mr. Anderson was a member of the Nuclear Review Board for Connecticut Yankee Atomic Power Plant. The review board was tasked with independent oversight of nuclear safety at the plant.

U.S. Navy / U. S. Department of Energy experience was as a metallurgist on Admiral Rickover's staff at Naval Reactors. Assignments included development, testing, and analysis of naval core cladding materials and naval reactor plant structural materials. Mr. Anderson designed and coordinated testing to determine the susceptibility of nickel base alloys to stress corrosion and corrosion fatigue. He established design procedures and analytical methods for predicting the corrosion performance of structural materials used in the primary coolant system.

Publications

Anderson, F.C., Jackson, P.S., Moelling, D.S., HRSG Tube Failure Diagnostic Guide Second Edition, ISBN 0-9719616-0-8, Copyright 2004 by Tetra Engineering Group, Inc.

Anderson, F.C., et. al. "*HRSG Tube Failures: Prediction Diagnosis and Corrective Actions*", National Association of Corrosion Engineers (NACE) Corrosion 2003 Conference, San Diego, California.

Anderson, F.C., Jackson, P.S., Moelling, D.S., Taylor, M., HRSG Inspection Planning Guide, ISBN 0-9719616-2-X, Copyright 2003 by Tetra Engineering Group, Inc.

Anderson, F.C., Jackson, P.S., Moelling, D.S., HRSG Tube Failure Diagnostic Guide, ISBN 0-9719616-0-3, Copyright 2002 by Tetra Engineering Group, Inc.

Moelling, D.S., Anderson, F.C., Taylor, M., "Application of Quantitative Analysis Techniques to HRSG Erosion-Corrosion", Electric Power Research Institute 1999 Maintenance Conference, Atlanta, Georgia, June 21-23, 1999.

Rode, D. M. and Anderson, F.C., "Avoiding Piping Pitfalls", Power Engineering, November 1997.

Anderson, F.C., et. al., "A Probabilistic Methodology for Assessing Steam Generator Tube Integrity", 5th International Conference on Nuclear Engineering, May 26 -30, 1997, Nice, France.