

Stephen Neal Smith, P.E., FNACE
15 Devon Mill Pl.
The Woodlands, Texas U.S.A. 77382

Education

M.S. Metallurgical Engineering, University of Texas at El Paso, August 1975. Thesis - The Effects of Several Transition Metal Ions Upon the Polarization Curve of Type 302 Stainless Steel. Advisors - Dr. F. E. Rizzo and Dr. J.H. Ford.

B.S. Metallurgical Engineering, University of Texas at El Paso, December 1973 (Cum Laude).

Awards

Exxon Production Research Outstanding Instructor, 1994

NACE Technical Achievement, 2003

ExxonMobil Upstream Research Outstanding Instructor, 2003

ExxonMobil Upstream Research Outstanding Instructor, 2004

NACE Distinguished Service, 2004

Senior Research Fellow, Institute for Corrosion and Multiphase Technology at Ohio University, 2010

NACE Fellow Honor, 2015

Experience

Adjunct Professor, Ohio University, Institute for Corrosion and Multiphase Technology, Department of Chemical and Biomolecular Engineering. (February 2009 to Present)

Advising graduate students on research work associated with corrosion mechanisms that include H₂S, elemental sulfur or that simulate oil and gas production field conditions.

Consultant (July 2008 to Present)

Consultant to several supermajor oil and gas production companies providing services such as mentoring of younger corrosion engineers, providing H₂S corrosion mechanism expertise to assist with failure analyses and guidance of in-house company research programs, general trouble shooting of production facility corrosion problems, and development and/or assessment of formal facility corrosion management systems.

ExxonMobil Production Co., Houston Texas (January 2000 to March 2008). Senior Materials and Corrosion Consultant.

Provide technical support to ExxonMobil Production organizations that require technical assistance in the areas of materials and corrosion. Facilitator for corporate upstream Materials and Corrosion Network. Responsible for preparation of technical guidance documents for use by upstream affiliates. Provide Production Company materials and corrosion technical input to Upstream Research Company and operations feedback relative to materials and corrosion issues to Development Company. Participate as technical specialist member in Upstream Materials and Corrosion Job Family for training, career guidance and development of all materials and corrosion engineers in all upstream ExxonMobil companies. Significant contributor to design and implementation of corporate Facilitates Integrity Management System, including training of affiliate management and reporting of results to corporate senior management.

**Exxon Upstream Development Co., Houston Texas (January 1999 to January 2000).
Engineering Associate.**

Placed on assignment from Exxon Production Research Co. Prepared materials specifications for new construction projects. Technical supervision of engineering and construction materials engineers working on Exxon projects. Advised Exxon engineering staff in areas of materials selection, corrosion, cathodic protection, non-metallics and paints and coatings. Active projects included design of an FPSO for west Africa, several subsea developments in the Gulf of Mexico and two oil projects in Norway.

**Exxon Production Research Co., Houston Texas (February 1998 to January 1999).
Engineering Associate.**

Provided technical support is provided to affiliate operating organizations and design project teams. This support included consulting on technical matters related to corrosion, teaching schools where materials science issues are presented, providing technical guidance to affiliate staff and participating in risk review and technology application assessment teams.

**Exxon Company, U.S.A., New Orleans, La. (January 1995 to February 1998). Lead
Corrosion Engineer.**

Directed technical activities of Materials and Corrosion group within New Orleans Production Operations, initiated company policy in areas of corrosion control and equipment inspection and liaised with materials and corrosion experts throughout rest of Exxon Corporation. Geographic area of responsibility included all Exxon production in Gulf of Mexico and all inland production in Louisiana, Mississippi, Alabama and Florida. The group served as technical advisor to operations groups in all areas of corrosion, metallurgy, materials selection and scale control, except painting.

**Exxon Production Research Co., Houston Texas (March 1982 to December 1994).
Research Associate.**

Conducted research in the areas of corrosion that are relevant to oil and gas production. Topics of particular interest were the corrosion mechanism in the presence of hydrogen sulfide, corrosion inhibition in high temperature, high pressure environments and cathodic protection of offshore platforms and pipelines. In addition to conducting research in these areas, technical support was provided to affiliate operating organizations. This support included consulting on technical matters related to corrosion, teaching schools where materials science issues were presented and providing technical guidance to affiliate staff.

In addition to technical responsibilities, functioned as a research group leader starting May 1986. As group leader, provided technical supervision to as many as twelve professionals and technicians. Group leader responsibilities included responsibility for direct supervision of technical matters, overall direction guidance for research programs, and functioning as primary contact for affiliate management and technical staff.

**FERA Corporation, Houston Texas, (December 1978 to November 1981). Vice President of
Development and Data Processing and Corporate Secretary**

Designed and developed the first hand held electronic unit that could be used to conduct close interval cathodic protection pipeline surveys. This unit provided the design basis for virtually all of the close interval pipeline survey meters currently used today. Also designed and wrote the computer programs that were used to analyze the data recorded for well over 1000 miles of pipeline that was surveyed each year. As the system designer, also provided assistance in the

interpretation of the results and of the cathodic protection conditions indicated. Application development work with the hand held units also allowed a variety of cathodic protection survey procedures to be evaluated. These included combinations fast and short cycle instant-off surveys that also captured on-potentials to quantify IR, combined close interval surveys with cell-to-cell surveys and side-drains (much like many of the new direct assessment methods) and procedures to significantly increase equipment input impedance to allow continuous close interval surveys to be conducted for almost all soil resistivities.

As Vice President, responsibilities also included direct involvement in day to day company management. This included working in areas of accounting, personnel management and planning.

Harco Corporation, Houston Texas, (August 1977 to December 1978). Research Engineer.

Developed a method to speed the reliability of data recorded during offshore pipeline cathodic protection surveys. This involved the use of a microcomputer (today's PC) to collect, analyze and present the data in an understandable form. During the test period, the system was used to conduct continuous CP surveys on underwater pipelines in the Gulf of Mexico and the North Sea. Use of the new equipment allowed better observation of the pipe conditions and required less engineering judgment than had been used in previous work.

Dow Chemical Co., Freeport Texas (May 1974 to August 1977). Research Engineer.

Designed and carried out a continuing development program to maintain Dow's leadership in the galvanic anode market. Technical services were supplied both inside and outside of Dow in the use of and design of systems using Dow's products. Quality assurance and production troubleshooting services were provided to all manufacturers using Dow's technology.

During this time I was fortunate to be able to carry a new product, Galvalum III, from a laboratory tested alloy through marketability testing, large scale field testing, and initial commercial production.

Technical Associations

Registered Professional Engineer, Texas No. 49316

NACE International (National Association of Corrosion Engineers)

Member

Certificated Corrosion Specialist, P

Certificated Cathodic Protection Specialist

Past Chair Policy Committee

Certification Committee Reviewer

Past Vice Chair, Task Group 169 (Offshore Pipeline Cathodic Protection)

Past Technology Coordinator, N1 (Oil and Gas Industry)

Past Chair, Task Group 170 (Revision of NACE SP 0176)

Past Secretary, T-1 Group Committee

Past Vice Chair, T-7 Group Committee

Past Chair, T-7L Unit Committee

Past Chair, T-1-5 Task Group

Past Trustee, Houston Section

Past Chair, Houston Section

Past Chair, New Orleans Section

NACE International Institute

Director, Policy and Practices

Chair, Policy and Practices Committee

Tau Beta Pi, Engineering Honor Society, member

Patents

U.S. 6,461,082 B1, "Anode System and Method for Offshore Cathodic Protection", October 8, 2002

Publications

1. "Development of a Broad Application Saline Water Aluminum Anode - Galvalum III", Materials Performance, March 1978.
2. "Supplemental Studies of the Galvalum III Anode, Exposure Time and Low Temperature", Corrosion/1977.
3. "Computer Assisted Corrosion Engineering", Materials Performance, October 1980.
4. "Optimum Design of Cathodic Protection for Offshore Structures", OMAE Conference, February 1986.
5. "Cathodic Protection of a Guyed Tower in 1000 Feet of Water", Materials Performance, March 1986.
6. "Modified Well Casing Cathodic Protection Attenuation Calculation", Corrosion/87.
7. "Offshore Well Casing Cathodic Protection", Corrosion/87.
8. "Cathodic Protection of Coated Well Casing", Corrosion/87.
9. "Design of Cathodic Protection for Deep-Water Offshore Structures", Corrosion/87.
10. "Scaling Phenomena in High-Temperature Aqueous and Gaseous Environments Containing Sulfur", International Symposium of Corrosion Science and Engineering Proceedings, March 1989.
11. "Effect of Elemental Sulfur Upon Performance of Nitrogen-Based Oilfield Corrosion Inhibitors", Corrosion/89.
12. "Corrosion of Iron in Gaseous Environments and in Gas-Saturated Aqueous Environments", Corrosion, January 1990.
13. "Effect of Elemental Sulfur Upon Performance of Nitrogen-Based Oilfield Corrosion Inhibitors", Materials Performance, February 1990, page 48-65.
14. "Overview of NACE Offshore Cathodic Protection Standards", International Conference on Corrosion Standards, London, March 1992.
15. "Analysis of Cathodic Protection on an Underprotected Offshore Pipeline", Corrosion/92.
16. "Cathodic Protection of Tank Bottoms in High Resistivity Soil Using Cable Type Anodes", Corrosion/92.
17. "Electrochemical Growth of Iron Sulfide Films in H₂S-Saturated Chloride Media," Corrosion, February 1993.
18. "A Proposed Mechanism for Corrosion in Slightly Sour Oil and Gas Production," International Corrosion Congress, Houston, Tx., September 1993.
19. "Prediction of Minimum H₂S Levels Required for Slightly Sour Corrosion," Corrosion/94.
20. "Field Experiences with Intelligent Pigs," Corrosion/96.
21. "A Consumer's Perspective of Aluminum Anode Quality Test Design," Corrosion/96.
22. "A New Approach to the Design of Retrofit Sacrificial Anodes", Corrosion/01.
23. "Prediction of Corrosion in Slightly Sour Environments", Corrosion/02.
24. "Prediction of Corrosion in Slightly Sour Environments", Materials Performance, August 2002.
25. "Corrosion Product Analysis in Oil and Gas Pipelines", Materials Performance, August 2003.
26. "Thirty Years of Downhole Corrosion Experience at Big Escambia Creek: Corrosion Mechanisms and Inhibition", Corrosion/04.

27. "Attenuation Analysis of Survey Data on a Subsea Pipeline with Retrofit Anodes", Corrosion/05
28. "Corrosion of Carbon Steel by H₂S in CO₂ Containing Oilfield Environments", Corrosion/06
29. "The History of NACE RP 0176", Corrosion/06
30. "Materials and Corrosion History with LaBarge Madison Production: A 20 Year Story of Success", Corrosion/08
31. "Effect of Ca²⁺ on the Carbonate Scale Protection on Carbon Steel Corrosion in CO₂ Containing NaCl solutions", Electrochemical Society, 213th Conference, Phoenix, AZ, May 2008.
32. "A Parametric Study of Sour Corrosion of Carbon Steel", Corrosion/10
33. "Corrosion at Higher H₂S Concentrations and Moderate Temperatures", Corrosion/11
34. "Discussion of the History and Relevance of the CO₂/H₂S Ratio", Corrosion/11
35. "Current Understanding of Corrosion Mechanisms Due to H₂S in Oil and Gas Production Environments", Corrosion/15
36. "Corrosion of Carbon Steel by H₂S in CO₂ Containing Oilfield Environments - 10 Year Update", Corrosion/15
37. "The CO₂/H₂S Ratio - Use and Relevance", Materials Performance, May 2015.