



## JIM MCLAUGHLIN

*Materials Engineer*

Jim McLaughlin has over 30 years experience in materials engineering in the petroleum industry working with Chevron for 4 years, Exxon for 21 years and ExxonMobil for 11 years. He has been involved in all aspects of materials engineering including corrosion prevention, failure analysis and fitness-for-service assessments in the entire range of equipment in refineries, petrochemical units and upstream facilities. Highlights of his activities include:

- Lead technical expert in areas of crude corrosion, high temperature corrosion, fitness-for-service (including high temperature remaining life assessments), risk-based inspection and metallurgy.
- Leadership role in several API efforts to develop standards including
  - Brittle fracture prevention guidelines in API 653
  - Research on creep embrittlement of Cr-Mo steels
  - Research and guidance on minimum pressurization temperature for heavy wall reactor vessels
  - Risk-based inspection standards 580 and 581
  - Fabrication of heavy wall Cr-Mo and Cr-Mo-V reactors (series of 934 standards)
- Company participant in several industry sponsored research efforts and lead in deploying/using results at company facilities
  - Cracking of steels in wet H<sub>2</sub>S environments
  - Assessing life of equipment operating in creep range – Project Omega
  - Reliability of aging heavy wall reactor vessels
- Led effort within company to increase refinery ability to process increasing volumes of corrosive crude through improved understanding of crude corrosion mechanisms and optimal use of mitigation strategies, such as inhibitor injection and selective use of alloy.
- Taught courses to plant engineers on subjects including metallurgy, corrosion, risk-based inspection, degradation mechanisms, fitness-for-service and assessing remaining life of equipment in the creep range.
- Lead expert in performing failure analyses using the range of analytical equipment available at company materials laboratory
- Conducted research on and evaluated the effects of harsh environments at high temperatures involving such phenomenon as carburization, metal dusting and sulfidation in reducing conditions.

Mr. McLaughlin has a BS degree from the University of Notre Dame in Metallurgical Engineering and a MS degree from Lehigh University in Metallurgy and Materials Science. He has authored or co-authored over 10 papers in ASME/PVP, NACE or other conferences, and has lead and presented topics at many industry exchange meetings.

## Jim McLaughlin Publications

1. McLaughlin, J.E., "Preventing Brittle Fracture of Aboveground Storage Tanks – Basis for the Approach Incorporated in API 653," Proceedings Case Studies: Sessions III and IV of the IIW Conference, Fitness-For-Purpose of Welded Structures, Key Biscayne, Florida, USA, October 23-24, 1991.
2. McLaughlin, J.E., Sims, J.R., "Assessment of Older Equipment for Risk of Brittle Fracture," ASME PVP Vol.261, American Society of Mechanical Engineers, New York, N.Y., 1993, pp. 257-264.
3. Findlay, M., McLaughlin, J.E., and Sims, J.R., "Assessment of Older Cold Service Pressure Vessels for Brittle Fracture During Temperature Excursions Below the Minimum Design Temperature," ASME PVP Vol. 288, American Society of Mechanical Engineers, New York, N.Y., pp. 297-305.
4. McLaughlin, J.E., "Remaining Life Assessment of Hot Wall Carbon Steel Catalytic Cracking Vessel," I do not have exact reference but it was an ASME PVP Publication in about 1995 making is circa volume 310 to 320.
5. McLaughlin, J.E. et al, "Life Limiting Considerations for Stainless Steel Cladding in Heavy Wall Pressure Vessels," ASME PVP 315, 1995
6. McLaughlin, J.E. et al, "Probabilistic Risk Based Approach for Performing an Onstream High Temperature Hydrogen Attack Inspection, NACE Symposium 06-TEG-205X, March 2006.
7. McLaughlin, J.E., "Establishing Minimum Pressurization Temperature (MPT) for Heavy Wall Reactors in Hydroprocessing Units," Proceedings of PVP2006-ICPVT11-93243, July 2006
8. McLaughlin, J.E., et al, "Probabilistic Assessment Procedure for Crack-Like Flaws" PVP2007-26128, July, 2007
9. McLaughlin, J.E., "A Qualitative Risk-Based Assessment Procedure for High Temperature Hydrogen Attack of C-1/2Mo Steel," PVP2007-26129, July 2007.
10. McLaughlin, J.E., et al, "High Temperature Sulfidation Corrosion in Refining," International Corrosion Conference, Las Vegas, NV, 2008
11. McLaughlin, J.E., et al, "Cracking of non-PWHT'd Carbon Steel Operating at Conditions Immediately Below the Nelson Curve," PVP2010-25455, July 2010