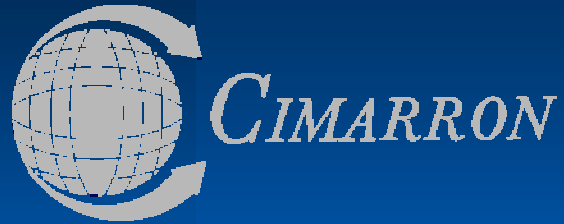


Jerry Bauman, P. Eng.

- ◆ **30+ years experience in corrosion industry covering all disciplines**
- ◆ **3 years - Corrosion/Materials Engineer/Head of Inspection for Qatar Liquefied Natural Gas Company**
- ◆ **Currently Manager, System Integrity at CIMARRON Engineering Ltd.**
- ◆ **NACE Corrosion Specialist**
- ◆ **NACE Materials Selection Design Specialist**



Cathodic Protection

**Jerry Bauman, P.Eng.
Manager, Systems Integrity
CIMMARRON Engineering Ltd.**

CP – Items of Interest

- ◆ **Address numerous aspects, as they apply to SE Alberta and Alberta as a whole.**
- ◆ **High resistivity soils, significant additions to pipeline systems, MIF connections, protection criteria, types/applications of external coatings, and AIT training – CP companies vs. operators**

High Resistivity Soils

- ◆ **SE Alberta has challenges with high resistivity/dry soil conditions.**
- ◆ **Historical, simplistic approach is to install lots of horizontal anodes c/w irrigation at low current discharge per anode.**
- ◆ **Should have reams of experience with performance of existing systems.**
- ◆ **Alternatives include: higher voltage rectifiers, irrigating at a known frequency, semi-deep vertical beds or deep well beds.**

Exponentially Expanding Systems

- ◆ Continuing tremendous growth in the pipelines being installed in SE Alberta.
- ◆ Continual expansion/additions to existing systems to get them to “reach” to the new extremities.
- ◆ Increasing rectifier sizes substantially is not usually detrimental.
- ◆ High “On” potentials are meaningless, i.e., seems to be a fear that such potentials are detrimental to coatings, steel, etc.
- ◆ Sometimes need to step back and start over with system design.

MIF Connections

- ◆ **MIF connections causing electrical discontinuity within a given pipeline due to excessive “glue” applied at each joint.**
- ◆ **While possible, not a common issue**
- ◆ **Painful solution is to bond across each affected joint – usually numerous such joints, if any**
- ◆ **Key is to limit amount of glue – more is not better**

Protection Criteria for Steel/Cast Iron

- ◆ **Four basic criteria accepted by RP0169-2002**
- ◆ **-850 millivolts vs. Cu/CuSO₄ (IR compensated)**
- ◆ **-100 millivolts polarization shift**
- ◆ **Net current flow to structure**
- ◆ **Inspection verifies that no corrosion is occurring**

External Coatings

- ◆ **Technology has not changed dramatically over past 25 years**
- ◆ **Handling and construction practices have changed dramatically**
- ◆ **Shrink sleeves – the devil's invention?**
- ◆ **Coating repairs – necessary?**

Rectifier Electrical Training

- ◆ **Created as a result of one incident resulting in a fatality**
- ◆ **Five-day course developed by Corrpro with assistance from electrical engineers**
- ◆ **What do Operators need for monthly checks/adjustments?**

Summary

- ◆ **CP may be a more easily understood, straightforward corrosion mitigation technology than others, but that does not mean it is dead easy.**
- ◆ **There are ways to achieve your goals outside of “That’s how we’ve always done it.”**
- ◆ **Before accepting that the situation is either dire or perfect in every way – THINK!**
- ◆ **Get justifications for recommendations**