

## PROFESSIONAL EXPERIENCE

25+ years of experience in the pipeline industry and is involved with the design, construction, operations, and maintenance of pipeline systems with specific emphasis on corrosion control, pipeline integrity, and regulatory compliance programs on hazardous liquids (Part 195) and natural gas (Part 192) pipeline systems. He has previously held corrosion control, pipeline integrity, and regulatory compliance management positions with major engineering companies and the Department of Transportation (PHMSA).

Professional experience with the development and implementation of the following:

- Internal Corrosion Monitoring & Mitigation Programs
- Evaluation of Internal Corrosion Mechanisms
- External Corrosion Monitoring & Mitigation Programs
- AC Interference Analysis & Mitigation Design
- Part 195 & 192 Operating & Maintenance Procedures
- 192 & 195 Integrity Management Programs.
- Pipeline Integrity Assessments
- Pipeline HCA / EFRD / Risk Analysis
- Pipeline Preventative & Mitigative Measures
- Pipeline Facility Acquisition Due Diligence
- Pipeline Facility Mechanical Integrity Programs.
- Pipeline Facility Fitness for Service Programs
- Geospatial Data Collection, Integration and Analysis Techniques
- Audit Support

### **Audubon Field Solutions, LLC**

**2017 – Present**

#### ***Vice President, Asset Integrity & Corrosion***

- Manage the Operations of the Pipeline Integrity Division
- Create GIS content and Data Alignment Sheets to support analysis
- Analyze Pipeline Integrity Data
- Reporting for Indirect Assessment and ECDA work

### **Black & Veatch, Inc.**

**2012 – 2017**

#### ***Corrosion & Materials Engineering Lead***

- Provide consultation on materials and corrosion issues encountered in the Oil & Gas and Power Generation market segments.

### **DOT, PHMSA, Office of Pipeline Safety**

**2009 – 2012**

#### ***Accident Investigator***

- Conducted comprehensive root cause failure investigations of 49 CFR 192 (gas) and 195 (hazardous liquid) regulated pipelines that resulted in release of product.
- Authored Corrective Action, Compliance or Safety Orders as required subsequent to pipeline incidents. Tracked Operator enforcement case progress integrity verification process including field investigation, laboratory analysis, in-line inspection and hydrostatic testing results.
- Reviewed NTSB findings, state and federal enforcement history for Operators in the Region. Prioritized unit inspections base on risk associated with individual Unit pipeline segments.
- Conducted Integrity Management, Operator Qualification, Standard Unit and Construction related inspections.
- Supported PHMSA Headquarters staff to improve PHMSA's organizational understanding of pipeline failures and monitoring of pipeline performance.
- Represented PHMSA at technical conferences, legal proceedings and symposia, meetings.

**Black & Veatch, Inc.**

**1999 – 2009**

***Corrosion & Materials Engineering Lead***

- Provide consultation on materials and corrosion issues encountered in the Oil & Gas and Power Generation market segments.
- Developed engineering and construction cost estimates for corrosion protection (CP, monitoring, protective coatings) for regulated pipelines and facilities.
- Maintained corporate corrosion protection standards and procedures. Develop new procedures as required.
- Conducted failure analyses on piping and equipment, including the specification of analysis techniques, identification of failure modes and reporting of conclusions and recommendations.
- Developed internal and external corrosion monitoring programs, including the selection of direct and indirect assessment methods (CP survey, coating inspection, product sampling, corrosion coupons, in-line inspection, local NDE, etc...) analysis of results and recommendation of mitigative measures.
- Conducted reviews of facility design to ensure future reliability, operability, availability and maintainability.
- Developed and managed fitness for service and risk based inspection programs for in-service piping and equipment.
- Developed integrity management procedures, assessment programs and evaluation of results for regulated transmission pipelines.

**Corrpro Companies, Inc.**

**1993 – 1999**

***Corrosion Engineer***

- Designed, installed and tested cathodic protection and monitoring systems for regulated transmission, water / waste water pipelines and facilities.
- Conducted, coordinated and managed over the line pipeline assessments including depth of cover, close interval potential survey, ACVG/DCVG, PCM and direct assessment for over 2000 miles of regulated pipeline. Evaluated integrated data and recommended mitigative measures to comply with applicable regulations.
- Directed and supervised the duties of pipeline operations corrosion personnel for the maintenance of existing pipeline systems and the construction of pipeline and gas processing facilities.

**SELECTED PROJECT EXPERIENCE**

Air Liquide – Integrity Assessment

Provided external corrosion direct assessment (ECDA) engineering and technical services to assess pipeline integrity for approximately seven miles of 8” diameter pipeline. The regulated pipeline was subject to integrity management (IM) rules, 49 CFR Part 192, Subpart O. Determined that ECDA was an acceptable method to assess the integrity of the pipeline. Provided turnkey services for individual components of the four-step ECDA process including data collection, feasibility analysis, indirect inspection surveys, direct examination digs, and anomaly characterization, data integration, remaining life and reassessment interval calculations and design of repairs.

Project Overview

- Feasibility Study
- Sub-Centimeter GIS Integrated Data Collection
- Secure Web Based Project Portal
- Regulatory Compliance

Scope of Work

- Project Management
- Pre-Assessment Data Collection
- Indirect Inspection (CIS, DCVG, PCM)
- Direct Examination
- Analysis and Reporting

ONEOK – AC Interference Analysis and Mitigation System Design

Provided an AC interference and mitigation study on two existing pipelines. The pipelines will be in collocation with two (2) proposed High Voltage AC (HVAC) overhead transmission lines. The objective of this study was to identify the level of AC interference on the existing pipelines from the proposed power lines under average and peak loads and to propose a conceptual design for the AC mitigation system, for both safety and corrosion compliance.

The following were investigated as part of the work:

- Risk to personal safety, under both steady-state and fault conditions.
- Coating stress voltage, and pipeline integrity risk under fault conditions.
- AC corrosion risk under steady-state conditions.
- Risk of arcing between tower footing and the pipeline under fault and lightning conditions, due to the proximity of the two systems.
- Simulations were performed using the Elsyca IRIS software.

Project Overview

- Sub-meter GIS Integrated Data Collection
- Secure Web Based Project Portal
- Regulatory Compliance
- Impartial Analysis

Scope of Work

- Project Management
- Field Data Collection
- HVAC / Pipeline Data Retrieval
- Simulation Construction & Analysis
- Mitigation System Detailed Design for Construction

Oryx Midstream – Breakout Tank Cathodic Protection and Grounding

Provided project management, engineering design, material procurement, construction, field support, and commissioning services to construct a linear anode impressed current Cathodic Protection (CP) System. The CP System was provided to protect the external base plate surfaces of a regulated atmospheric breakout tank against corrosion. Provided system design calculations, specifications and detail drawings for the CP System. In addition, performed installation, testing and final commissioning of the CP System.

Project Overview

- New Construction
- Impressed Current Cathodic Protection
- Linear Anode System
- Regulated Breakout Tank

Scope of Work

- Cathodic Protection System Design
- Project Management
- Material Procurement
- Construction
- Testing & Commissioning Services

San Mateo Midstream – HCA / EFRD / Risk Analysis

Provided pipeline integrity management, engineering, and field services to identify high consequence areas (HCA) associated with design and construction of a new crude oil pipeline system. Conducted EFRD studies which included pipeline centerline location accuracy, leak detection capability, elevation and pipeline control, and response elements. Risk analysis was conducted based on identification of credible threats to pipeline integrity, qualitative risk analysis to determine the probability of threat occurrence, consequence of failures, and expression of risk in dollars per pipeline miles. Findings and recommendations were submitted to the client to assist with operational prioritization and pipeline maintenance budgeting.

Project Overview

- New Construction
- Regulated Crude Transportation & Gathering
- Integrated Project Approach
- Cloud Based Project Management Portal

Scope of Work

- HCA Analysis of Pipeline Route(s)
- EFRD Study to Protect Affected HCA's
- MLV & Check Valve Location Recommendations
- Risk Analysis to Identify and Minimize Exposure
- Preventative & Mitigative Measure Recommendations

Targa Resources – Pipeline Cathodic Protection

Provided project management, design, construction management, field engineering support, and commissioning services to construct a conventional impressed current Cathodic Protection (CP) System. The CP System was provided to protect a regulated gas gathering pipeline against corrosion. Additional services included project cost control, contracting support, procurement of material, and vendor surveillance. Provided system design calculations, specifications and detail drawings for the impressed current CP System. Performed on-site inspection during earthwork and installation of CP equipment system final testing and commissioning of the CP System.

Project Overview

- Impressed Current Cathodic Protection
- Natural Gas Gathering System

Scope of Work

- Cathodic Protection Design
- Project Management
- Construction Management
- Field Engineering Support
- Commissioning / Testing Services

XTO Energy – Regulatory Compliance and Asset Management

Provided pipeline regulatory compliance and asset management services to develop and deploy a new crude oil pipeline operations and maintenance program. Customized the operator's ArcOnline web portal and developed a base analytics and reporting system. Sharepoint was utilized to facilitate work sharing and requests. ArcOnline was also incorporated into the SharePoint scheduling and tracking features. Licensing and access rights were established for Concentric and ArcOnline account users. Provided two (2) years of maintenance and technical support with the ownership of data and online systems maintained by the client. Offered an option for existing pipeline systems to allow the initial site set up to be designed to streamline the migration of as-built data to ArcOnline. The project complied with US Department of Transportation requirements - Transportation of Hazardous Liquids by Pipeline - 49 CFR Part 195.

Project Overview

- New Construction
- Regulated Crude Transportation & Gathering
- Integrated Project Approach
- ArcOnline Project Web Portal

Scope of Work

- Written O&M Regulatory Compliance Program
- Survey123/Collector Form Development & Deployment
- Pipeline Centerlines & Point Feature Attributes
- Custom Maps
- Customized Analytical Tools & Reporting
- SharePoint for Data Sharing, Scheduling & Tracking
- Data Management & Technical Support

Enbridge Energy Partners - Line 6A

Provided field inspection, design, construction management and commissioning for the Line 6A stray current monitoring and mitigation system located in the Chicago Sanitary and Ship Canal (CS&SC) fish barrier vicinity. The stray current source produces a high-power (Megawatt) pulsed DC current that cannot be detected by conventional monitoring systems. Field inspection and permanent monitoring tools, data retrieval and storage solutions were custom designed, built and deployed to characterize the effect of the pulsed DC stray current source on the integrity of the Line 6A. Coordinated stray current monitoring data with Enbridge in-line inspection data to determine the net effect of stray current on the pipeline segment.

TransCanada - Various Pipeline Survey

Conducted, coordinated and managed over the line pipeline assessments including depth of cover, close interval potential survey for over 2000 miles of regulated pipeline. Evaluated integrated data and recommended mitigative measures to comply with applicable regulations.

**EDUCATION**

Louisiana State University

- Bachelor of Science, Chemical Engineering

MidAmerica Nazarene University

- Master of Arts, Business

**PROFESSIONAL DEVELOPMENT & TRAINING**

- Licensed Professional Engineer – GA, KS, NY, OK, TX and WY
- NACE International – Corrosion Specialist #5191
- NACE International – Cathodic Protection Specialist #5191
- NACE International – Certified Coating Inspector #9745
- GPA Midstream Pipeline Committee
- NACE Foundation Board of Directors
- NACE Kansas City Section Trustee
- NACE Tulsa Section Secretary
- NACE Cathodic Protection 1 & 2 Instructor
- Six Sigma Certified Black Belt