MANGAN INC.
PROCESS ANALYZERS & CEMS

ANALYZER / CEMS ENGINEERING
& TECHNICAL EXPERTISE

MANGAN INC.
PROCESS ANALYZERS & CEMS

TECHNICAL EXPERTISE

ANALYZER / CEMS ENGINEERING

SERVICES

Turnkey analyzer engineering:

Integration and installation support – start to finish –
Over 100 Continuous Emissions Monitors (CEMS)
NOx/SOx projects completed since 1992

Analytical Engineering

- Functional Specifications
- Analyzer selection/recommendations
- Sample conditioning systems design
- Control system design (PLC, DCS, PI/Historian)
- Shelter design
- Integration

PROCESS ANALYZERS

Process Analyzer Capabilities:

- Monitor product quality or foreign component levels for process optimization
- Complete sample systems from probe to grade
- Control systems for system automation and testing
- Complete system infrastructure including personnel safety systems
- Data acquisition and interface with plant DCS for control, historization and reporting

Process Analyzer Challenges Include:

- Each process presents its own unique sample environment requiring particular attention to conditioning requirements and measurement technology selection

ENVIRONMENTAL ANALYZERS

Continues Emission Monitoring Systems (CEMS):

- Monitoring stack emissions including NOx, SO2, O2, CO, stack flow and opacity
- Complete sample systems from sample probe at furnace stack to CEMS shelter at grade
- Control systems for system automation and testing
- Complete system infrastructure including personnel safety systems
- Data acquisition for historization and reporting
- Mangan has fielded a maintenance group for 25 years giving us special insight into end user's needs

FLARE ANALYZERS

Flare Analyzers Capabilities:

- Monitoring speciated sulfur compounds and individual components contributing to the HHV content of the sampled gases
- Complete sample systems from probe to grade
- Control systems for system automation and testing
- Complete system infrastructure including personnel safety systems
- Data acquisition for historization and reporting

CEMS Analyzer Challenges Include:

- Low level SO2 measurement and NO2 measurement (water soluble)
- High particulate environments
- High NH3 environments
- NOx reduction systems including upstream and downstream measurement systems

Flare Analyzers Challenges Include:

- Flare environments provide special challenges owing to the extreme variability of the gas content (or liquid!)
- Sample conditioning is extremely difficult yet critical if these systems are to perform
- Rule 1118 requires measurements of sulfur from 20 ppm to 25%. This requires multiple range systems with saturation protection
- Mandated uptime requirements demand that these systems be robust

ANALYZER / CEMS ENGINEERING

ANALYZER TECHNOLOGIES

Measurement Technologies:

- Chemiluminescence
- Gas-filter correlation
- Dual wave length infrared
- Ultraviolet fluorescence
- Paramagnetic
- Zirconium oxide
- Electrochemical
- Pitot tube ΔP
- Thermal dispersion
- Optical Scintillation
- Gas Chromatography
- Mass Spectrometry
- Calorimetry
- Pulsed Ultraviolet Fluorescence
- Lead acetate

APPLICATION EXPERTISE

- Gas and Diesel Blending
- Furnace Cracking
- Decoking
- H2S Scrubber Tower
- Distillation Column Bottoms and Overhead
- Moisture in Dryer Beds
- Product Purity
- SCR Ammonia Slip
- H2 Purity
- Ambient Air Monitoring
- HRVOC on Flares and Cooling Towers
- Subpart JA on Flare
- Water TOC
- Water pH
- Water Conductivity
- Water Turbidity
- Vapor Recovery Systems
- Liquid Recovery Systems
- Mercury Analyzer Systems
- Methane to Grid Entry Units
- Pipeline Analysis

COMMISSIONING

Commissioning Considerations:

- New Process Analyzers and CEMS at MPAC Facility (i.e. Mangan Process Analyzer CEMS)
- Detailed Commissioning Procedure
- Pre-requisites - FAT and SAT completed; MOC and PSSR requirements, training, operator orientation
- Install probe & tube bundle during commissioning
- Covers physical equipment cutover and procedural Issues - confirmation of DCS/data functions, alarms, second shift coverage etc.
- Multi-discpline Commissioning Team: Operations, CEMS Maintenance, Environmental, Control Systems, Mangan.
- Generally achieved in eight (8) hours

FOUNDATION & CABLE TRAY RACKS FOR ANALYZER SHELTERS

CIVIL & STRUCTURAL

Foundation Design

- Obtain geotechnical report with cost efficient recommendations.
- Foundation design and analysis in accordance with all applicable building codes.

Structural Steel Design

- Steel design and analysis, with expertise in connection detailing for seismic applications.
- Assist with competitive bid for steel fabrication and review of shop drawings.

Miscellaneous

- Plan Check & Permit – Submit plans and coordinate with building official to obtain Ready to Issue permits.
- Equipment Drawings and calculations - Review vendor documents to ensure compliance with project needs and client standards.

PIPING MODIFICATIONS FOR ANALYZER SHELTERS

SCOPE OF WORK:

Analyzer shelters:

Sample Probe

- Hot tap on Flare line for sample probe to provide flare gas to analyzer
- Isometrics for sample line
- BOM for piping, hand valves, flanges, etc.

Utility

- Piping design for various utility connections to Analyzer shelter
- Instrument air
- Steam
- Water