

### **Sean A. Cunningham, ISA84 Expert Senior Engineer, Kenexis**

#### **Fields of Competence**

Fire & Gas System Design  
Safety Instrumented System Design  
Computational Fluid Dynamics (CFD)  
Human Reliability Analysis (HRA)  
SIL Assessment  
Quantitative Risk Analysis (QRA)  
Process Hazards Analysis (PHA)  
Layer of Protection Analysis (LOPA)  
Quantitative Consequence Modeling  
Safety Requirement Specification (SRS)  
SIS Functional Testing and PSAT  
Cost/Benefit Analysis

#### **Experience Summary**

**Mr. Cunningham** has extensive experience in design of Safety Instrumented Systems (SIS) and Fire & Gas Systems (FGS). He is involved in risk-based studies in upstream oil & gas production, petroleum refining and specialty chemicals. Mr. Cunningham is a senior engineer with Kenexis and responsible SIS and FGS design and implementation, including but not limited to PHA/LOPA studies, SIL Assessment and function testing of critical devices. Specialized performance-based FGS design including risk-based techniques for FGS integrity analysis and fire & gas detector mapping techniques.

#### **Credentials**

B.S., Chemical Engineering, University of Dayton

Qualified on Safety Instrumented System – Front End Engineering Design Part 1 and Part 2

ISA84 Expert

#### **Key Assignments**

Performed Process Hazards analysis (PHA) and safety instrumented system (SIS) design and verification projects at various customer sites worldwide on various process units. SIS design basis projects include identification and definition of safety instrumented functions, risk analysis to determine safety integrity level requirements using Layer of Protection Analysis (LOPA), conceptual design, and quantitative reliability analysis to verify achievement of SIL targets and

Safety Requirements Specification (SRS) development and development of functional testing requirements/procedures.

- Fired Heaters & Burner Management Systems
- Crude/Vacuum Distillation
- Coking
- Hydrotreating
- Hydrocracking
- Flare System Overloading / Overpressure Protection
- Sulfur Removal and Recovery
- Onshore/Offshore Oil and Gas Production
- Coal Fired Boilers
- Compressor Systems
- Gas Liquefaction / LNG Production
- Batch Chemicals
- Steam / Power Cogeneration
- Storage and Loading
- Waste Water Treatment
- Hydrogen Production

Responsible for managing Pre-Startup Acceptance Testing (PSAT) of Critical Devices for major US refiner.

Responsibility includes development of Function Testing Procedures, inspection of instrument installation and supervision of testing to ensure compliance with corporate and industry standards.

Performed quantitative risk assessment studies at various customer sites worldwide. These projects include fully quantitative consequence analysis of fire, combustible gas and toxic gas hazards and detailed likelihood analysis including examination of mechanical and electrical reliability as well as human reliability analysis (HRA) to provide customers with guidance on installation on active and passive safeguards. Studies included detailed dispersion and consequence analysis modeling and cost benefit analysis to assist customers in making well informed engineering decisions.

- Hazardous Materials Loading/Unloading
- Onshore/Offshore Oil and Gas Production
- Flare System Overloading / Overpressure Protection
- Storage Tank Rimseal Fire & Overfill Protection
- Flammable Materials Handling in Enclosed Spaces

Executed Fire & Gas System design projects at various customer sites worldwide. These projects include the design of fire & gas systems for both process and non-process areas. Incorporating both performance-based designs for process areas and prescriptive based design (NFPA 72) for non-process areas. Projects include hazard identification, risk-based analysis of existing fire & gas systems, FGS SIL Assessment design of fire & gas system, Fire & gas detector coverage mapping and reliability analysis.

- Offshore Oil & Gas Production & Processing
- Onshore Oil & Gas Processing
- Gas Liquefaction / LNG production
- Gas Treatment Plants and Gas to Liquids (GTL)
- Combustible Gas / H<sub>2</sub>S Detection Systems at Petroleum Refineries
- Offshore Floating Production Storage & Offloading (FPSO)

#### **Affiliations**

American Institute of Chemical Engineers (AIChE)  
Instrumentation, Systems and Automation Society (ISA)

