

Austin M. Bryan **Senior Engineer, Kenexis**

Fields of Competence

Safety Instrumented Systems (SIS)
Burner Management Systems (BMS)
Fire and Gas Systems (F&G)
Layer of Protection Analysis (LOPA)
Hazards and Operability Analysis (HAZOP)
Preliminary Hazards Analysis (PHA)
Quantitative Risk Assessment (QRA)
Fault Tree Analysis (FTA)
Dispersion Modeling
F&G Coverage Mapping
Reliability Analysis
Process Hazards Analysis / Hazard Identification
Chemical Engineering

Experience Summary

Mr. Bryan has more than 10 years of experience in risk analysis and safety instrumented systems design. Mr. Bryan is a senior engineer with Kenexis and responsible for the implementation of process safety management services and safety instrumented system verification and implementation projects. He utilizes risk analysis techniques to determine existing and proposed SIS design reliabilities. Mr. Bryan has experience facilitating numerous HAZOP and Layers of Protection Analysis (LOPA) studies. In his current position he has experience in SIS verification and risk analysis projects for a variety of process plants, including upstream oil & gas facilities, refineries, petrochemicals, and specialty chemicals. Mr. Bryan also has experience in analysis and risk-based design of fire and gas (F&G) systems, including determination of coverage and safety availability of F&G designs for both onshore and offshore facilities.

Credentials

- M.S., Chemical Engineering, Michigan Technological University
- EIT Certification
- ISA 84 Expert
- Completed Dyadem HAZOP course
- Approved ISA EC 52/54 Instructor
- Qualified on Safety Instrumented System – Front End Engineering Design Parts 1&2

Key Assignments

Performed PHA and SIS design basis study of multiple integrated oil & gas production facilities and refinery units utilizing HAZOP/LOPA methodologies. Projects included development of a Safety Instrumented Function (SIF) List, facilitation of HAZOP and LOPA meetings, SIL selection using Layer of Protection Analysis (LOPA) study results, SIL

Verification calculations, Fault Tree Analysis (FTA) to analyze complex systems, identification of performance gaps and recommendations for design / testing of SIS to meet customer objectives. PHA studies included:

- Coker
- Naptha Hydrotreater
- Methanator
- Hydrotreater
- Fluidized Catalytic Cracking Unit
- Sorbex Unit
- Isom Unit
- Oil & Gas Separation Systems
- Turbine Driven Compressor Systems
- NGL Recovery System
- TEG Regeneration System
- Fired Heaters
- Boilers
- Flare Systems
- Crude Oil Shipping Pumps/Metering
- Produced Water Injection
- Production and Injection Wells
- Pipeline Pig Launchers/Receivers
- Utilities Systems
- Heat Media Systems
- Waste Heat Recovery Unit
- Chemical Storage and Injection
- Rail and Truck Loading / Unloading Stations
- Oil Pipelines
- Storage Facilities / Tank Farms
- Pipeline Pumping Stations

Performed SIS design basis study of multiple proposed and existing ammonia production facility using LOPA methodology in the US. SIS design basis responsibilities include facilitation of LOPA meetings, identification and definition of safety instrumented functions, risk analysis to determine safety integrity level (SIL), and quantitative reliability analysis to verifying achievement of SIL targets through the use of fault tree analysis (FTA). Units covered in the study include:

- Primary Steam Methane Reformer
- High temperature Shift Reactor
- Pressure Swing Adsorption Unit
- Boiler / Steam System
- Condensate System

Performed LOPA study of fire and gas detection and shutdown systems for a fuel loading facility. Study included identification and definition of fire and gas safety systems, SIL determination through LOPA meetings of systems, and reliability analysis through the use of fault tree analysis (FTA).

Performed LOPA studies on ammonia / fertilizer plants in the US and Trinidad. Project responsibilities included development of Safety Instrumented Function (SIF) list, leading LOPA study, SIL selection using LOPA study results for both existing and proposed systems. Systems analyzed include:

- Compressor Systems
- Primary and Secondary Ammonia reactors
- Ammonia Scrubber
- Ammonia Nitrate / Urea Ammonia Nitrate Pumps
- Boiler System

Austin M. Bryan Continued

- Fired Heaters
- Primary Steam Methane Reformers
- Secondary Reformers
- Methanators
- Steam and Condensate Systems
- Flare Systems
- CO₂ Absorption/Stripping Systems
- Glycol Drying Systems
- Refrigeration Unit
- Methanol Reactor
- Methanol Distillation
- Ammonia Loading

Performed LOPA study for Expanded Polystyrene facility fire and gas detection system. Study included identification and definition of fire and gas safety systems, SIL determination through facilitation of LOPA meetings, and SIL verification calculations.

Performed SIS design basis study for fire and gas detection system (FGS) for gas plant. Project included scenario modeling of releases for flammable cloud dispersion, toxic cloud dispersion, pools fires, and jet fires, reliability calculations for FGS Safety availability analysis, and development of FGS requirement specifications. Systems analyzed include

:

- Amine System
- Glycol System
- Nitrogen Rejection Unit
- Condensate Stabilization
- Condensate Storage
- Flare System
- Condensate Stabilization
- Hot Oil System
- Sulfuric Acid Plant
- Compressor Systems

Facilitated SIS design basis study utilizing LOPA methodology for Benzene Saturation Unit. Project responsibilities included development of Safety Instrumented Function (SIF) list, leading LOPA study discussions, SIL selection using LOPA study results, and development of system requirement specifications (SRS).

Lead PHA/HAZOP projects for Chevron affiliate in Kazakhstan and Russia. Project responsibilities included lead facilitation of HAZOP study for pipeline systems including pump stations, storage tanks, and pipeline.

Facilitated multiple LOPA studies for ADNOC company. Project responsibilities included development of Safety Instrumented Function (SIF) list, leading LOPA study discussions, SIL selection using LOPA study results, and SIL Verification of SIFs.

Performed SIS design basis study for fire and gas detection system (FGS) for multiple off-shore oil and gas platforms. Project included area grading and coverage mapping for platforms including:

- Remote Wellhead Platforms
- Riser Platforms
- Production Platforms

Performed SIS design basis for compressor stations and NGL plants located in the US. Project responsibilities included identification of safety instrumented functions, facilitation of LOPA to determine Safety Integrity Level (SIL) for identified safety functions, development of safety requirements specification (SRS) for the SIS, and development of functional test plans for all SIFs.

Facilitated SIL selection meetings utilizing LOPA for multiple LNG facilities located worldwide. Project responsibilities included identification of safety instrumented functions, facilitation of LOPA to determine Safety Integrity Level (SIL) for identified safety functions, and SIL verification calculations for SIF with identified SIL.

Lead PHA/HAZOP for ethanol facilities in US. Job responsibilities include preparation and facilitation of HAZOP meetings, generation of PHA report.

Lead PHA/HAZOP study on sintering furnaces used in nuclear fuel production. Project responsibilities include preparation and facilitation of HAZOP meetings, generation of PHA report.

Facilitated PHA/HAZOP meetings for a Chinese facility utilizing membrane chloralkali process to generate chlorine for VCM production. Project included analysis of brine generation, electrolysis systems, and drying / storing of produced chlorine.

Lead PHA/ HAZOP studies for US producer of specialty metals at multiple sites utilizing thermite reaction process to produce alloys. Project included analysis of manual batch operations to identify safety improvements.

Facilitated multiple PHA/HAZOP and LOPA studies for polymer facilities, including polypropylene and polystyrene production facilities.

Projects included use of fault tree analysis to model complex shutdown function, dispersion modeling of released flammable and/or toxic materials, identification of performance gaps, and development of recommendations of SIS design to meet customer objectives.

Co-author of ISA published book: *Performance-based Fire and Gas Systems Engineering Handbook*.

Affiliations

International Society of Automation (ISA)
Local Section Officer