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ALEJANDRO JIMENEZ, P.E., CFPS, CCPSC, CFEI
SR. STAFF CONSULTANT, FIRES & EXPLOSIONS

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Alejandro is a Sr. Staff Consultant with Engineering Systems Inc. (ESi) in the fire and explosion practice group. Alejandro supports our clients with their needs in safety, hazards & risks management, and investigations services across the United States and Internationally.

Alejandro is a licensed professional engineer with over 14 years of experience in the areas of process safety, chemical safety, hazardous materials, fire protection engineering, fire dynamics, life safety, incident investigations, HSE, and hazard & risk management. His expertise includes risk management, safety system reliability, health & safety (HSE), fire protection and alarm systems, buildings & marine life safety, fire dynamics, fire & explosion modeling, process hazard analysis, dust hazard analysis and compliance with industry codes and standards.

He has risk management and technical risk & reliability engineering experience for industrial facilities such as upstream (e.g., production, drilling, offshore, and onshore), midstream (e.g., pipeline, gathering and distribution), and downstream (e.g., refineries) oil & gas installations, chemical and petrochemical facilities, liquified natural gas (LNG) facilities (liquefaction and regasification), food manufacturing, and manufacturing facilities. Additionally, he has experience in supporting diverse non-industrial matters that involve hazardous materials, safety systems failures, fire protection systems failures, risk assessments and hazard evaluations.

In addition to his professional engineering (PE) license, Alejandro is a Certified Process Safety Professional (CCPSC), a Certified Fire Protection Specialist (CFPS), and a Certified Fire and Explosion Investigator (CFEI).

Prior to joining ESI, he worked as a process safety and technical risk engineering consultant where he supported the design and operation of chemical process, oil & gas facilities, offshore platforms, pipelines, and manufacturing facilities from the fire, explosion, and acute toxic gas exposure perspective, in the US and internationally.

Areas of Specialization

Risk Management & Risk Assessments
Industrial & Chemical Process Safety
Chemical and Manufacturing Processes
Major Accidents Events (MAE)/Major Hazards Events (MHE)
Safety Critical Elements (SCE) and Performance Standards
Safety Systems Reliability
Fire and Explosion
Fire Dynamics
Computational Fluid Dynamics
Gas Dispersion Analysis
Fire Modeling
Explosion Blast Effects
Fire Protection Systems
Fire & Gas Detection Systems
Combustible Dust Hazards
Process Hazards Analysis (PHA)
Dust Hazard Analysis (DHA)
Flammable and Combustible Liquids
Hazardous Materials (HAZMAT)
Escape and Evacuation Analysis
Marine Life Safety (e.g., SOLAS)
Health and Safety

Education

Ph.D., Reliability Engineering, (In Progress – expected 2025), Maryland University
M.S., Safety, Risk & Reliability Engineering. Heriot-Watts University. 2014
M.S., Fire & Explosion Engineering. University of Leeds. 2009
B.S., Chemical Engineering. Simon Bolivar University. 2007

Licensed Professional Engineer (P.E.)

State of Texas ..... License No. 125321
State of Florida ..... License No. 93842

Other Certifications

Certified Process Safety Professional (CCPSC) ..... Certificate No. 2019045320629707
Certified Fire and Explosion Investigator (CFEI) ..... Certificate No. 25808-15040
Certified Fire Protection Specialist (CFPS) ..... Certificate No. 4676

Language

English ..... Fluent
Spanish ..... Fluent (Native)

Professional Affiliations

Society of Fire Protection Engineers (SFPE), Professional Member

National Association of Fire Investigators (NAFI)

American Institute of Chemical Engineers (AIChE)

Positions Held

Engineering Systems Inc., Miami, Florida

Sr Staff Consultant, 2020 – Present

Baker Engineering and Risk Consultants (AKA BakerRisk), Houston, Texas

Senior Process Safety Engineer, 2019 – 2020

Bechtel Oil and Gas, Houston, Texas

Senior Process Safety Engineer, 2019

Environmental Resource Management (ERM), Houston, Texas

Senior Safety & Risk Consultant, 2013 – 2019

Arcadis, London, United Kingdom (UK)

Process Safety Analyst, 2012 – 2013

Wood Group Mustang, Woking, United Kingdom (UK)

Technical Safety Engineer, 2010 – 2012

Project Examples

Incident Investigation

Petrochemical Industry – Chemical Release
Acetic acid release during valve repair injuring three contractors. Supported data recollection after the incident, and causal analysis to determine potential causes and safety management system performance.

Dry Ice Asphyxia Assessment
Third-party delivery contractor injured by transporting dry ice pellets in its car. A carbon dioxide emissions and asphyxia analysis were performed.

Root Cause Analysis (RCA)
Participate in root cause analysis as a safety expert. In some cases, supported the clients in choose the best RCA method and organized the sessions, in other cases the scope just included in the participation as an expert.

Fire & Explosion Investigation
Participate in diverse fire and explosion investigations and root cause analysis (RCA) in diverse industries, including oil & gas upstream well sites, petrochemicals, pharmaceutical pilot plant, pulp & and paper, and residential gas appliances. These investigations include support due to a litigation, and others supported the owner to identify casual factors and prevention strategies.
Some of these investigations involved a dispersion and fire modeling assessment.

Acute Toxic impact
Participate in diverse cases related to toxic impact including carbon monoxide (CO), corrosive chemicals, and asphyxia for the chemical industry, and residential heating systems.

Experiment and Testing

Testing Design
Diverse fit for purpose testing design to evaluate important performance or behavior considering real exposure.
This experience also includes performing the actual test when needed.

Testing Coordination
Coordinate third party tests, e.g., with laboratory to measure combustion heat release of particular materials. Use the data obtained to model different fires in the facility using the Fire Dynamic Simulator (FDS).

Fire Protection & Life Safety

Fire Hazard Analysis (FHA)
Support a major oil refinery and petrochemical facilities during expansion projects on the evaluation and optimization of fire protection systems through a fire hazard analysis (FHA). Some projects involve the water-based fire protection systems and other included the fireproofing extension and requirement in the process units.

Fire & Gas Studies
Performed diverse risk-based Fire & Gas studies according to ISA-TR84.00.07 for diverse chemical and petroleum facilities, including offshore platforms. The objective of these studies was to evaluate the system coverage and look to optimize the system layout to maximize the coverage of fires and flammable gas.

Fire protection engineering design
Engineering design of diverse fire protection systems for diverse projects; including fire & gas detection, firewater system, deluge system, foam suppression system, and hazardous area classification, fire protection system layout drawing update, define fire protection philosophy.
Implementation of performance-based design approach by evaluating fire safety goals using fire and evacuation modeling.
Support the management of change (MOC) process related to fire protection systems, by reviewing changes or design systems needed due to the new risk profile.

Deluge System Operability Assessment
Operability analysis of a deluge system protecting a truck loading rack in hydrocarbon fuel loading terminal after an accidental activation. The analysis included a hydraulic analysis of the system, a reliability assessment, and a risk assessment to understand the performance of the system as a risk control measurement. Diverse recommendations were identified and assess through a cost-benefit analysis (CBA) to improve the system performance and reliability.

Egress Review Evaluation
Review of egress and evacuation routes of diverse occupations including goods manufacturing facilities, food manufacturing facilities, sport complex, retail business, oil & gas compression stations, offshore oil & gas facilities (drilling & production). The review included the evaluation of egress features against the life safety code (e.g., NFPA 101) and best practices.

Safety, Hazard & Risk Assessments

HSE General Support
General HSE support for capital projects, and manufacturing/industrial operations. The support included OSHA requirements, safety practices, inspections, Hazard Identification (HAZID), and ISO 450001 Audits.

Facility DHA
Support metal-based manufacturing company in evaluate de combustible dust hazards in the facility. The evaluation considered the thermite production process identifying the events that could lead to a combustible dust explosion or dust layer fire.

Toxic Materials Consequence Analysis
Release and toxic dispersion modeling of diverse materials, including sulfur trioxide (SO3), Ammonia, Hydrogen Sulfide (H2S), formaldehyde, and arsenic for diverse process facilities and operations; including mining, chemicals, oil & gas, and food manufacturing facilities.

Fire & Explosion Consequence Analysis
Modeling combustible and flammable liquid and gases fires and explosion events for diverse process facilities and operations. Including pipelines, offshore platforms, oil & gas production, oil & gas drilling sites, chemical & petrochemical, food manufacturing facilities, and railcars.

Facility Siting Studies
Facility siting studies for fire, explosion, and toxic events for diverse installations and operations. These operations included loading & offloading operations, oil & gas upstream, oil & gas midstream, oil & gas downstream, chemical, petrochemical, and food manufacturing.

Smoke Analysis
Smoke dispersion analysis from fires, mainly pool fires, analyzing the potential impact to human activities on diverse facilities, including offshore drilling vessels, offshore intervention vessel, offshore production facility, food manufacturing facility.

Flammable vapor & gas dispersion
Flammable vapor and gas dispersion modeling for diverse materials and operations to determine the potential concentration profile and extension of flammability concentrations. The operations included oil & gas, LNG facilities, LPG operations, chemical & petrochemical, and food manufacturing.

Quantitative Risk Analysis (QRA)
QRA for fire, explosion, and toxic events of hazardous materials for diverse facilities and operations; including pipelines, loading & offloading operations, oil & gas, offshore platforms & operations, chemical & petrochemical, food manufacturing. These studies included diverse individual and societal risks metrics, e.g., F-N & exceedance curves, PLL, IRPA, LSIR contours, building risks.

Major Accidents Events (MAE) Bowtie Study

Lead, participate, and technical assurance of diverse bowties analysis for diverse projects and diverse top events. The assessed process included oil & gas offshore (drilling and production), oil & gas onshore-offshore loading, transmission pipelines, compression stations, onshore facilities.

Flare Radiation and Dispersion Study
Flare heat radiation and dispersion analysis of a gas Semi-submersible Floating Production System (FPS) to be located in Western Australia. The analysis was intended to optimize the flare design to ensure a specific incident heat level in critical locations.

Standards compliance review
Review fire related standards and verify compliance for diverse occupations and operations. Including laboratory against NFPA 30 & NFPA 45, Butane injection process against NFPA 58, LNG operations against NFPA 59A, Sport complex against UK HSE Green Guide, chemical facilities against internal fire safety & explosion standards (FS&E), oil & gas against internal design engineering practices (DEP), and gas processing facilities against API recommended practices.

Flammable liquids control area determination
NFPA 30 control area determination of a quality laboratory facility to comply with Fire Marshal request. The project included a facility walkthrough to verify usage and location of flammable materials and determine the control areas specify in NFPA 30.

Floating LNG Cryogenic Risk Assessment
Risk assessment of loss of containment of cryogenic fluids on the vessel and sea, Phast was used as consequence analysis tool.

Process Hazard Analysis (PHA)
Lead, plan, and participate in diverse PHAs for diverse process including transmission pipelines, compressors stations, offshore platforms, LNG facilities, and manufacturing facilities.

Reliability Engineering

SCE & Performance Standards
Identify safety critical elements (SCE) and develop their performance standards for different offshore facilities. Some projects included drilling rigs and other processing facilities. Diverse regulations and requirements were considered based on location of the rig; for example, UK Health and Safety Executive (HSE), Australia National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), and the International Association of Drilling Contractor (IADC).

Reliability Operational Readiness
Support Reliability Engineering Group in the operational implementation of the performance standards defined during the engineering design stage for an offshore platform in the Gulf of Mexico. This support included the definition of inspection, testing, and maintenance (ITM) activities of the fire safety measures and assurance of their inclusion in the computational maintenance system (e.g., SAP) to ensure that the performance criteria defined in the performance standards are met.

Fire Deluge System Reliability Analysis
Deluge system reliability analysis protecting a truck loading rack in a hydrocarbon fuel loading terminal after an accidental activation. A fault tree analysis was used to estimate the probability of failure on demand (PFD) and the frequency of accidental activation.

Flame arrestor performance analysis
Performance analysis of a flame arrestor installed in diverse pulp & paper mills. This experience included an assessment of the flame arrestor extinguish mechanism, an evaluation and development of a performance tests, and inspections to pulp & paper mills.

LNG Valves failure analysis
Process and flare valve failure analysis of an LNG regasification facility. These valves failed in the final acceptance test after design, construction, and commissioning.

Thermal Protection System Performance
Research project to evaluate the thermal protection system performance installed in rail car DOT-117 when exposed to ethanol pool

fires. This project involved fire modeling, and fire testing.

Fire Protection System Failure Analysis
Investigation and analysis of fire protection systems that failed to activate on demand during a fire, performed inadequately or an accidental activation leading to water loss and/or environmental impact. For example, a retail company suffered a fire where the sprinkler system did not activate leading to a higher severity event. An analysis was performed to determine the causes of the system failure resulting in the identification of inadequate system impairment practices during repair and maintenance.

Safety & Risk Management

Technical Safety and HSE Advisor
Advisor, lead, and technical assurance for diverse capital projects on process safety, HSE, fire, and explosion aspects. Lead the major accidents events (MAE) management process and ALARP demonstration for several capital project in the oil & gas industry.

Management of Change (MOC) reviewer
Review proposed changes through the MOC process on aspect related to process safety, fire, and explosion hazards for diverse projects and operations. Review and update the MOC procedure for diverse operations.

Review and update Safety Management System (SMS)
Evaluate the SMS implemented against the international standard ISO 450001 and propose updates to improve. Develop the SMS risk management framework and perform a hazard identification study as an initial baseline of the improved SMS.

Process Safety Management (PSM) Audit
Perform diverse PSM audits against 29 CFR 1910.119 (AKA OSHA PSM) and good practices (e.g., CCPS).

Technical Safety Engineering
Engineering design of diverse technical safety aspects including hazardous area classification, HSE Plan, HSE Premise, safety system design philosophy, area safety charts, fire & gas systems, firewater design, deluge system, passive fire protection, and Safety Action Monitoring System (SAMS).

Emergency Management

Emergency Response Plans (ERP)
Review and develop diverse emergency response plans for diverse facilities, including Liquified Natural Gas (LNG), Oil & Gas Processing offshore platforms, Oil & Gas Pipelines, terminals, and piers.

Marine Safety

Offshore Dropped Object Analysis
Review and perform diverse dropped object analysis for offshore rigs. These studies included the drop object risk estimation during a mechanical handling activity using the cranes. These mechanical handling activities consider the activities within the offshore rig itself or between a supply vessel and the rig.

Marine Life Safety Review
Review life safety features to ensure compliance with Marine Safety Corporate requirements and IMO SOLAS. These evaluations included a review of life safety plans, engineering diagram and/or a survey on the offshore facilities. These reviews included different offshore platform types, for example fix jacket, drilling ships, Tension Leg Platforms (TLP), Float Production Storage and Offloading (FPSO) ship.

Hazard Identifications
Lead, review, and participate in diverse hazard identification (HAZID) studies for constructions and engineering activities on marine setups. During these evaluations the marine hazards were evaluated, and safety measures defined.

Escape and Evacuation Analysis
Oil & gas offshore platforms escape and evacuation analysis. These analyses included review and impairment evaluation (smoke, thermal, & blast) of escape routes, muster stations and Totally Enclosed Motor Propelled Survival Craft (TEMPSC) embarkation areas. Additionally, a moving time was modeled by different evacuation models

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Continued Education

- Annual Global Congress of Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), 2023
- Annual Global Congress of Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), 2022
- Annual Global Congress of Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), 2021
- Annual Global Congress of Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), 2020
- Annual Global Congress of Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), 2019
- Annual Global Congress of Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), 2018
- Advanced Fire Dynamic Simulator (FDS) with PyroSim and SmokeView Seminar, Society of Fire Protection Engineers (SFPE), 2021
- Fire Investigation Training Program, National Association of Fire Investigators (NAFI), 2021
- NSC Safety Congress & Expo, National Safety Council, 2021
- Forensics and Fire Protection Engineering, Society of Fire Protection Engineers (SFPE), 2021
- Fire Protection System Reliability, Society of Fire Protection Engineers (SFPE), 2021
- Using the Quantitative Risk-Based Approach for Fire Safety in Practice, Society of Fire Protection Engineers (SFPE), 2020
- Lithium-Ion Batteries, What Fire Protection Engineers Should Know, Society of Fire Protection Engineers (SFPE), 2020
- 75th Annual Instrumentation and Automation Symposium for the Process Industry, Texas A&M University, College Station, Texas, 2020
- Technical Safety Fundamentals (TSE-101), Shell, Houston, TX, 2015
- PHAST Advance, Det Norske Veritas (DNV), DNV Software Houston, 2013
- Training Course for PHAST, Det Norske Veritas (DNV), DNV Software, London, 2012
- Angus Fire, Angus Fire Foam Workshop, London, UK, 2011
- Emergency Response to Hazardous Materials Technician Level, Garner Environmental Services, Houston, Texas, 2007

Publications/Presentations

- **Jimenez,** “Energy Transition? Evaluation and Challenges in Risk Analysis”, presented at the Spanish presentations of the 19th Global Congress for Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), Houston, 2023
- **Jimenez,** “Cooling hazardous material tanks. A Practical Case of a fire hazard analysis in hazardous materials rail car”, presented at the Spanish presentations of the 19th Global Congress for Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), Houston, 2023
- **Jimenez,** “Protect, or not protect. Importance of fire & explosion philosophy”, presented at the Spanish presentations of the 18th Global Congress for Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), San Antonio, 2022
- **Jimenez,** “Are we correct? Risk management during incident investigations: hazard and risk understanding”, presented at the Spanish presentations of the 18th Global Congress for Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), San Antonio, 2022
- **Jimenez,** “Fire Hazard Analysis (FHA) as a tool for fire protection optimization”, presented at the Spanish presentations of the 17th Global Congress for Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), virtual, 2021.
- **Jimenez,** “Emergency Management integration during the design phase”, presented at the Spanish presentations of the 16th Global Congress for Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), virtual, 2020.
- **Jimenez,** Y. Saud, R. MacNguyen, “Facility Siting, a Practical Approach”, presented at the 15th Global Congress for Process Safety (GCPS), American Institute of Chemical Engineers (AIChE), New Orleans, LA, April 2019
- **Jimenez**, “Operability of Fire Protection Systems”, presented at ExpoFuego 2019, EnginZone, Lima, Peru, 2019.
- **Jimenez**, “Toxic and Particle Emissions from air starved Pool Fires”, Master’s Degree Dissertation, School of Process, Environmental & Material Engineering, University of Leeds, 2009.