

Craig J. Stickelmaier

PROFESSIONAL HISTORY:

*Risk Management Professionals, Inc.,
Irvine, CA; Project Engineer, 2018-
Present*

EDUCATION:

*Bachelor of Science, Chemical Engineering
University of California, Santa Barbara*

CERTIFICATIONS:

California Engineer-In-Training (EIT)

PROFESSIONAL AFFILIATIONS:

*American Institute of Chemical Engineers
(AIChE)*

Mr. Stickelmaier

graduated from the
University of California,
Santa Barbara with a



Bachelor of Science degree in Chemical Engineering with an emphasis in catalysis and biofuels research. Currently, Mr. Stickelmaier provides technical support as a Project Engineer for Risk Management Professionals.

In addition to his work with clients, Mr. Stickelmaier has been involved in educational outreach and has strived to improve the product

lines provided by Risk Management Professionals. In Spring 2019, Mr. Stickelmaier participated in the 15th Global Congress on Process Safety (GCPS) at the 2019 AIChE Spring Meeting, where he presented a poster on “Using HAZOP/LOPA to Create an Effective Mechanical Integrity Program.”

Since joining Risk Management Professionals, Mr. Stickelmaier has been immersed in multiple aspects of the United States Environmental Protection Agency (US EPA) Risk Management Plan (RMP), Occupational Safety and Health Administration (OSHA) Process Safety Management (PSM) Program, and California Accidental Release Prevention (CalARP) Program development. Mr. Stickelmaier has been involved with:

- Process Hazard Analyses (PHAs) and Hazard Reviews (HRs), including Hazard & Operability (HAZOP) facilitation support
- Layer of Protection Analysis (LOPA) facilitation support
- What-if and Checklist Analyses
- Risk Management Plans (RMP) / Process Safety Management (PSM) Programs
- California Accidental Release Prevention (CalARP) Program
- Nevada Division of Environmental Protection (NDEP) Chemical Accident Prevention Program (CAPP)
- Toxic and Flammable Gas and Liquid Dispersion Modeling
- Regulatory Compliance Auditing and Support
- Piping and Instrumentation Diagram (P&ID) Development and Field Verification

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- Hazardous Materials Inventory Calculations

While Mr. Stickelmaier has experience in diverse product lines, all completed projects have used high-end qualitative and/or quantitative risk analysis techniques for decision-making. He has been involved in a variety of engineering projects across several industries, including the following fields:

- Petroleum (Production, Refining, Storage)
- Gas Processing/Transportation/Storage
- Chemical Manufacturing
- Water Treatment and Distribution Systems
- Ammonia Refrigeration Systems

PROJECT EXPERIENCE

Process Hazard Analyses

Mr. Stickelmaier has facilitated and been the technical scribe for PHAs and Hazard Reviews (HRs) using the HAZOP, LOPA, and What-If/Checklist methodologies for refineries, ammonia refrigeration facilities, and water treatment facilities as well as for other industry sectors. The following list is representative of projects that Mr. Stickelmaier has provided facilitation and technical scribing support for in the conceptual design stages, detailed design stage, and operating cycle.

- *Butane Loading Rack - Refinery, Salt Lake City, UT* – Provided HAZOP/LOPA facilitation support over the course of six (6) days for the five-year redo PHA of the Butane Loading Rack at a refinery in Salt Lake City. The scope of the study included LPG and gasoline component rail car and truck loading/unloading including various vapor recovery systems, as well as propane storage bullets and butane storage spheres. Preparation support for the PHA included separation and delineation of P&IDs/PFDs into nodes, as well as pre-causing documentation of various hazard scenarios to be reviewed during session. The PHA was conducted remotely utilizing Microsoft Teams web-conference software. A review meeting with refinery leadership was also conducted to present PHA/LOPA recommendations.
- *Fuel Gas System - Refinery, Garyville, LA* – Provided HAZOP/LOPA facilitation support over the course of three (3) days for the five-year redo PHA of the fuel gas unit for a 500,000 barrel per day refinery in Louisiana. The PHA scope encompassed the fuel gas

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mixing drum, fuel gas bullet, and fuel gas and natural gas distribution piping to a number of downstream users in the refinery. The PHA Team included personnel from various sectors of the refinery. Preparation support for the PHA included separation and delineation of P&IDs/PFDs into nodes, as well as pre-causing documentation of various hazard scenarios to be reviewed during session. The PHA was conducted remotely utilizing both Microsoft Teams and Skype software. A review meeting with refinery leadership was also conducted to present findings from the PHA.

- *Polymer Sulfonation Process - Chemical Manufacturing Plant, Philadelphia, PA* – Provided HAZOP and What-If/Checklist facilitation support for a chemical manufacturing facility in Philadelphia that produces cation ion-exchange resins. The PHA specifically analyzed the unloading, storage, and supply of oleum to the sulfonation process. As part of the PHA, the Team reviewed relevant MOCs, previous incidents, external events, human factors, facility siting, and other general issues. Facilitation support for this PHA was conducted remotely using Skype software over the course of two days.
- *LPG Storage Sphere - Refinery, Salt Lake City, UT* – Provided HAZOP/LOPA facilitation support for the Management of Change (MOC) associated with the design and installation of a new LPG Storage Sphere at a refinery in Salt Lake City. The PHA assessed the current design of the new sphere in accordance with API and internal corporate standards.
- *Temporary Rental Boiler - Refinery, Salt Lake City, UT* – Provided HAZOP/LOPA facilitation support for the Management of Change (MOC) associated with the application of a temporary rental boiler skid to be used in an upcoming planned shutdown of a refinery in Salt Lake City. The PHA specifically reviewed the water treatment and steam generation processes of the rental boiler skid, including the fire side of the boiler, as well as the new tie-ins to the refinery steam system. The PHA Team included key representatives from the third-party rental boiler manufacturer.
- *Temporary Slops Rundown Cooler - Refinery, El Paso, TX* – Provided HAZOP/LOPA facilitation support for the Management of Change (MOC) associated with the installation of a temporary heat exchanger in the slops rundown line. Facilitation support for this MOC PHA was conducted remotely using Skype software.
- *Volatiles Handling and Storage Units - Refinery, Anacortes, WA* – Provided HAZOP/LOPA facilitation support for a five-year redo PHA for the tankage, rundown and interconnecting piping, and blending areas of a refinery storing LPG, various gasoline blending components, and spent caustic. Facilitation support for this PHA occurred over a span of two weeks and included a comprehensive management review meeting to present PHA

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recommendations to refinery leadership. Preparation support for the PHA included a modified node breakdown and pre-causing of all applicable hazard scenarios.

- *Tank Farm Unit - Refinery, Dickinson, ND* – Provided HAZOP/LOPA facilitation support and technical scribe support for a five-year redo and multiple Management of Change (MOC) PHAs for the Tank Farm of a refinery storing crude oil, diesel, untreated distillate, atmospheric tower bottoms (ATB), atmospheric gas oil (AGO), naphtha, liquefied petroleum gas (LPG) and soy bean oil. Support for this PHA included facilitation for one MOC PHA session and technical scribe support for two other MOC PHA sessions to accommodate new design changes. Preparation support for the PHA included pre-causing scenarios for all the storage and utility systems, including slops storage, red-dye storage, hot oil system, warm oil system, lubricity/static dissipating additive (SDA) injection, and truck loading/unloading operations. Facilitation and scribe support included remote Skype meetings involving the consultant design team and site-specific operations and engineering personnel.
- *Utility Units - Refinery, Dickinson, ND* – Provided HAZOP/LOPA facilitation support for multiple Project PHAs that took place at an engineering design firm in Long Beach, CA to accommodate design changes to multiple Utilities systems of a refinery in North Dakota. The specific Utilities systems included water pretreatment and boiler feed water, cooling water, natural gas, nitrogen, and instrument air. Facilitation and scribe support included remote Skype meetings involving the consultant design team and site-specific operations and engineering personnel.
- *HF Alkylation and Merox Units - Refinery, Mandan, ND* – Provided HAZOP/LOPA preparation and technical scribe support for the HF Alkylation / Merox five-year redo PHA for a refinery over the course of three weeks. As part of the PHA, the Team reviewed the HF Acid Alkylation and Merox processes, as well as the caustic, fresh/spent acid, and ASO wash systems. Preparation support for the PHA included separation and delineation of P&IDs/PFDs into nodes, as well as pre-causing documentation of various scenarios to be reviewed during session.
- *Crude and Vacuum Units - Refinery, Garyville, LA* – Provided HAZOP/LOPA preparation and technical scribe support over the course of five weeks for the Crude/Vacuum Distillation Units five-year redo PHA for a refinery with a throughput of over 500,000 barrels per day. Support for the 5-year redo PHA simultaneously included design changes associated with a major refinery revamp project. Preparation support for the PHA included

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separation and delineation of P&IDs/PFDs into nodes, as well as pre-causing documentation of various scenarios to be reviewed during session.

- *Crude and Naphtha Units - Refinery, Dickinson, ND* – Provided HAZOP/LOPA preparation and technical scribe support for the Crude Distillation and Naphtha Stabilizer Units five-year redo PHA for a refinery over the course of two weeks. As part of the PHA, the Team reviewed the Corrosion Study report to verify operating windows, corrosion mechanisms, dead legs, and mixing/injection points. Preparation support for the PHA included separation and delineation of P&IDs/PFDs into nodes, as well as pre-causing documentation of various scenarios to be reviewed during session.
- *LSR Hydrotreater and Penex Units - Refinery, Garyville, LA* – Provided HAZOP/LOPA preparation and technical scribe support over the course of two weeks for the Light Straight Run (LSR) Hydrotreater and Penex Units five-year revalidation PHA for a refinery that processes over 500,000 barrels per calendar day of crude oil. Preparation support for the PHA included separation and delineation of P&IDs/PFDs into nodes, as well as pre-causing documentation of various scenarios to be reviewed during session.
- *Crude Unit - Refinery, El Paso, TX* – Provided HAZOP/LOPA preparation and technical scribe support over the course of four days for a MOC PHA regarding changes to the relief valves in the Crude Distillation Unit.
- *Multiple Units - Refinery, Gallup, NM* – Provided HAZOP/LOPA preparation and technical scribe support over the course of five days for a Project PHA of a refinery intent on implementing improved design modifications to various processes. Support for the Project PHA included the Isomerization, Naphtha Hydrotreater, Amine Treating, Fluid Catalytic Cracking, and ASO Handling Units. Preparation support for the PHA included separation and delineation of P&IDs/PFDs into nodes, as well as pre-causing documentation of various scenarios to be reviewed during session.
- *Chlorine Injection System - Water Treatment Plant, Fairfield, CA* – Provided HAZOP and What-if/Checklist facilitation support, including guidance of a technical scribe, for a process utilizing chlorine injection from one-ton chlorine cylinders to disinfect water. As part of the PHA, the Team reviewed relevant MOCs, previous incidents, external events, human factors, facility siting, and other general issues.
- *Chlorine and Ammonia Injection Systems - Water Treatment Plant, Claremont, CA* – Provided HAZOP and What-if/Checklist facilitation support, including guidance a technical scribe, for a process utilizing chlorine injection from 150 lb. chlorine cylinders to disinfect water. The PHA scope included the chlorine and ammonia injection systems as well as

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the scrubber system. As part of the PHA, the Team reviewed relevant MOCs, previous incidents, external events, human factors, facility siting, and other general issues.

- *Anhydrous Ammonia - Refrigeration Facility, Selma, CA* – Provided HAZOP and What-if/Checklist co-facilitation and technical scribe support for the North system of an operating ammonia refrigeration facility. As part of the PHA, the Team reviewed relevant MOCs, previous incidents, external events, human factors, facility siting, and other general issues.



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Compliance Audits

Mr. Stickelmaier has completed many CalARP/RMP/PSM Compliance Audits, which include facility walkdowns and familiarization with the regulated covered process, reviewing Prevention Program documentation to identify deficiencies that would result in citations from the applicable regulatory agencies, developing a line item report that lists the specific deficiencies, and meeting with facility personnel in order to identify any other needs or services they may require. Below is a partial list of projects for which Mr. Stickelmaier has performed Compliance Audits:

- *Oil & Gas Plant - Gas Processing Unit, Lompoc, CA* – Conducted a CalARP/RMP/PSM Program 3 Compliance Audit for the Gas Processing Unit of the facility's Oil and Gas Plant over the course of two (2) days. The audit included a site walkdown of the process to verify Piping and Instrumentation Diagrams (P&IDs) and Operating Procedures. A close-out meeting to review audit findings and items to improve overall CalARP/RMP/PSM program management was also performed as part of the audit.
- *Chlorine Injection System - Water Treatment Plant, Fairfield, CA* – Performed a Triennial CalARP/RMP/PSM Program 3 Compliance Audit for a water treatment plant in northern California over the course of two days. The scope of the Compliance Audit included a review of facility policies and procedures, a review of all Prevention Program elements, a site walkdown to verify compliance, and personnel interviews to determine implementation of the CalARP/RMP/PSM Program.
- *Anhydrous Ammonia System - Refrigeration Facility, Selma, CA* – Performed two Triennial CalARP/RMP/PSM Program 3 Compliance Audits for two separate systems of an Ammonia Refrigeration Facility over the course of two days with another colleague. P&ID walkdowns, personnel interviews, and close-out meetings were encompassed as part of the audit. In addition, a sample size of equipment was reviewed to assess Process Safety Information and Mechanical Integrity compliance.
- *Anhydrous Ammonia System - Refrigeration Facility, Commerce, CA* – Performed a CalARP Compliance Audit for an Ammonia Refrigeration facility that was utilized by multiple tenants within the complex, including conduction of a close-out meeting to review recommendations and assign responsibility for addressing deficiencies.

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CalARP/RMP/PSM Program Development and Updates

Mr. Stickelmaier has been deeply involved with the development of many California Accidental Release Prevention (CalARP) Programs, RMP, and PSM Programs for a wide spectrum of industries and processes. As part of these efforts, he has conducted Offsite Consequence Analyses (OCA), external events analyses, dispersion modeling, recommendations review, program development, United States Environmental Protection Agency (US EPA) and Administering Agency (AA) submittals, and review. Mr. Stickelmaier has been working closely with regulators to help his clients stay ahead of regulatory requirement amendments. Below is a partial list of projects for which Mr. Stickelmaier has provided CalARP/RMP/PSM Program Development/Update support:

- *Polymer Sulfonation Process - Chemical Manufacturing Plant, Philadelphia, PA* – Developed a five-year update of the Hazard Assessment/Offsite Consequence Analysis for a RMP/PSM Program 3 facility regulated for their onsite oleum storage and handling.
- *Chlorine Injection System - Water Treatment Plant, Sacramento, CA* – Developed the Hazard Assessment/Offsite Consequence Analysis for a CalARP/RMP/PSM Program 3 facility regulated for their chlorine injection process.
- *Gas Plant - Lyons/McPherson, KS* – RMP Program assistance including development of Hazard Assessment/Offsite Consequence Analyses and EPA RMP Submittals for multiple gas plant sites in Kansas.
- *Aerosol Recycling and Propane Storage Facility - Beatty, NV* – Provided Hazard Assessment/Offsite Consequence Analysis development to support compliance with the Nevada Division of Environmental Protection (NDEP) Chemical Accident Prevention Program (CAPP). Support included multiple updates to the Hazard Assessment and close correspondence with the NDEP Regulator so as to ensure commissioning of the client's facility in a timely manner.

CLIENT LIST

The following is a partial list of clients that Mr. Stickelmaier has managed and/or provided technical support:

Oil and Gas

- Marathon Petroleum Company
- Worley

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- Burns & McDonnell
- Freeport-McMoRan Oil & Gas
- Williams Midstream
- Consumers Energy Company

Ammonia Handling Facilities

- Capstan California
- Harris Ranch
- Smithway Associates

Municipalities and Water Treatment

- Three Valleys Municipal Water District
- Solano Irrigation District
- City of Sacramento
- City of Tracy
- City of Stockton

Manufacturing/Chemical Processing

- Accella Polyurethane Systems
- Esterline Corporation
- Purolite

