

Joyce H. Shen

PROFESSIONAL HISTORY:

*Risk Management Professionals, Inc.
Irvine, California; Project
Engineer;*

EDUCATION:

*Bachelor of Science, Chemical
Engineering, University of
California, San Diego*

PROFESSIONAL AFFILIATIONS:

*American Institute of Chemical
Engineers (AIChE)*

Ms. Joyce Shen graduated from the University of California, San Diego (UCSD) with a Bachelor of Science



degree in Chemical Engineering. During her education, Ms. Shen participated in a progressive engineering team and served as a project manager under AIChE Projects at UCSD. Currently, Ms. Shen provides technical support as a Project Engineer for Risk Management Professionals.

Since joining, Ms. Shen has been involved in multiple aspects of 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, including the following:

- Process Hazard Analyses (PHAs) Hazard Operability (HAZOP) Studies scribe / facilitation support
- Layer Protection Analysis (LOPA) Studies scribe / facilitation support
- Latent Failure and Human Factors Analyses
- Toxic and Flammable Gas and Liquid Dispersion Modeling
- Risk Management Plans (RMP) / Process Safety Management (PSM) Programs
- California Accidental Release Prevention (CalARP) Program

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

- Petroleum (production, storage, refining)
- Wastewater Treatment and Distribution Systems
- Natural Gas Odorization
- Ammonia Refrigeration

Joyce H. Shen

PROJECT EXPERIENCE

Process Hazard Analyses (PHA)

Ms. Shen has been the technical scribe / facilitator for PHAs using HAZOP and LOPA for varying facilities. The following is representative of the projects that Ms. Shen has provided technical scribing / facilitation support for in the conceptual design stage, detailed design stage, and operating cycle.

- Lithium Extraction Process, Westborough, MA – Provided onsite facilitation support over the course of eight (8) days for the Lithium Extraction Process for recycling used lithium batteries.
- *Hydrogen Process System, Campo, CA* – Provided remote facilitation support for a one-day HAZOP study, including Human Factors/Facility Siting/External Factors checklists, for the hydrogen process system, as part of the iron flow battery system.
- *Ammonia Refrigeration System, Commerce, CA* – Provided onsite and remote facilitation support for a one-day PHA, including HAZOP and Human Factors/Facility Siting checklists for the Single-Stage Anhydrous Ammonia Refrigeration System.
- *Fluid Catalyst Cracking Unit, Anacortes, WA* – Provided remote HAZOP/LOPA scribing support over the course of twenty-nine (29) days for the Fluid Catalyst Cracking Unit. This includes pre-session preparations such as nodding and pre-causing.
- *Aqueous Ammonia System, Brea, CA* – Provided onsite facilitation and scribing support for a one-day PHA, including HAZOP and what-if checklists for the Aqueous Ammonia System. This includes conducting a quick site walkdown to ensure P&ID accuracy and redlining as needed.
- *Crude Heater Upgrade MOC, Salt Lake City, UT* – Provided onsite HAZOP/LOPA scribing support over the course of two (2) days for the Crude Heater Upgrade MOC PHA.
- *Oil Movements Division (Tank Farm Unit), Salt Lake City, UT* – Provided onsite HAZOP/LOPA/checklist scribing support over the course of eleven (11) days for the Tank Farm Unit. This includes pre-session preparation works such as nodding and pre-causing.
- *Fuel Gas Scrubber Unit, West Bountiful, UT* – Provided remote HAZOP/LOPA scribing support over the course of two (2) days for the Sulfur Recovery Unit (SRU) alternative scrubber unit.

Joyce H. Shen

- *Acid Load Out Area, Claypool, AZ* – Provided onsite HAZOP/Checklist scribing support over the course of four (4) days for an Acid Load Out Station. The study was conducted as hybrid sessions with Team members joining both onsite and remotely using Microsoft Teams.
- *Natural Gas Odorization System, Jackson, MI* – Provided remote facilitation support for a one-day PHA including HAZOP and what-if checklists for the GPL 750 Odorizer System. The HAZOP study was conducted using Microsoft Team for remote collaboration.
- *Pretreat Wastewater Treatment Plant, Paramount, CA* – Provided remote HAZOP/LOPA scribing support over the course of four (4) days for pretreat wastewater treatment and associated anaerobic reactor, aerobic reactor, DAF unit, and acid/caustic/urea injection skids.
- *API Oil-Water Separator and DNF, Martinez, CA* – Provided onsite HAZOP/LOPA scribing support over the course of four (4) days for an API separator and DNF system. This includes pre-session preparation such as nodding and precausing.
- *Sour Water Treatment and Ammonia Conversion System, Bakersfield, CA* – Provided onsite HAZOP/LOPA scribing support over the course of five (5) days for a sour water treatment plant and ammonia conversion system.
- *Foul Water Stripper Unit, Martinez, CA* – Provided onsite HAZOP/LOPA partial facilitation/scribing support over the course of four (4) days for a foul water stripping system. This includes post-session documentation such as HAZOP/LOPA/HCA report development.
- *Therminol Heating and Circulation System, Martinez, CA* – Provided onsite HAZOP/LOPA scribing support for a therminol (hot oil) heating and circulation system over the course of five (5) days. This includes post-session documentation such as HAZOP/LOPA/HCA report development.
- *Sulfur Recovery System, Paramount, CA* – Provided remote HAZOP/LOPA scribing support over the course of four (4) days for a sulfur recovery system and associated acid/SVE knockout vessels, caustic scrubbers, and thermal oxidizer.
- *Potable Water, Firewater, Crude, and Vacuum Gas Oil Systems, Martinez, CA* – Provided onsite HAZOP/LOPA scribing support over the course of five (5) days for specific section within the Gauging Department which consisted of potable water, firewater, crude, and vacuum gas oil. This includes pre-session preparation such as nodding, precausing, and post-session documentation such as HAZOP/LOPA/HCA report development.

Joyce H. Shen

- *LPG Unit, El Paso, TX* – Provided onsite HAZOP/LOPA scribing support over the course of five (5) days for an LPG unit that handles propane, butane, isobutane, and odorant, and includes additional support such as P&ID redlining.
- *Hydrocarbon Recovery Gas Plant, Martinez, CA* – Provided onsite HAZOP/LOPA scribing support for a hydrocarbon recovery gas plant and associated Depropanizer, Deethanizer, and H₂S Adsorber systems. The PHA was conducted over the course of ten (10) days and includes preparation and report development to document PHA findings.
- *Relief System, El Paso, TX* – Provided onsite scribe support for a five-day PHA including HAZOP and LOPA for the North and South Relief Unit. This included pre-session preparation, P&ID verification, and post-session documentation.

CalARP/RMP/PSM Program Developments and Updates

Ms. Shen has developed several CalARP, RMP, and PSM Programs for a number of industries and processes.

- *Foam Production Facility, Orange, CA* – Provided Program 1 development support, including Offsite worst-case analysis for release of toluene diisocyanate.
- *Powder Metal Facility, Compton, CA* – Provided CalARP Program 2 program development support, including Safety Information and Hazard Assessment/Offsite consequence analysis for the anhydrous ammonia storage.
- *Hydrogen Peroxide Transloader Facility, Carlin, NV* – Provided NDEP-CAPP development support, including an internal compliance audit to ensure all regulatory requirements are met.
- *NGL Extraction Facility, Parachute, CO* – Provided RMP Program Level 3 Submittal development support, including Hazard Assessment / Offsite Consequence Analysis and completing CDX online application as Preparer.
- *NGL Storage Facility, Lyons, KA* – Provided RMP Program Level 3 development support, including Hazard Assessment / Offsite Consequence Analysis and completing CDX online application as Preparer.
- *Aqueous Ammonia System, Brea, CA* – Provided CalARP Program Level 2 Submittal development support, including Hazard Assessment / Offsite Consequence Analysis.
- *Ammonia Refrigeration, City of Industry, CA* – Provided CalARP Program Level 2 Submittal development support, including Compliance Audit and field walkdown.
- *Generating Station, El Centro, CA* – Provided CalARP Program Level 3 Submittal development support, including Hazard Assessment / Offsite Consequence Analysis.
- *Hydrogen Peroxide Production Facility, Carlin, NV* – Provided NCAPP compliance support, including Hazard Assessment / Offsite Consequence Analysis.
- *Paint and Coating Facility, Mojave, CA* – Provided CalARP Program Level 3 Submittal development support, including Hazard Assessment / Offsite Consequence Analysis.
- *Polonio Pass Water Treatment Plant, Shandon, CA* – Provided RMP/PSM Program Level 3 development support, including Hazard Assessment / Offsite Consequence Analysis.

Joyce H. Shen

CLIENT LIST

The following is a partial list of clients that Ms. Shen has provided technical support:

Oil and Gas

- Marathon Petroleum Company
- Consumers Energy Company
- World Energy
- Bakersfield Renewable Fuels
- HF Sinclair
- Williams Midstream

Municipalities and Water Treatment

- Central Coast Water Authority
- City of Pittsburg
- Imperial Irrigation District
- Santa Fe Irrigation District
- City of Gardena

Manufacturing/Chemical Processing

- PPG Aerospace
- Evonik Active Oxygens
- Winonics

Ammonia Refrigeration

- Heritage Distribution
- 32 Cold

Mining

- Freeport McMoRan

Renewable Energy

- ESS, Inc.
- Ascend Elements