

## Risk Assessment/Risk Management



Industrial accidents often occur because of unrecognized risk. As workers perform routine tasks, day after day, without incident, they become complacent about Process Safety. A comprehensive risk assessment and management program prevents complacency and protects against unwanted events.

### Why Should I Invest in a Risk Assessment and Management Program?

A risk assessment will define the potential causes for deviations, consequences of the deviations, and list protection/mitigation measures. A clear understanding of potential event causes facilitates directed focus of resources to reduce risk. With effective risk management, capital expenditures are better justified, operating procedures are more robust, and personnel training is more focused.

### Benefits

A robust risk assessment and management program will identify the risks of a process, proactively manage the likelihood of occurrence, and mitigate the consequences of an event. Benefits include the following:

- Thorough understanding of the links between equipment and human actions to potential catastrophic events
- Maintenance and testing frequency and priority are based on protection requirements
- Reduce redundancy and wasted effort
- Increase confidence in plant safety and emergency preparedness
- Ensure that the facility meets regulatory requirements and good engineering practices
- Identify and improve weak systems

### Clients

Our clients include the following:

- Pfizer
- Solvay Advanced Polymers
- Tesoro
- ConocoPhillips
- Shell
- DSM
- Akzo Nobel
- Bayer
- Procter & Gamble
- Olin
- Dalu Semiconductor Materials
- Colonial Pipeline
- Oxychem
- Best Foods
- International Flavors and Fragrances
- Rhodia

### Application Experience

- Silicon purification
- Ammonia refrigeration
- Chlorine
- Anhydrous HCl
- Oil and gas production and transport
- Hydrogen
- Batch resins production
- Potent pharmaceutical compounds
- Breathing air systems
- Fiber optics
- Strong inorganic acid and base
- Polyethylene fiber
- Ammonium nitrate
- Ethylene oxide/propylene oxide

### Services

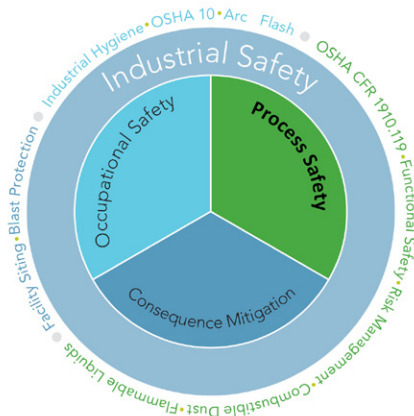
CH2M HILL is experienced in identifying and assessing hazards and risks through the use of quantitative and qualitative methodologies. Our qualified engineers work directly with the owners' personnel to identify and assess hazards and acceptable mitigation alternatives. Our services include the following:

#### Risk Assessment

- Process hazard analysis
- Layer of protection analysis (LOPA)
- SIL determination
- Fault tree analysis
- Consequence and release analysis (on and offsite)
- Fire and explosion assessment
- Reaction and explosion modeling
- Qualitative and quantitative risk evaluation

#### Risk Management

- Risk management planning and program development
- Maintenance and testing planning
- RAGAGEP review
- Pressure relieving device sizing and audits
- Design code compliance assessment (NFPA, API, ASME etc.)
- Regulatory compliance audits (PSM, RMP etc.)
- Constructability, operability and maintainability review
- Fire and blast protection design
- Value-added assessments
- Inherently safe design evaluation
- Incident investigations



### About CH2M HILL

Headquartered near Denver, Colorado, employee-owned CH2M HILL is a global leader in full-service consulting, program management, design, construction, and operations for public and private clients. With \$6.3 billion in revenue and more than 23,500 employees worldwide, CH2M HILL delivers innovative, practical, sustainable solutions—helping clients develop and manage infrastructure and facilities that improve efficiency, safety, and quality of life. The firm has long been recognized as a most-admired company and leading employer, including being named by FORTUNE magazine as one of the 100 Best Companies to Work For (2009). CH2M HILL is an industry-leading program management, construction management, and design firm as ranked by *Engineering News-Record* (2009).

Visit us at [ch2mhill.com](http://ch2mhill.com)

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