Risk Management at Chevron

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AIChE/SACHE Workshop
Context for HES Risk Management

Corporation
Sets policies &
expectations

Centers of
Expertise
Establish
processes &
verify

Finance  Political  Operational  Price  Legal

Oversight Level
Global Risk

Local Risk
Review of Terms

Risk

The probability that a hazard will result in a specified level of loss.

- Defined mathematically as:
  Risk = [Severity] x [Frequency]

Risk Assessment

The application of a procedure that asks:

- What can fail or go wrong?
- What are the consequences?
- What is the likelihood?
- How do the likelihood and consequences combine to give a statement of risk?

Qualitative Risk Assessment

A team of experienced personnel judge the consequences and likelihoods of events of concern based upon their experiences.

Quantitative Risk Assessment

Qualified analysts apply validated modeling tools, data and mathematical techniques to quantify the consequences and likelihoods of events of concern, which are then combined in risk statements.
Risk Management Defined

“The systematic application of management policies, procedures and practices to the tasks of analyzing, assessing and controlling risk in order to protect employees, the general public, the environment and company assets while avoiding business interruptions.”

AIChE Center for Chemical Process Safety
Context for HES Risk Assessments

The Chevron Way

Company Values
- CSOC/CPDEP
- Decision Quality
  - Identify & Select Opportunity
  - Generate & Select Alternatives
  - Develop the Preferred Alternative
  - Execute
  - Operate & Evaluate

Protecting People and the Environment
- Company Design Standards
- Industry Standards & Practices
- Risk Assessment
- Project Development & Construction
- Operating Standards & Procedures
- Selection of Personnel
- Training & Competency Verification
- Maintenance
- Reliability Programs
- Human Factors & Behaviors (RBL-IIF)
- Emergency Response

Organizational Capability
- OE Management System
  - Security
  - Facilities Design and Construction
  - Safe Operations
  - Management of Change
  - Reliability & Efficiency
  - Third-Party Services
  - Environmental Stewardship
  - Product Stewardship
  - Incident Investigation
  - Community Awareness & Outreach
  - Emergency Management
  - Compliance Assurance
  - Legislation & Regulatory Advocacy

Zero Incidents
- Structured process
- Clearly stated objectives
- Enterprise-wide scope
- Mapped to specific OE expectations
- Defined roles and responsibilities
- Specific leading and lagging measures reported annually at the corporate level
- Common risk assessment and management procedure: **RiskMan2**
HES Risk Management Procedures

Identify, Group & Prioritize (Plan)

Perform High Level Risk Assessment

Perform Detailed Risk Assessment

Track Risk Reduction Actions to Documented Closure

Revalidate
Scalable Risk Assessment Approach

- Simple Production
- Terminals
- Shallow Offshore
- Complex Processing & Deepwater

Numbers of Facilities
- Higher Consequence
- Increasing Rigor

Level of Effort
- Qualitative
- Quantitative

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Qualitative Studies

- IHAZID
- Checklists
- What-if checklist
- HAZOP (HAZard and OPerability) Study
- HAZOP - Safety Objectives Analysis / Layers of Protection Analysis

- Other qualitative reviews (layout studies, essential system survivability analyses [ESSAs], etc.)
**Individual Risk** represents the likelihood that a person will sustain a fatal injury from all of the hazardous events to which he or she may be exposed. Presented as a frequency number (fatalities/year). Individual risk ensures that each person is not exposed to an aggregation of different risk exposures, the sum of which leads to an overall high risk exposure for the individual.

**Societal Risk** represents the number of people who may be killed by large, single events and how often those events might occur. Presented as F-N Curves (plots depicting the frequency “F” of exceeding “N” or more fatalities) which set:
Quantitative Studies

Personnel Societal Risk

Total Personnel Risk
Flash Fire
Thermal
BLEVE

Individual Risk per Annum - Personnel Workgroups

Operations  Maintenance  Technical  Contract

Occupational  BLEVE
Toxic  Thermal
Explosion  Flash Fire
Corporate Requirements

- Undertake periodic HES risk assessments of all existing facilities, activities and capital projects.
- Follow the RiskMan2 procedure including the use of Qualified Facilitators and Environmental/Health/Social Facilitators and other competent personnel.
- Maintain and implement a plan for conducting assessments consistent with the Corporate implementation timeline.
- Maintain and implement an HES risk-reduction plan and document closure of all recommendations.
- Revalidate assessments at a minimum of every five years.
- Provide representative HES risk-assessment documentation to the Risk Management Center of Excellence for quality assurance review.
- Submit an OPCO annual summary report.
Learnings at the Facility Level

Process has provided a solid foundation
- Assessments support that our OEMS provides effective safeguards
- Information is being used effectively in design

Areas of focus for continuous improvement
- Qualitative assessment quality
- Driving consistent risk reduction
Context for Risk Decision Making

Means of Calibration
- Codes and Standards
- Verification
- Peer Review
- Benchmarking
- Internal Stakeholder Consultation
- External Stakeholder Consultation

Significance to Decision Making Process
- Codes & Standards
- Good Practice
- Engineering Judgement
- Risk Based Analysis (e.g., QRA, CBA)
- Company Values
- Societal Values

Decision Context Type

A. Nothing new or unusual
   - Well understood risks
   - Established practice
   - No major stakeholder implications

B. Lifecycle implications
   - Some risk trade-offs/ transfers
   - Some uncertainty or deviation from standard or best practice
   - Significant economic implications

C. Very novel or challenging
   - Strong stakeholder views and perceptions
   - Significant risk trade-offs or risk transfer
   - Large uncertainties
   - Perceived lowering of safety standards