CHEMICAL INDUSTRY RISK ASSESSMENT

Document Information

Field	Details
Company Name	_____
Facility Type	☐ Manufacturing ☐ Storage ☐ Laboratory ☐ Distribution ☐ Other: _____
Assessment Date	_____
Assessor Name	_____
Assessor Position	_____
Department/Area	_____
Review Date	_____
Document Reference No.	RA-CHEM-_____

1. Introduction

This Risk Assessment document is designed to identify, evaluate, and control hazards associated with chemical industry operations. The chemical industry presents high-risk environments including exposure to toxic, flammable, and reactive substances, process safety hazards, environmental risks, and occupational health concerns. This assessment aims to ensure the health and safety of all personnel and the protection of the environment by systematically identifying potential hazards and implementing appropriate control measures in accordance with chemical safety regulations (OSHA PSM, EPA RMP, REACH, GHS) and industry standards.

2. Scope of Assessment

This risk assessment covers the following chemical industry activities and areas:

- [ ] Chemical manufacturing/processing
- [ ] Raw material receiving and storage
- [ ] Reactor operations
- [ ] Distillation and separation
- [ ] Packaging and filling
- [ ] Laboratory operations
- [ ] Quality control and testing
- [ ] Waste treatment and disposal
- [ ] Tank farm operations
- [ ] Loading and unloading
- [ ] Maintenance activities
- [ ] Other: _____

Facility Address: _____

EPA Facility ID: _____

Number of Employees: _____

Major Chemicals Handled: _____

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3. Risk Identification

Risk ID	Risk Description	Risk Category	Affected Area/Personnel
CHEM-001			
CHEM-002			
CHEM-003			
CHEM-004			
CHEM-005			
CHEM-006			
CHEM-007			
CHEM-008			
CHEM-009			
CHEM-010			

4. Risk Analysis Matrix

Risk Scoring Criteria

Likelihood Scale:

Score	Likelihood	Description
1	Rare	May occur only in exceptional circumstances
2	Unlikely	Could occur but not expected
3	Possible	Might occur at some time
4	Likely	Will probably occur in most circumstances
5	Almost Certain	Expected to occur in most circumstances

Impact Scale:

Score	Impact	Description
1	Negligible	Minor exposure, no health effects
2	Minor	First aid treatment, contained release
3	Moderate	Medical treatment, localized environmental impact
4	Major	Serious injury/illness, significant environmental damage
5	Catastrophic	Multiple fatalities, major environmental disaster

Risk Analysis Table

Risk ID	Likelihood (1-5)	Impact (1-5)	Risk Score (L×I)	Risk Level
CHEM-001				
CHEM-002				
CHEM-003				
CHEM-004				
CHEM-005				
CHEM-006				
CHEM-007				
CHEM-008				
CHEM-009				
CHEM-010				

Risk Level Classification:

- **Low (1-4):** Acceptable risk, monitor and review
- **Medium (5-9):** Action required, implement additional controls
- **High (10-16):** Immediate action required, restrict operations

- **Critical (17-25):** Operations must cease immediately

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5. Risk Control Measures

Risk ID	Current Controls	Additional Controls Required	Responsible Person	Target Date	Status
CHEM-001					☐
CHEM-002					☐
CHEM-003					☐
CHEM-004					☐
CHEM-005					☐
CHEM-006					☐
CHEM-007					☐
CHEM-008					☐
CHEM-009					☐
CHEM-010					☐

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6. Chemical Industry-Specific Hazards

The following hazards are commonly encountered in chemical industry operations:

6.1 Chemical Exposure Hazards

- Inhalation of toxic vapors and gases
- Skin contact with corrosive substances
- Eye exposure to irritants
- Ingestion of hazardous materials
- Chronic exposure effects (carcinogens, sensitizers)

6.2 Fire and Explosion Hazards

- Flammable liquids and gases
- Combustible dusts
- Reactive chemical combinations
- Static electricity ignition
- Process runaway reactions

6.3 Process Safety Hazards

- Overpressure events
- Runaway reactions
- Equipment failures
- Loss of containment
- Utility failures (power, cooling, steam)

6.4 Physical Hazards

- High-pressure systems
- High-temperature operations
- Cryogenic materials
- Rotating equipment
- Confined spaces

6.5 Environmental Hazards

- Air emissions
- Wastewater discharges
- Soil contamination
- Groundwater contamination
- Hazardous waste generation

6.6 Storage Hazards

- Incompatible chemical storage
- Container integrity failures
- Overfilling of tanks
- Secondary containment failures
- Improper labeling

6.7 Transportation Hazards

- Loading/unloading operations
- Pipeline transfers
- Tanker truck operations
- Rail car handling
- Packaging failures

6.8 Laboratory Hazards

- Small-scale reactions
- Sample handling
- Analytical equipment
- Compressed gas cylinders
- Biological hazards

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7. Chemical Inventory and Hazard Classification

7.1 Major Chemical Inventory

Chemical Name	CAS Number	GHS Classification	Quantity	Location

7.2 Highly Hazardous Chemicals (PSM/RMP)

Chemical	Threshold Quantity	Actual Quantity	Above Threshold
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No

7.3 Chemical Incompatibility Matrix

Chemical A	Chemical B	Incompatibility	Segregation Required
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No

8. Process Safety Management Elements

8.1 PSM Compliance Checklist

PSM Element	Status	Last Review
Process Safety Information	☐ Complete	
Process Hazard Analysis	☐ Complete	
Operating Procedures	☐ Complete	
Training	☐ Complete	
Mechanical Integrity	☐ Complete	
Management of Change	☐ Complete	
Pre-Startup Safety Review	☐ Complete	
Compliance Audits	☐ Complete	
Incident Investigation	☐ Complete	
Emergency Planning	☐ Complete	
Contractor Safety	☐ Complete	
Employee Participation	☐ Complete	
Hot Work Permits	☐ Complete	
Trade Secrets	☐ Complete	

8.2 Process Hazard Analysis Summary

Process Unit	PHA Method	Last PHA Date	Recommendations Open
	☐ HAZOP ☐ What-If ☐ FMEA		
	☐ HAZOP ☐ What-If ☐ FMEA		
	☐ HAZOP ☐ What-If ☐ FMEA		

9. Engineering Controls

9.1 Ventilation Systems

Area	Ventilation Type	Air Changes/Hour	Last Inspection
	☐ General ☐ Local Exhaust		
	☐ General ☐ Local Exhaust		
	☐ General ☐ Local Exhaust		

9.2 Safety Systems

System	Location	Status	Last Test
Emergency Shutdown		☐ Operational	
Pressure Relief Devices		☐ Operational	
Rupture Discs		☐ Operational	
Flame Arrestors		☐ Operational	
Containment Systems		☐ Operational	
Scrubbers/Absorbers		☐ Operational	

9.3 Detection and Alarm Systems

System	Gases Detected	Alarm Setpoints	Last Calibration

10. Emergency Response Procedures

10.1 Emergency Contacts

Role	Name	Contact Number
Plant Manager		
EHS Manager		
Process Safety Manager		
Control Room		
Emergency Services		911 / 000 / 999
CHEMTREC		1-800-424-9300
Poison Control		
EPA/Regulatory Authority		
Environmental Contractor		

10.2 Emergency Procedures

Chemical Spill:

1. Evacuate immediate area
2. Alert others and sound alarm
3. Identify chemical from SDS/labels
4. Notify control room/supervisor
5. Don appropriate PPE if response required
6. Contain spill if safe (dikes, absorbents)
7. Do not wash into drains
8. Report to regulatory authorities if required

Chemical Exposure:

1. Remove victim from exposure area
2. Remove contaminated clothing
3. Flush affected area with water (15+ minutes)
4. Call emergency services/poison control
5. Provide SDS to medical personnel
6. Complete incident report

Fire/Explosion:

1. Activate fire alarm
2. Evacuate to designated area
3. Call emergency services
4. Initiate emergency shutdown if trained
5. Do not fight chemical fires without training
6. Account for all personnel

Process Upset/Release:

1. Initiate emergency shutdown
2. Evacuate affected area
3. Notify control room immediately
4. Activate emergency response team
5. Monitor for toxic/flammable atmospheres
6. Implement shelter-in-place if required

Toxic Gas Release:

1. Hold breath and evacuate crosswind/upwind
2. Sound alarm
3. Don SCBA if rescue required
4. Notify emergency services
5. Implement community notification if required

Assembly Points:

- Primary: _____
- Secondary: _____
- Shelter-in-Place Location: _____

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11. Personal Protective Equipment (PPE) Requirements

PPE Item	Required	Specification
Safety Glasses/Goggles	☐ Yes ☐ No	Type: _____
Face Shield	☐ Yes ☐ No	Type: _____
Chemical Resistant Gloves	☐ Yes ☐ No	Material: _____
Chemical Suit/Apron	☐ Yes ☐ No	Type: _____
Respiratory Protection	☐ Yes ☐ No	Type: _____
SCBA	☐ Yes ☐ No	Duration: _____
Safety Boots	☐ Yes ☐ No	Chemical resistant: ☐ Yes ☐ No
Hard Hat	☐ Yes ☐ No	Type: _____
Hearing Protection	☐ Yes ☐ No	NRR: _____
Other: _____	☐ Yes ☐ No	_____

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12. Environmental Compliance

12.1 Permits and Authorizations

Permit Type	Permit Number	Expiration Date	Status
Air Permit			☐ Current
Water Discharge			☐ Current
Hazardous Waste			☐ Current
Storage Tank			☐ Current

12.2 Spill Prevention

Measure	Implemented	Details
Secondary containment	☐ Yes ☐ No	
Spill kits available	☐ Yes ☐ No	
SPCC Plan	☐ Yes ☐ No	
Stormwater controls	☐ Yes ☐ No	

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13. Sign-Off and Approval

Assessor Declaration

I confirm that this risk assessment has been conducted in accordance with applicable chemical safety regulations and represents an accurate evaluation of the identified hazards.

Assessor Name:	_____
Signature:	_____
Date:	_____

EHS Review

I have reviewed this risk assessment and confirm that appropriate controls are in place.

EHS Manager Name:	_____
Signature:	_____
Date:	_____

Management Approval

I approve this risk assessment and authorize the implementation of the identified control measures.

Plant Manager Name:	_____
Position:	_____
Signature:	_____
Date:	_____

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14. Review Schedule

Review Type	Frequency	Next Review Date
Daily Safety Checks	Daily	
Process Hazard Analysis	Every 5 years	
Comprehensive Review	Annually	
Post-Incident Review	As required	
Management of Change	As required	

Triggers for Immediate Review:

- Any incident, near-miss, or release
- Process or equipment changes
- New chemicals introduced
- Regulatory changes
- PHA recommendations
- Audit findings
- Employee concerns

Document Control

Version	Date	Author	Changes Made
1.0			Initial version

This document is a template and should be customized to meet specific facility requirements and regulatory requirements (OSHA PSM, EPA RMP, local regulations).