Chemical Safety

Berkshire Hathaway Homestate Companies

Loss Control Department

Berkshire Hathaway HOMESTATE COMPANIES
Workers Compensation Division

Fatal Chemical Release: LyondellBasell, La Porte, TX (2021)

100,000lbs acetic acid
released during maintenance event

2 fatalities
30 hospitalizations

- Mistaken removal of pressure-retaining part from plug valve
- Lack of written maintenance procedures
- CSB recommended improved valve procedures and training

Designed to Fail: Chemical Release at LyondellBasell

CSB Case Study: LyondellBasell La Porte Chemical Release

AGENDA

November 2025

- Chemical Safety Foundations
  - Standards & Documentation (HAZOP, SDS, GHS)
- Hazard Identification & Classification
- Controls & PPE
  - Inventory & Storage
- Spill & Emergency Response
  - Waste & Transportation
  - Compressed Gases
- Inspections & Incident Management
- Training & Culture

We Will Focus on Best Practices

- The goal of contractor/vendor safety management is to ensure the safety of all employees, contractors, and visitors on the worksite.
- Regulatory standards are *minimum* requirements. Best in class employers go above and beyond.
- Remember that every workplace is different. Find the risk potential and address it proactively.

From: World Construction Today


Chemical Safety Foundation

Why Chemical Safety Matters

Mishandling chemicals cause serious injury, illness or death.

Incidents can result in environmental contamination and regulatory fines

Business operations can be disrupted due to clean up, investigations or shutdowns.

Safety protocols protect works, communities, and company reputation

Overview of Chemical Hazards

- Physical Hazards: Flammability, explosiveness, reactivity
- Health Hazards: Toxicity, carcinogenicity, corrosiveness
- Environmental Hazards: Aquatic toxicity, ozone depletion, bioaccumulation

HazCom Standard

- OSHA requires identification and communication of chemical hazards
- Workers have the right to know about exposures and protections
- Employers must:
  - Label hazardous chemicals
  - Provide Safety Data Sheets (SDS)
  - Train employees on safe handling

Why It Matters

HazCom isn't just paperwork, it's a life-saving system. When workers understand the risks, they're empowered to act safely and prevent accidents.

Understanding SDSs

- SDS includes 16 standardized sections for each chemical
- It’s a step-by-step guide for safe handling, storage, and emergency response
- Key sections to focus on:
    - Hazard Identification
    - PPE Recommendations
    - First Aid Measures
    - Emergency Procedures

GHS- Global Harmonized System

HCS Pictograms and Hazards

Health Hazard	Flame	Exclamation Mark
		
• Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	• Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides • Desensitized Explosives	• Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazard Not Otherwise Classified (non-mandatory) • Hazardous to Ozone Layer (non-mandatory)
Gas Cylinder	**Corrosion**	**Exploding Bomb**
		
• Gases Under Pressure • Chemicals Under Pressure	• Skin Corrosion/Burns • Eye Damage • Corrosive to Metals	• Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle	**Environment** (non-mandatory)	**Skull and Crossbones**
		
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

Hazard Identification & Classification

Identifying Hazardous Chemicals

Not all hazards are clearly labeled. Watch for unlabeled or transferred containers.

Check the following:

Inventory Lists

Safety Data Sheets (SDS)

Container Labels

Don’t Touch

When in doubt, report and verify first

Chemical Inventory Management

Accurate inventories support:

- Emergency response
- Purchasing control
- Hazard tracking

Keep inventories current and complete

- Chemical name & quantity
- Storage location
- SDS reference
- Expiration or review dates

Chemical Classification

Chemicals are classified by the type of hazard they pose.

- Each class requires specific handling, storage, and PPE. Examples:
  - Flammable – Acetone
  - Corrosive – Sulfuric acid
  - Toxic – Cyanide
  - Reactive – Organic peroxides
  - Carcinogenic – Benzene

Risk Assessment Basics

Always ask: *"What's the worst that could happen?"*

Identify

Pinpoint the chemical and its hazards.

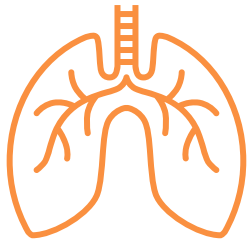
Evaluate

Determine severity of harm (e.g., burns, poisoning, explosion).

Assess

Consider likelihood of exposure (frequency, duration, route).

Exposure Pathways



Inhalation

Skin and Eye Contant

Ingestion

Controls & PPE

Engineering Controls

- First line of defense- control the hazard at the source
- Examples:
  - Fume hoods- contain and ventilate airborne chemicals
  - Local exhaust ventilation (LEV)- capture contaminants at the point of release
  - Sealed transfer systems- prevent spills and exposure during chemical movement

Engineering controls reduce reliance on PPE and minimizes human error

Administrative Controls

Policies and Procedures that reduce exposure risk

Examples:

- Signage and labeling
- Standard operating procedures (SOPs)
- Work rotations and scheduling
- Restricted access to high-risk areas

Only effective if consistently followed and enforced

PPE protects against chemical exposure when other controls aren’t enough.

PPE Overview

Common Types:

- Gloves- chemical –resistant materials (nitrile, neoprene)
- Goggles and faces shield – splash and vapor protection
- Lab coats and aprons – barrier against spills and splashes
- Respirators- protect against inhalation of harmful vapors or dusts

PPE is the last line of defense – use alongside engineering and administrative control.

Proper PPE Selection

Match PPE to specific chemical hazard

Use chemical resistance charts to choose the right glove material

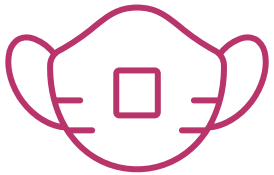
examples

- nitrile gloves- best for solvents like acetone or toluene
- neoprene gloves- better for acids like sulfuric or hydrochloric
- Respirator cartridges- must match vapor type (organic vs acid gas)

Improper PPE = False sense of security

PPE Donning and Doffing Procedures

Follow a step-by-step process to avoid contamination



Donning (putting on):

- Inspect PPE for damage
- Put on in correct order (e.g., gown → mask → goggles → gloves

Doffing (removing):

- Remove contaminated items carefully
- Avoid touching exposed surfaces
- Dispose or clean PPE properly
- Practice regularly — muscle memory matters in emergencies

PPE Inspection and Maintenance

Inspect PPE Before Each Use

- Tears, cracks, worn straps
- Fogged or scratched lenses
- Expired or clogged respirator cartridges

Store PPE properly

- Clean and dry
- Away from chemicals, heat, and sunlight
- In labeled, designated storage areas
- Replace damaged or expired PPE immediately

Safe Chemical Handling Practices

- Use proper tools for measuring, transferring, and dispensing chemicals
- Avoid:
  - Overfilling containers
  - Tasting or sniffing chemicals
  - Improvised equipment
  - Always pour acid into water, never the reverse:
    - "A into W, and you'll be okay"
- Follow SOPs and SDS guidance for each chemical

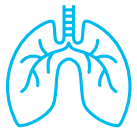
Flammable & Combustible Storage

Store	Store flammable liquids in approved flammable storage cabinets
Keep	Keep containers sealed, labeled, and away from ignition sources
Bond and ground	Bond and ground containers during dispensing to prevent static sparks
Segregate	Segregate from oxidizers and incompatible chemicals
Limit	Limit quantities stored in work areas

Corrosive Storage

- Separate acids and bases to prevent violent reactions
- Use corrosion-resistant shelving and trays
- Store in ventilated, labeled cabinets
- Keep containers sealed, upright, and away from incompatible chemicals
- Inspect regularly for leaks, rust, and label damage

Toxic & Reactive Chemical Storage



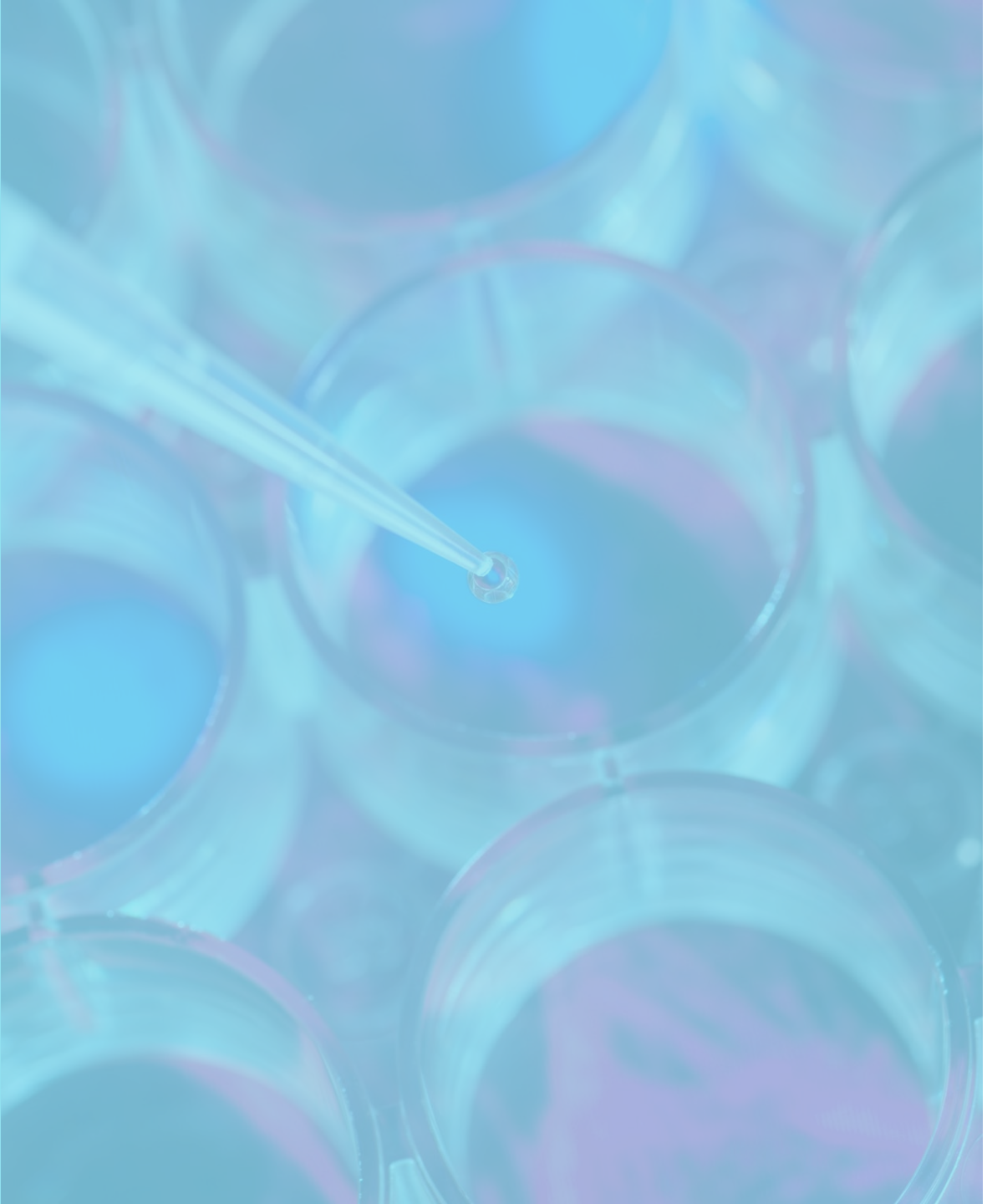
Keep in ventilated cabinets

Stabilize per manufacturer's recommendations

Labeling and inventory management

Emergency Preparedness

Spill & Emergency Response



Spill Prevention

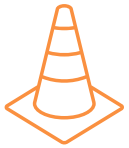
- Effective spill prevention starts with the right equipment
  - Drip trays, secondary containment, transfer funnels
- Clean as you go – avoid build up
- Routine Inspections and Maintenance
- Training and awareness
- Emergency Preparedness

Spill Response Procedures

Evacuate if necessary

Use appropriate spill kit (acid, base, solvent)

Report immediately- never hide a spill



Contain, neutralize and dispose properly

Post-incident Review

Emergency Equipment

- Eyewash: 15-minute flush rule
- Safety Showers: full-body rinse
- Fire extinguishers: know which type works for chemicals

General Best Practices

- Emergency equipment must be easily accessible, clearly labeled, and free of obstructions.
- Conduct regular drills and refresher training to ensure staff know how and when to use each piece of equipment.
- Include emergency equipment locations in site maps and safety orientations.

Chemical Waste Management

1

Label all waste containers

2

Segregate incompatible wastes

3

Proper Storage and Disposal

4

Training and accountability

Use separate containers for:

- Acids vs bases
- Oxidizers vs organics
- Halogenated vs non-halogenated solvents

Transporting Chemicals Safely

- Use carts with lips or containment trays
- Cap containers securely before moving
- Plan your route and minimize risk

Document and review transport incidents to improve future practices

Working with Compressed Gases

- Secure cylinders with chains.
- Never drag — use carts.
- Inspect for damage and leaks
- Valve Protection
- PPE
- Keep away from heat sources
- Proper Storage
- Training and emergency procedures
- Labeling

Why it Matters

Working safely with compressed gases protects both people and property. Incidents involving compressed gases can result in severe injury, fire or explosion – so following these steps is **crucial.**

Inspections & Incident Management

Laboratory – Specific Considerations

- Diverse range of chemicals, even at smaller scale
- Use fume hoods for volatile/toxic substances
- Label all experiments clearly
- Store chemicals safely by compatibility
- Follow proper chemical waste disposal protocols
- Wear appropriate PPE: lab coat, eye protection, gloves
- Know emergency procedures and equipment locations

Workplace Inspections

- Conduct walk-throughs
- Identify and address hazards early
- Involve employees in the process
- Document inspections and actions

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Training & Culture

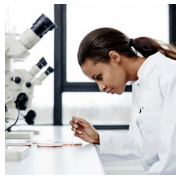
Training and Competency

Hands-on, interactive training for real competency

Regular refreshers—annually and with new chemicals

Training adapts to new risks and procedures

Engaged workforce builds a strong safety culture



Monitor and document training effectiveness

Incident Reporting and Investigation

- Support no-blame reporting culture
- Investigate incidents for root causes
- Use findings to drive safety improvements
- Share lessons learned and corrective actions
- Meet compliance requirements

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Building a Chemical Safety Culture

Safety: an essential part of every job

Recognize and reward safe actions

Positive culture drives continuous improvement

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Recap

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Questions?

Please email additional questions to losscontrol@bhhc.com