# Grad Student Safety Orientation: Chemical Lifecycle

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# Overview

**Understand the Chemical Lifecycle**

**Practice using EH&S/RSS tools**

- UC Chemicals – chemical inventory
- WASTe – waste management

**Awareness of Chemical Segregation and Waste Storage Best Practices**

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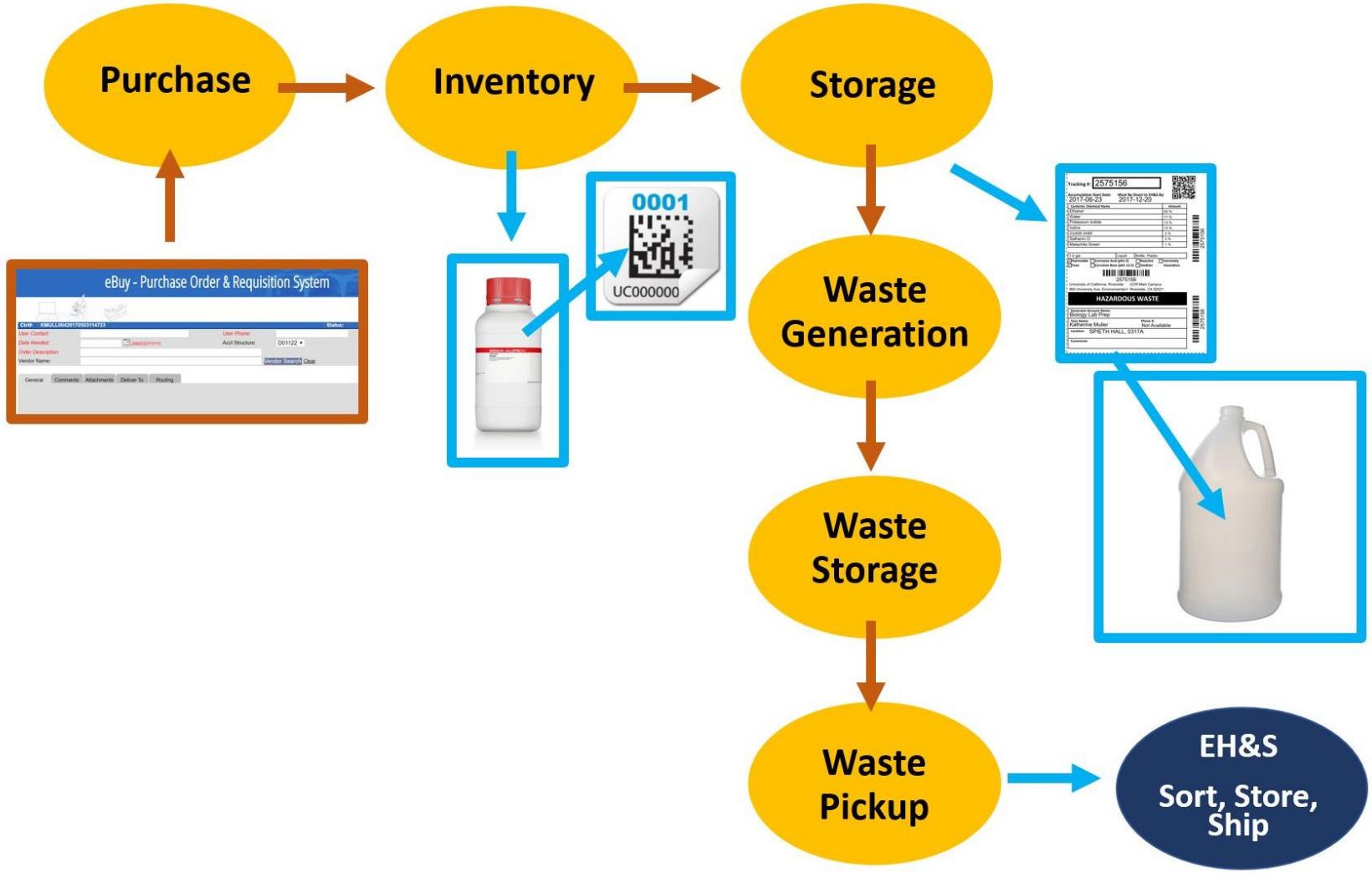
# CHEMICAL LIFECYCLE



# Purchase

## Ordering Chemicals

- The lifecycle of a chemical starts when purchasing
- Only order what is reasonably needed
- Order what can be safely stored and used in the lab
  - Space and facilities considerations
  - Flammable cabinets
  - Refrigerators/freezers

## Ordering process varies by department and lab

- Work with your lab to learn how to order chemicals properly

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eBuy - Purchase Order & Requisition System

View Order

Were you trying to edit this order?

| Ctrl#: | NGONZ02820210301123448 | | Status: | Cancelled |
|---|---|---|---|---|
| Requestor: | | | Transactor: | NGONZ028 |
| User Contact: | | | User Phone: | 22593 |
| Order Description: | chemicals 2/26/2021 | | Quote Number: | |
| Date Needed (MM/DD/YYYY): | 04/12/2021 | Expected Delivery | (MM/DD/YYYY) | |

Order Type: DAPO

Agreement: Lab-Genl Supl.&Chem.-Lg 2nd (VWR)

Vendor: VWR FUNDING INC

Acct Struct: D01054 - Chemistry

Preview

General | Comments | Delivery | Terms | Selection | Misc | PO Vendor | Attachments | Approvals | Routing

| Line | Qty | UOM | Catalog Number | Unit Price | Tax | Tot Amt | Expected Delivery | Action |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Each | BT219260-100ML | 27.040 | Y | 27.04 | | FAU |

Description: PIPERIDINE 100ML

| | |
|---|---|
| Sub Total: | 27.04 |
| + Tax (@8.75%): | 2.37 |
| + Freight: | 0 |
| Grand Total: | 29.41 |

Default FAU

View: by Line Item $ Totals Descriptions

| | Account | Activity | Fund | Function | Cost Center | Proj Code | PC corp | Amt (%) |
|---|---|---|---|---|---|---|---|---|
| 1 | 720150 | A01096 | 29051 | 44 | FCF30 | | | 100.00 |

Approve Purchase Order | Deny Purchase Order | Back To Menu

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# Inventory

## Why should you maintain a chemical inventory?

**Benefits to the lab**

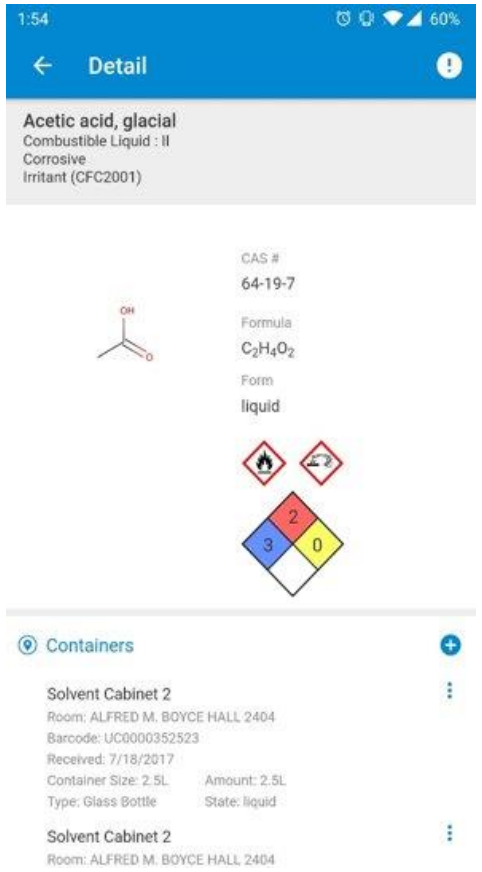
- Keep track of what you have on hand
- Where it is in the lab
- Limit over ordering

**Regulatory Requirements**

- EH&S reports to county, state, and federal agencies using UC Chemicals data

**Hands on practice today with entering chemicals in desktop app**

- Phone app also available for easily working in lab

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# Storage

## Safe Chemical Storage Priorities

### Flammability

- Number one storage priority
- Store in a flammable cabinet

### Isolate

- If it will contribute to a fire, isolate it
- Oxidizers, combustibles

### Corrosivity

- Acids/Bases
- Some acids need separate storage

### Toxicity

- Prevent Release
- Controlled Substances – separate storage

**The basic flow of consideration when setting up chemical storage**

**Not all chemicals will fit neatly into a category**

- Use guides such as the Chemical Segregation Chart for general storage setup
- Consult SDS (Sections 7 & 10) for specific storage requirements and incompatibilities

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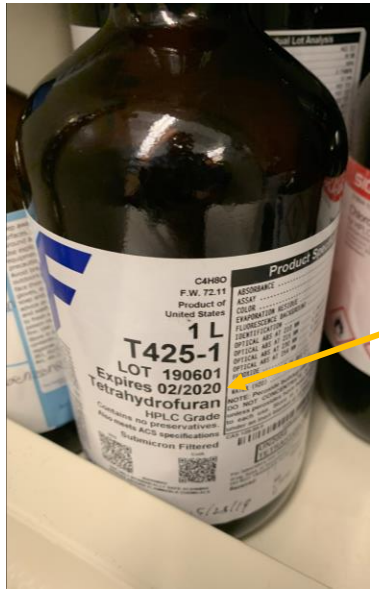
# Storage

Incompatible

Unlabeled




Expired


Lab Freezers


Flammable Storage

## Chemical Segregation Chart

UCR Environmental Health & Safety

This chart assists with proper segregation of chemicals in storage and waste. With all chemicals: **Check the SDS** (Section 7: Handling and Storage, Section 10: Stability and Reactivity) for specific storage requirements. **Label** all storage areas with the hazard present. Use **secondary containment** whenever possible for hazardous chemicals, and is **required** for all waste. Secondary should be large enough to contain **110% of the largest container**. For assistance with chemical storage questions, contact ehslaboratory@ucr.edu, and for all lab and research safety needs, visit ehs.ucr.edu

| Cat. | GHS Symbol | Chemical Hazard | Examples | Storage | Store away from |
|---|---|---|---|---|---|
| Compressed Gas | | Flammable | Methane<br>Acetylene<br>Propane | • Cool, dry area<br>• 20 ft. away from oxidizing gases or separated by 5 ft. high wall with 0.5hr fire resistance<br>• Secure cylinders upright with two chains/straps | Oxidizing gases<br>Toxic gases<br>Oxidizing solids |
| | | Oxidizing | Oxygen<br>Chlorine<br>Fluorine mixtures | • Cool, dry area<br>• 20 ft. away from flammable gases or separated by 5 ft. high wall with 0.5hr fire resistance<br>• Secure cylinders upright with two chains/straps | Flammable Gases |
| | | Poisonous | Carbon monoxide<br>Hydrogen sulfide | • Cool, dry area<br>• Away from flammable gases and liquids<br>• Secure cylinders upright with two chains/straps | Flammable Gases<br>Oxidizing Gases |
| Corrosives | | Inorganic Acids | Hydrochloric acid<br>Sulfuric acid<br>Phosphoric acid | • Separate acid storage cabinet<br>• Use a chemically resistant secondary container<br>• Metal shelves not recommended due to corrosion | Flammables<br>Bases<br>Oxidizers<br>Organic acids |
| | | Organic Acids | Acetic acid<br>Trichloroacetic acid<br>Lactic acid | • Separate acid storage cabinet<br>• Use a chemically resistant secondary container<br>• Metal shelves not recommended due to corrosion | Flammables<br>Bases<br>Oxidizers<br>Inorganic acids |
| | | Oxidizing Acids | Nitric Acid<br>Perchloric acid<br>Chromic acid | • Separate acid storage cabinet<br>• Use a chemically resistant secondary container<br>• Away from flammables and other acid types<br>• Metal shelves not recommended due to corrosion | Flammables<br>Inorganic acids<br>Organic acids<br>Bases |
| | | Bases | Ammonium hydroxide<br>Potassium hydroxide<br>Sodium hydroxide | • Storage cabinet separate from all acids<br>• Use a chemically resistant secondary container | Flammable liquids<br>Oxidizers<br>Poisons<br>Acids |
| Reactives | | Explosives | Picric acid (dry)<br>Tri-nitro compounds<br>Heavy metal azides | • Secure location<br>• Away from all other chemicals<br>• Protect from falls, impacts, and shocks<br>• Contact EH&S for specific guidelines | All other chemicals |
| | | Flammable Liquids | Acetone<br>Benzene<br>Methanol | • Flammable storage cabinet<br>• Separate, dry, cool area<br>• Away from oxidizers and corrosives<br>• Peroxide forming chemicals must be dated when opened | Acids/Bases<br>Oxidizers<br>Poisons |
| | | Flammable Solids | Phosphorous<br>Carbon<br>Charcoal | | |
| | | Oxidizers | Hydrogen peroxide<br>Potassium dichromate<br>Halogens<br>Nitrate compounds | • Non-combustible cabinet<br>• Use a chemically resistant secondary container<br>• Away from flammables | Reducing agents<br>Flammables<br>Organic materials |
| | No GHS symbol | Water Reactive Chemicals | Sodium metal<br>Potassium metal<br>Lithium Metal | • Dry, cool location<br>• Use a chemically resistant secondary container<br>• Label location "water reactive" | All aqueous solutions<br>Oxidizers |
| Other | | Poisons | Cyanides<br>Heavy metal compounds | • Cool, dry area<br>• Well ventilated area<br>• Use a chemically resistant secondary container | Flammables<br>Corrosives<br>*Check Sections 7 & 10 of SDS* |
| | | Skin/Eye Irritants<br>Acute Toxicity<br>Narcotic Effects<br>Respiratory Tract Irritants | Tris Base<br>Dichloromethane<br>Polyvinylpyrrolidone | | |
| | | Carcinogens<br>Mutagens<br>Respiratory Sensitizers<br>Target Organ Toxicity<br>Aspiration Toxicity | Acrylamide<br>Chloroform<br>Formaldehyde | • Secure location, limit access to only trained users<br>• Use a chemically resistant secondary container<br>• Store separate from flammable and corrosive materials to avoid damage to container | Flammables<br>Corrosives<br>*Check Sections 7 & 10 of SDS* |

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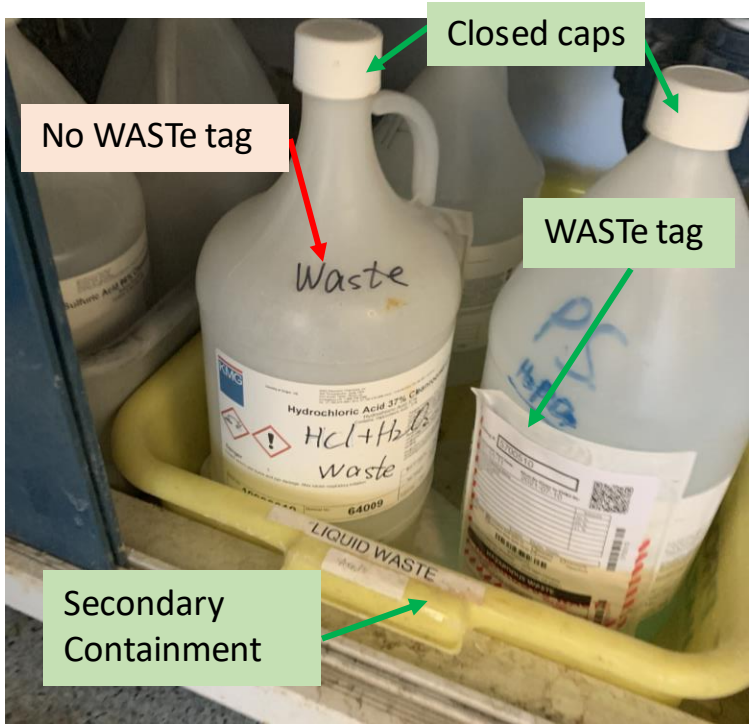
# Chemical Waste

**As soon as one drop of waste is accumulated:**

- Create a label in WASTe and attach to container
- Store waste containers safely

**For Radioactive and Biological waste streams:**

- Follow specific lab procedures
- Keep chem, bio, and rad waste separate




Waste storage practices

Fire from putting hazardous waste in regular trash

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# Today's Activity

**Taking a chemical through its lifecycle**

| Each group needs |
| --- |
| A "chemical" |
| Safety Data Sheet for your chemical |
| |


Barcode your chemicals!

Enter your chemical into inventory

Store Your Chemical Safely

Generate a waste tag for your chemical

Store your waste safely and request a pickup

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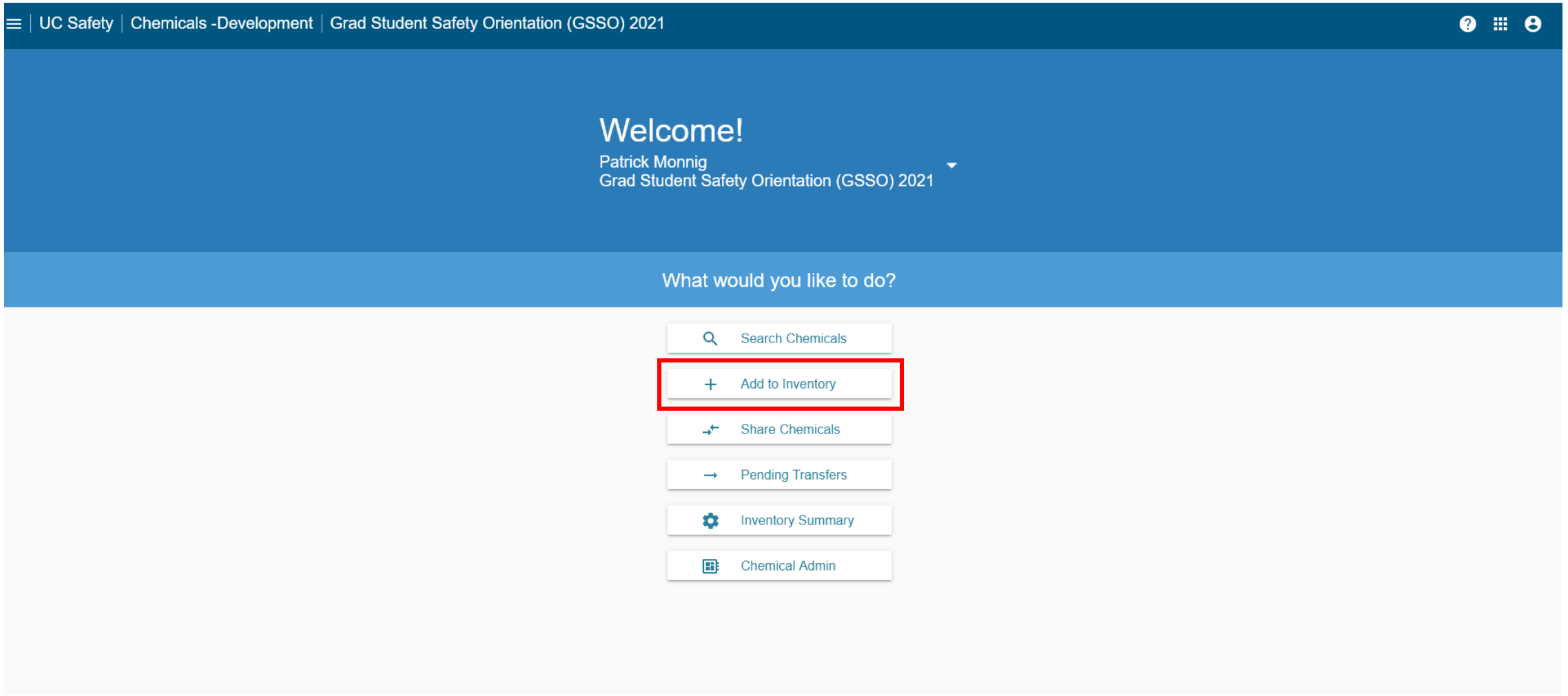
# Chemical Inventory Workflow

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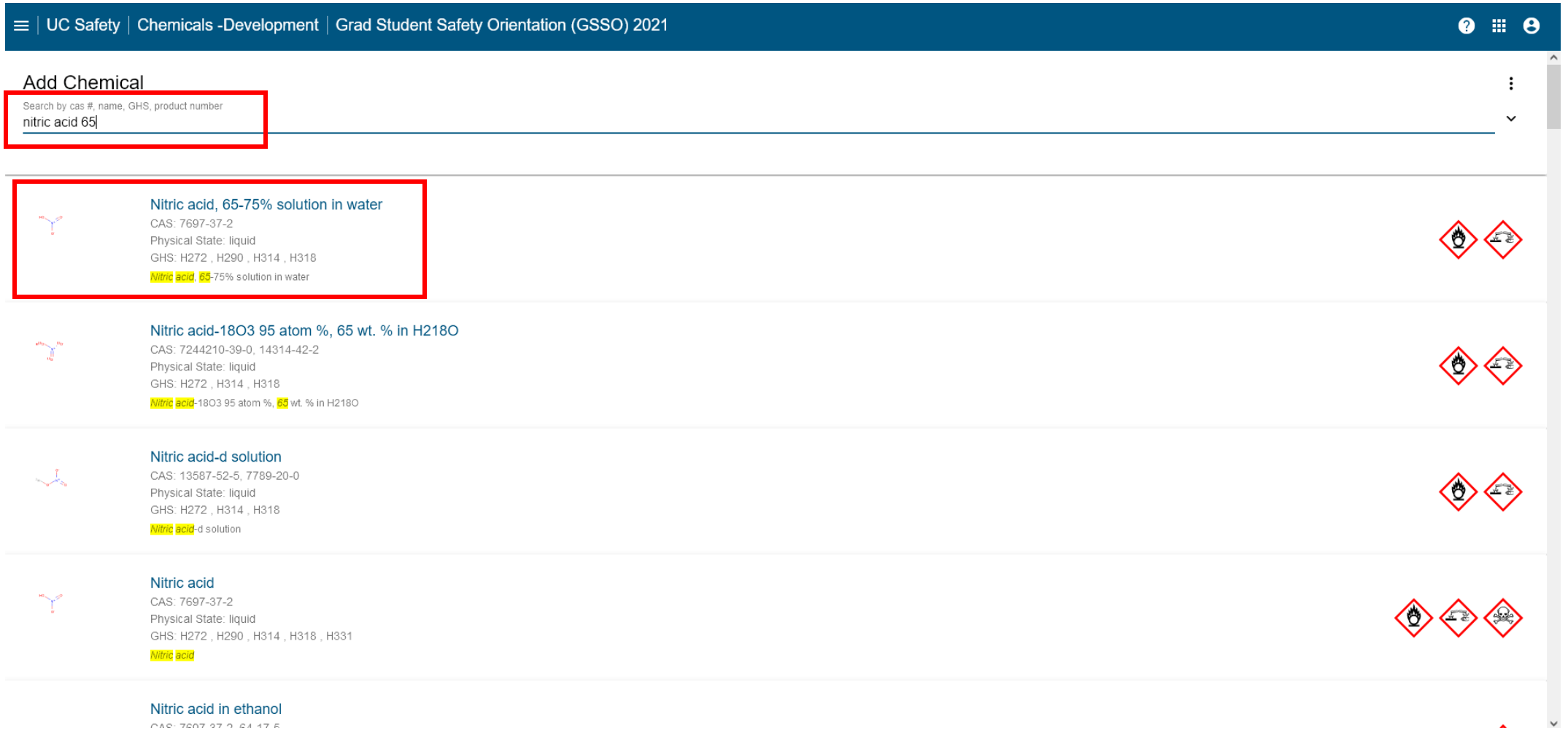
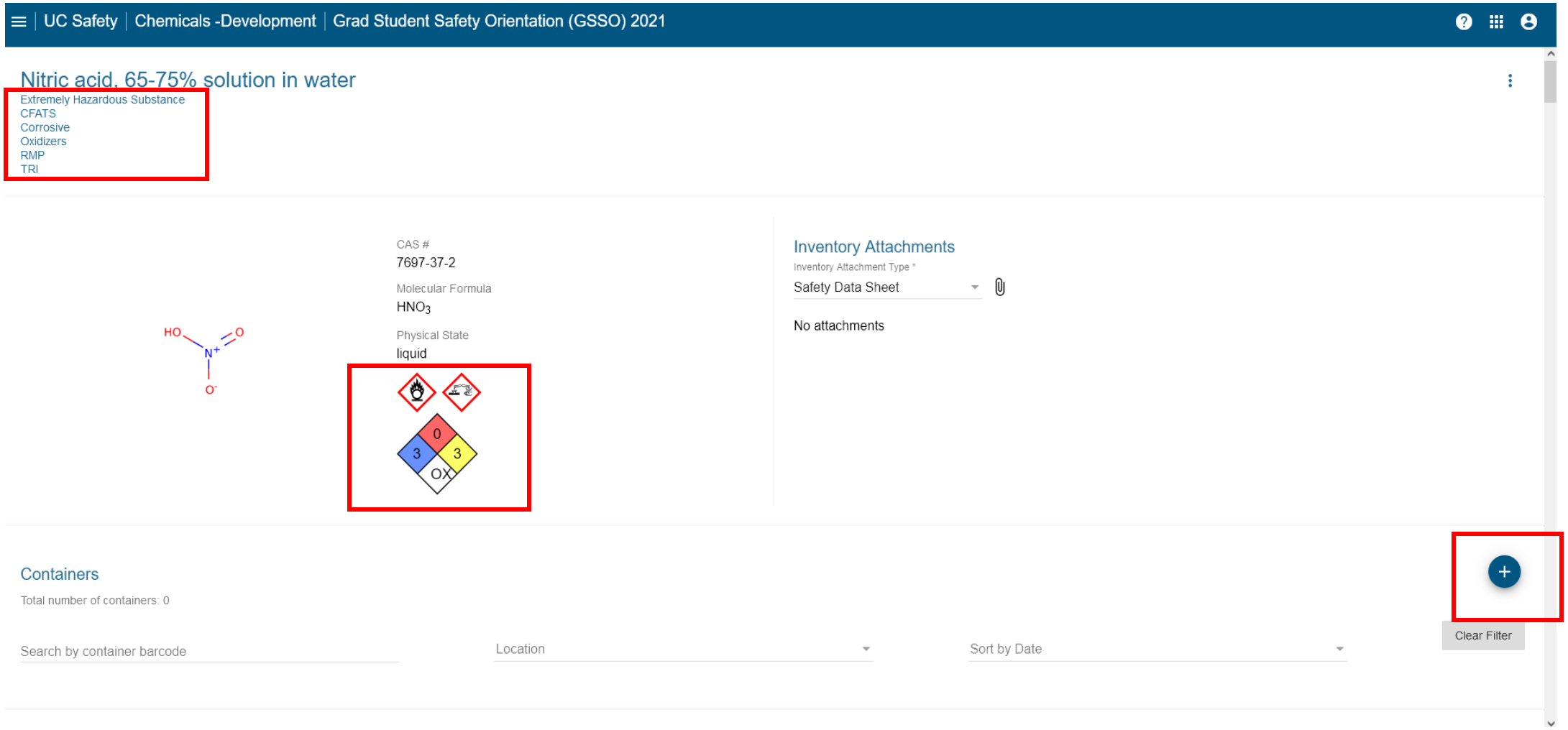


# Chemical Inventory Workflow



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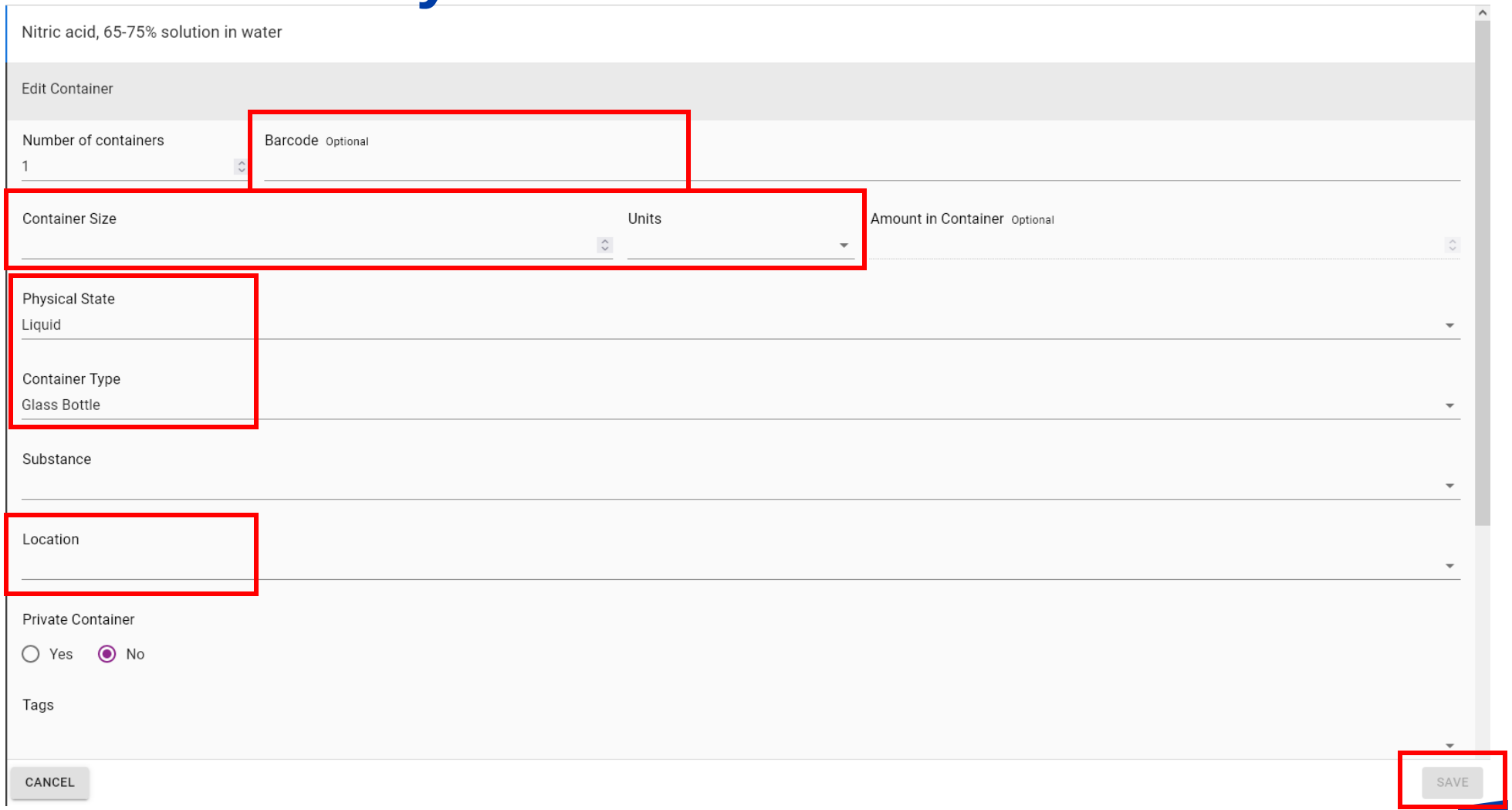


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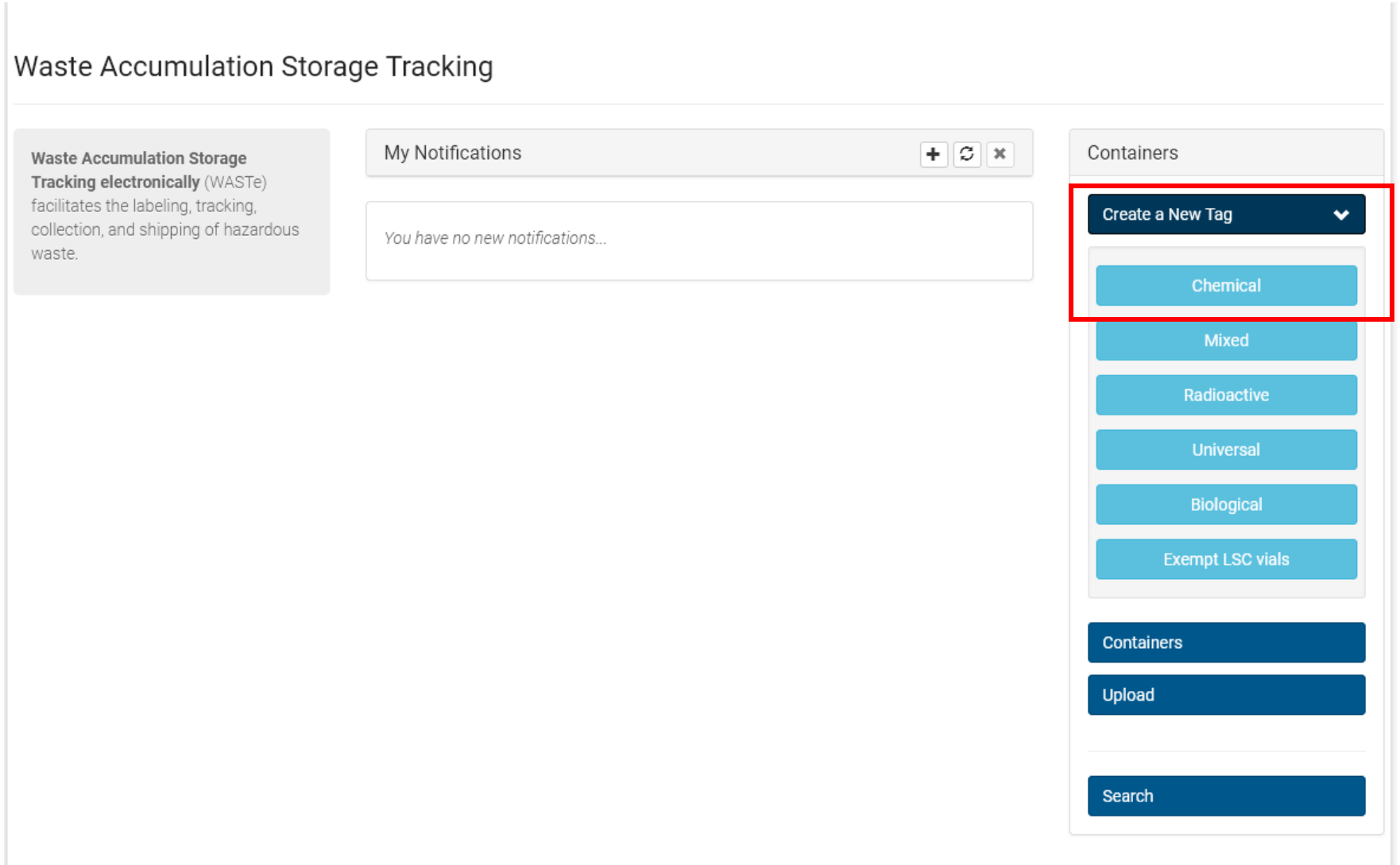
# WASTe Workflow



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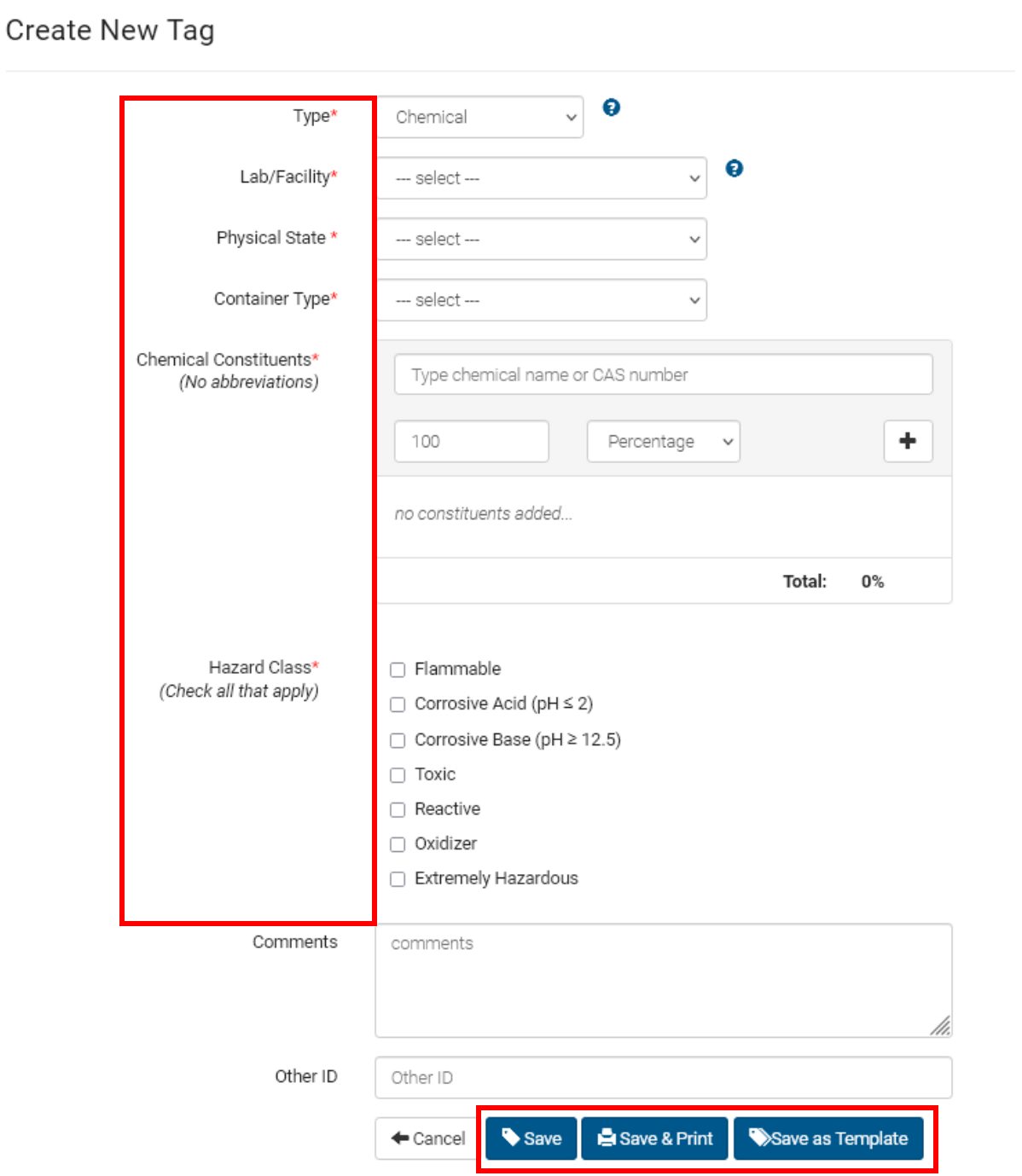


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# Summary

**What did we learn?**

**Chemical Inventory:**

- How to enter a chemical into UC chemicals
- The importance of maintaining an inventory

**Chemical Storage:**

- Proper chemical segregation
- Resources to assist with chemical storage determinations

**Chemical Waste:**

- How to generate a WASTe tag
- How to request a waste pickup

**Have questions? Contact ehslaboratory@ucr.edu**

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