THE UNIVERSITY OF ARIZONA
Sustainability & Climate Action Plan

Establish a Laboratory Chemicals Repository

SUSTAINABILITY COMMITMENT(S) THIS INITIATIVE SUPPORTS

- 1 - Decarbonization
- **3 - Waste Reduction**
- 6 - Responsible Sourcing

INITIATIVE ALIGNMENT WITH THE CHARGE

- Eliminate Emissions: Less emissions are generated by reducing the number of deliveries of new chemicals to campus, in the transportation of waste chemicals to the disposal facility, and in the ultimate destruction of these chemicals by incineration. Reduced chemical storage in laboratories also reduces the combustible load in a building and reduced chemical storage in a building creates less toxic smoke in case of fire.
- Be Actionable: A surplus chemicals repository can be established on campus and publicized.
- Be Data Informed: In the 1990s, Risk Management Services published a quarterly list of chemicals available for redistribution. The requests from the research community kept RMS staff busy with deliveries for two weeks after publication. Lists of the most requested and the least requested chemicals were compiled. The lists helped RMS know what materials would be requested and what materials should go directly to the waste disposal program. A list of requestors was also maintained. A simple security check was performed before delivery. If the requestor was from a department with no chemical usage, the request was denied.
- Inspire Adaptive Management: A chemicals repository allows researchers the option of buying and waiting for delivery or obtaining the chemicals from an on-campus location. Researchers would also have the option of donating materials to the repository and reducing chemical quantities in the lab.

INITIATIVE DETAILS

Initiative Summary

This initiative proposes to reduce chemical waste and associated greenhouse gas emissions at the University of Arizona by establishing a centralized chemicals list and repository. It will minimize waste generated in research departments by designating storage hubs for surplus or incoming chemicals to prevent duplicate orders and promote resource sharing between departments. Actionable items will include:

- Create a centralized chemicals list and repository detailing the inventory and locations of all chemicals used on the main campus, including NFPA classifications for safety compliance.

- Designate central storage locations where researchers can donate unused chemicals or acquire needed ones, aiming to minimize waste, reduce duplicative orders, and enhance chemical safety practices.
- Provide comprehensive training sessions for university researchers on how to effectively utilize the centralized chemicals list and repository, ensuring accessibility and promoting sustainable chemical management practices.
- Communicate clearly about the purpose, benefits, and location of the centralized chemicals list and repository to all researchers, ensuring information accessibility for diverse linguistic and learning needs.
- Plan for future expansion of the centralized repository model to include additional resources and supplies, such as glassware, to further reduce waste and promote sustainable inventory management practices across the university.

Proposed Initiative & Background

University of Arizona researchers purchasing chemicals get better pricing when buying larger quantities than they need for their research. The required amount is used, and the unused portion sits on a shelf for years or is collected by Risk Management Services (RMS) for disposal through the hazardous waste program. RMS is responsible for the disposal of chemical and biological wastes. Research Laboratory Safety Services is responsible for the disposal of radioactive waste. Unopened containers of usable chemicals are collected during lab cleanouts. These unopened containers would be added to the repository inventory. Disposal of still useful chemicals is a waste of the chemical and money spent on packaging, transportation, and disposal. If there are no other options for chemical reuse, or if they have reached their usable shelf life, the ultimate form of disposal is incineration. The university tracks the emissions associated with the incineration of these chemicals and includes that data in the annual Greenhouse Gas Inventory. Reducing the amount of chemicals incinerated through this initiative would help to directly reduce emissions associated with incineration.

Chemicals list and repository: Create a centralized chemicals list showing the inventory and location of all types of chemicals on main campus used by research labs/groups. This initiative can be expanded to other university locations after establishment. The inventory database should also include the appropriate National Fire Protection Association (NFPA) classification to ensure compliance with existing codes and safety guidelines.

Designate central storage locations for researchers to donate chemicals no longer needed or receive chemicals for upcoming research to avoid waste or duplicative orders and to minimize risk in safe chemical storage. In addition, provide training for university researchers on how to use the inventory list and campus repository. The central repository can be located somewhere easily accessible to researchers and with operating hours to accommodate diverse schedules.

Communicate clearly about the location, benefit, and purpose of the centralized chemicals list and repository to ensure all researchers are aware of its existence and benefits. Ensure that this information is accessible to everyone (i.e., including non-native English speakers). Ensure these training courses are inclusive and accessible to researchers with different learning styles and backgrounds.

In the future, this central repository model can be expanded to additional resources and supplies, such as glassware, to reduce waste. Note that this initiative also aligns with initiative RE12, "Lab Consumables and Hazardous Material Inventory."

A chemical repository is feasible and necessary; challenges include finding a host department, location including storage space and containment, and departmental staffing. Ideally, the chemicals would be offered free of charge, however, a surcharge may be required.

Note that if this would create a new policy, then the new University Policy-making Policy from September 27, 2023 would be followed.

Data Analyses to Support Initiative

No relevant data has been generated for years, but historical observations from parties involved show the need for a chemicals repository. Risk Management processes many unopened or partially full containers of chemicals in the hazardous waste program that could still be used. The above-mentioned redistribution list proved the validity and need for a chemicals repository open to the research community. The repository could be patterned after the old Redistribution Program and updated and refined as warranted.

Risk Management does have some records of the amounts of chemicals collected from different labs, transfers, and how much is incinerated each year, but the amount of chemicals that could be reused and redistributed is unknown. Purchasing records could also be collected to benchmark the amount spent on chemicals each year across the university, the number of distributors and where they come from, etc.

Some other universities already have similar centralized systems, e.g., BYU: https://lifesciences.byu.edu/00000172-85a1-db0b-a773-b7ed94b70000/centralized-chemical-inventory-policy-pdf

Resource Requirements & Return on Investment

Resource Requirements

- Additional staffing capacity within RMS to handle centralized tracking, purchasing, distribution, etc.
- Cost for additional storage space. Costs could be increased depending on the storage environment requirements for different chemicals.
- Cost of software for managing supplies.

Return on Investment

- Significant savings could be made by centralizing the purchasing of supplies to one office (RMS), instead of allowing all departments to buy chemicals individuals. This could significantly reduce the amount of chemicals purchased and reduce the amount of product that goes to waste.

- Buying chemicals in bulk through a central contract could also bring down the per unit cost of supplies, creating further savings.
- With orders going to one office and then distributed to labs, there would be less private shipping/delivery vehicles on campus, reducing emissions on campus and reducing congestion.
- Smaller savings could be seen within research departments by freeing up admin staff from dealing with purchasing and administrative tasks.

Potential Funding Sources

- Central administration fees

Accountable Division(s) & Department(s)

- Risk Management Services
- A department that would be willing to host the repository or, ideally, expand the capacity of RMS to enable them to take this on. The host department should be skilled in the use of balances and scales for measuring small aliquots of chemicals.

Partners & Collaborators

- Risk Management Services including Environmental Compliance Technology and the Fire Safety Team as well as Research Laboratory & Safety Services.
- Procurement and Contracting Services
- Other beneficiaries would be users of chemicals in the research community. More broadly, the repository idea may be applicable to other types of materials in research/lab spaces like painting/mixed media work in Fine Arts or Architecture's materials lab.

Implementation

Length of Time to Implement

- Less than one year
- One to five years
- More than five years

Difficulty of Implementation

- Low
- Medium
- High
- Extremely High

Relative Timing

- Begin within two years
- Begin in three to five years
- Begin in six years or later

Metrics for Success

- Amount of chemicals incinerated
- Number of supplies reused/redistributed
- Purchasing budgets
- Administrative staff time savings or increases
- Annual Arizona Department of Environmental Quality (ADEQ) Pollution Prevention report
- Quarterly reports including donations and requests for chemicals could be generated. Requests could include donor and department and requester and department, chemical, and amount.