

**UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
AUDIT & ADVISORY SERVICES**

**Lab Safety – Follow-up
Project # 24-006**

April 2024



University of California
San Francisco

Audit & Advisory Services

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Douglas Dresnek
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Environment, Health and Safety (EH&S)

SUBJECT: Lab Safety – Follow-up Review

As a planned internal audit for Fiscal Year 2024, Audit & Advisory Services (A&AS) conducted a review to validate that actions taken to address the risks identified from a prior review (Lab Chemical Safety & Management, Project #17-039, January 2017) have been sustained.

Our services were performed in accordance with the applicable International Standards for the Professional Practice of Internal Auditing as prescribed by the Institute of Internal Auditors (the "IIA Standards").

Our review was completed and the preliminary draft report was provided to department management in March 2024. Management provided their final comments and responses to our observations in April 2024. The observations and corrective actions have been discussed and agreed upon with department management and it is management's responsibility to implement the corrective actions stated in the report. A&AS will periodically follow up to confirm that the agreed upon management corrective actions are completed within the dates specified in the final report.

This report is intended solely for the information and internal use of UCSF management and the Ethics, Compliance and Audit Committee, and is not intended to be and should not be used by any other person or entity.

Sincerely,

Irene McGlynn
Chief Audit Officer
UCSF Audit and Advisory Services



EXECUTIVE SUMMARY

I. **BACKGROUND**

As a planned audit for Fiscal Year 2024, Audit & Advisory Services conducted a review to validate that actions taken to address the risks identified from a prior review (Lab Chemical Safety & Management, Project #17-039, January 2017) have been sustained.

The prior review identified opportunities for improvement in the management of hazardous chemicals to ensure better compliance with state regulations and the university's Chemical Hygiene Plan. In summary, the specific observations and areas for enhancement of processes were as follows:

Management of Hazardous Chemicals

- Flammable chemicals are not always consistently, appropriately stored in research laboratories.
- There is not an effective tool or method of identifying the aggregate amount of hazardous chemicals stored in university buildings.
- Excessive amounts of hazardous chemicals are being stored in university buildings.
- Compounds that may become explosive were not appropriately labeled.

Compliance with the university's Chemical Hygiene Plan

- Standard Operating Procedures (SOP) were not present for all Particularly Hazardous Chemicals.
- Refresher training of lab employees on proper handling of chemicals was not current.
- Hazardous Chemicals On-line Inventory is neither complete nor updated annually as required.

The Chemical Safety policy (Campus Administrative Policy 550-24) establishes requirements and responsibilities for the safe use of hazardous chemicals in all facilities at UCSF. Under the Office of Research, the Office of Environment, Health and Safety (EH&S) provides expertise and resources to help the UCSF community maintain a safe workplace, ensure safe work practices, and preserve the environment. EH&S is responsible for coordinating implementation of the Chemical Safety policy, and for monitoring and enforcing the chemical safety program at UCSF. EH&S performs quarterly inspections of all UCSF laboratories, recommending safe practices, reporting on findings, and assisting end users to correct unsafe conditions and practices in a timely fashion.

According to the Campus Administrative Policy 550-24: Chemical Safety, Principal Investigators (PIs) and other supervisors have a responsibility for:

- Enforcing compliance with chemical safety policies,
- Ensuring appropriate training is completed by those individuals working under their supervision,
- Ensuring that those individuals wear appropriate personal protective equipment and follow safe procedures,
- Ensuring timely correction of identified hazards in their areas, and
- Ensuring a current chemical inventory is reported to EH&S on an annual basis.

Non-compliance with lab safety policies and protocols may increase the risk and severity of lab accidents and expose laboratory personnel to potential health hazards.

II. AUDIT PURPOSE AND SCOPE

The purpose of this review was to validate that the actions taken to address risks identified in the prior review (audit report dated January 2017) have been addressed and sustained. The scope of the review included processes and procedures regarding:

- lab personnel training
- inventory records management
- storing hazardous chemicals and monitoring time-sensitive chemicals

Procedures performed as part of the review included interviews of EH&S personnel to understand departmental processes, a review of the university's Chemical Hygiene Plan and other guidance regarding chemical management, a review of the online chemical inventory, and inspections conducted with EH&S personnel for a sample of research laboratories. For more detailed steps, please refer to Appendix A.

Work performed was limited to the specific activities and procedures described above. As such, this report is not intended to, nor can it be relied upon to provide an assessment of compliance beyond those areas specifically reviewed. Fieldwork was completed in February 2024.

III. SUMMARY

EH&S's policies and practices to conduct lab inspections appear to be effective. EH&S regularly reviews lab process in the areas of personnel training on chemical hazards and appropriate safety procedures, and appropriate chemical storage. Additionally, EH&S has migrated UCSF's online chemical inventory system to UC Chemicals¹. Finally, UCSF opened ChemCentral² chemical management program in selected buildings. This service offers research labs a centralized chemical stockroom to help reduce the amount of hazardous chemicals stored in individual research labs.

Opportunities for improvement exist in the areas of certification of online chemical inventory by labs and segregation of incompatible chemicals in shipments from the centralized stockroom.

The specific observations from this review are listed below.

1. Several online chemical lab inventories have not been certified on an annual basis as required, and some labs have not been certified at all.
2. Incompatible chemicals were left in a lab's drop zone upon delivery by ChemCentral.

¹ UC Chemicals is an on-line inventory management system for recording inventories of hazardous chemicals at UCSF.

² ChemCentral provides comprehensive chemical management to select UCSF buildings. This includes onsite stockrooms for common research materials, and central receiving, unpackaging and inventory of all chemicals.

IV. **OBSERVATIONS AND MANAGEMENT CORRECTIVE ACTIONS (MCAs)**

No.	Observation	Risk/Effect	Recommendation	MCA
1	<p><i>Several online chemical lab inventories have not been certified on an annual basis as required, and some labs have not been certified at all.</i></p> <p>As of November 2023, UC Chemicals has 586 research lab inventories: of these, 75 (13%) inventory certifications were either out of date (62 inventories, 11%) or had no inventory certification at all (13 inventories, 2%). Per discussion with management, there were several causes for the inventories being past due certification or not certified:</p> <p>Of the 62 with out-of-date inventory certification:</p> <ul style="list-style-type: none"> • 25 labs either closed, are closing, moved, or the PI retired. In these situations, all chemicals would be either transferred to another lab or disposed of. • 31 labs had no reason provided for out-of-date inventory certification. • 3 labs were issued an advisory by EH&S during the 4th quarter 2023. • 1 lab with missing certification was overlooked and not noted during the EH&S inspection. • 1 lab did not have a Department Safety Advisor until recently. • 1 lab subsequently certified their inventory on 11/24/2023. 	<p>Comprehensive, accurate and current inventories of hazardous chemicals provide greater safety and better compliance. An accurate inventory is necessary to effectively evaluate hazards in university buildings. Furthermore, an accurate inventory is also essential to ensure the safety of first responders who may need to enter UCSF buildings in case of a fire or medical emergency.</p> <p>Absent an inventory such as this, the connection between the chemicals stored in university buildings, their hazards and associated safety information cannot be made.</p> <p>Additionally, the campus can be fined if it does not provide an</p>	<p>To help establish and maintain confidence the accuracy of chemical inventories, EH&S should periodically evaluate all chemical inventories included in UC Chemicals to determine if they have been certified on an annual basis.</p> <p>Additionally, those inventories where the labs have closed or where the PI has retired should be cleared out and removed from the online inventory system.</p>	<p>Actions:</p> <p>(a) EH&S Chemical Safety will implement an annual check on inventory certification dates and follow up on campus laboratory inventories with out-of-date certifications.</p> <p>Target Completion Date: 06/01/2024</p> <p>(b) EH&S Chemical Safety will coordinate with the relevant safety officers to recertify inventories for non-lab areas.</p> <p>Target Completion Date: 10/01/2024</p> <p>(c) EH&S Campus Safety will update their Lab Clearance Checklist to include a requirement to inform the Chemical Safety Officer of</p>

No.	Observation	Risk/Effect	Recommendation	MCA
	<p>Of the 13 on-line inventories with no inventory certification:</p> <ul style="list-style-type: none"> • 8 labs were closed, or the PI retired. • 5 labs were new labs with the inventory certification in progress. <p>Additionally, other chemical on-line inventories have not been certified on an annual basis or have not been certified at all. These include:</p> <ul style="list-style-type: none"> • Facilities Chemical Inventories: 22 Locations • LARC Chemical Inventories: 7 Locations • ChemCentral Chemical Inventories: 3 Locations <p>Per the UCSF Chemical Safety Policy (Campus Administrative Policy 550-24, 10/2018) and the UCSF Chemical Hygiene Plan (12/2022):</p> <ul style="list-style-type: none"> • Anyone responsible for an area where hazardous materials are stored is required to maintain a complete chemical inventory in UC Chemicals. • Chemical inventory records must be comprehensively updated (reconciled) and certified annually. 	<p>accurate inventory to emergency response personnel and appropriate regulatory agencies.</p>		<p>retired inventory. This will ensure that Chemical Safety is informed of closed-down labs in a timely manner.</p> <p>Target Completion Date: 07/01/2024</p> <p>Responsible Party: EH&S Assistant Vice Chancellor</p>
2	<p><i>Incompatible chemicals were left in a lab's drop zone upon delivery by ChemCentral.</i></p> <p>ChemCentral chemical management program is in selected buildings offering research labs a centralized chemical stockroom. During our inspection, we noted one lab where ChemCentral delivered chemicals to the lab</p>	<p>Materials should always be segregated and stored according to their chemical family or hazard classification. Separation of incompatible chemicals will reduce the risk of</p>	<p>ChemCentral should review the distribution and transportation procedures for ChemCentral to help ensure that incompatible chemicals are not accidentally</p>	<p>Action: Drop zones in Weill are intended to be transient storage locations. If ChemCentral staff notice chemicals still in the drop zone on their next delivery, they will</p>

<u>No.</u>	<u>Observation</u>	<u>Risk/Effect</u>	<u>Recommendation</u>	<u>MCA</u>
	<p>and left incompatible liquids (flammables and corrosives) in the lab's drop zone which is not in compliance with the UCSF Chemical Safety Policy.</p> <p>Per the UCSF Chemical Safety Policy (Campus Administrative Policy 550-24, 10/2018) and the Safe Storage of Hazardous Chemicals guide (12/2022):</p> <ul style="list-style-type: none">• Storage practices must reflect good housekeeping, including proper segregation of incompatible chemicals.• Flammables should be stored separate from other hazard classes, especially oxidizers and toxics.	<p>mixing in case of accidental breakage, fire, earthquake or lab emergency. Mixing incompatible chemicals during such events could increase the risk the safety hazard.</p>	<p>provided to research labs without adequate separation or other safeguards.</p>	<p>email the lab contact to remind them to immediately move their chemicals out of the drop zone cabinet and cc the EH&S DSA. EH&S will also communicate with labs in Weill, reminding them to promptly move chemicals out of the drop zone cabinet and into their long-term storage location.</p> <p>Action Completed</p>

APPENDIX A

To conduct our review the following procedures were performed for the areas in scope:

- Reviewed UCSF and Environment, Health and Safety (EH&S) policies, including:
 - Chemical Safety, Campus Administrative Policy 550-24
 - UCSF Chemical Hygiene Plan
 - Safe Storage of Hazardous Chemicals
- Interviews and walkthroughs with EH&S personnel to understand their processes.
- Reviewed and evaluated management's processes and procedures for:
 - Conducting lab inspections and remediating noted deficiencies
 - Managing chemical inventories and storage, including the migration and implementation of the UC Chemical inventory system
 - Providing training to lab personnel regarding hazardous chemicals specific to their lab
- Accompanying EH&S personnel during a sample of lab inspections to evaluate the lab inspection and reporting process