# RIVERSIDE: AUDIT & ADVISORY SERVICES

February 27, 2018

To: Albert Vasquez, Executive Director

 Enterprise Risk Management

Subject: Internal Audit of Environmental Health & Safety Laboratory Safety Program

Ref: R2017-06

We have completed an internal audit of the Environmental Health & Safety (EH&S) Laboratory Safety Program in accordance with the UC Riverside Audit Plan. Our report is attached for your review. We will perform audit follow-up procedures in the future to review the status of management action. This follow-up may take the form of a discussion or perhaps a limited review. Audit R2017-06 will remain open until we have evaluated the actions taken.

We appreciate the cooperation and assistance provided by your staff. Should you have any questions concerning the report, please do not hesitate to contact me.

 Gregory Moore

 Director

cc: Ethics & Compliance Risk and Audit Controls Committee

UNIVERSITY OF CALIFORNIA AT RIVERSIDE

AUDIT & ADVISORY SERVICES

MEMBER OF ASSOCIATION OF COLLEGE & UNIVERSITY AUDITORS

INTERNAL AUDIT REPORT R2017-06

ENVIRONMENTAL HEALTH & SAFETY

LABORATORY SAFETY PROGRAM

FEBRUARY 2018

 Approved by:

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**UC RIVERSIDE**

**ENIVRONMENTAL HEALTH & SAFETY**

**LABORATORY SAFETY PROGRAM**

**INTERNAL AUDIT REPORT R2017-06**

**FEBRUARY 2018**

**I. MANAGEMENT SUMMARY**

Based upon the results of work performed within the scope of the audit, it is our opinion that, overall, the Environmental Health & Safety (EH&S) laboratory safety program and related processes should be improved to strengthen internal controls, ensure effectiveness and efficiency of operations, and achieve compliance with University policies and procedures.

The following observations were noted:

1. Not all campus departments with laboratory operations have completed their annual laboratory safety self-assessments. (Observation III.A.)
2. The Chemical Hygiene Plans (CHPs) of some departments have not been reviewed and updated for more than a year. (Observation III.B.)
3. Not all personnel working in UCR laboratories have undergone specific laboratory safety training. (Observation III.C.)

These items are discussed below. Minor items that were not of a magnitude to warrant inclusion in the report were discussed verbally with management.

**II. INTRODUCTION**

 **A. PURPOSE**

UC Riverside Audit & Advisory Services (A&AS), as part of its Audit Plan, performed an internal audit of the EH&S laboratory safety program and related processes to evaluate compliance with University policies and procedures, efficiency and effectiveness of selected operations, and adequacy of certain internal controls.

 **B. BACKGROUND**

The University of California is committed to achieving excellence in providing a healthy and safe working environment, and to supporting environmentally sound practices in the conduct of University activities. It is University policy to comply with all applicable health, safety, and environmental protection laws, regulations, and requirements.

The University's goal is to prevent all workplace injuries and illnesses, environmental incidents, and property losses or damage. Achieving this goal is the responsibility of every member of the University community.

The EH&S Laboratory & Research Safety program incorporates safety guidelines for hazards found in the laboratory setting including chemical safety, radiation safety, biological safety, field research safety, and general safety. EH&S provides oversight of chemical hygiene plans, laboratory manuals, Standard Operating Procedures (SOPs), laboratory audits, and field safety, and coordinates with Laboratory Safety Officers (LSO). The program combines resources for individuals working in research and teaching laboratories. It addresses injury prevention, emergency preparedness, chemical safety, laboratory equipment safety information and links to other laboratory safety programs.

EH&S provides training, guidance, and tools for department personnel to properly conduct laboratory safety self-assessments at least once a year. EH&S aims to monitor the progress of safety self-assessments by all laboratories, compile and analyze data derived from the self-assessment process, and identify and track all significant safety issues until they are resolved. The Lab Safety Audit Specialist maintains information needed to generate the laboratory safety accountability report for departments and campus management.

 **C. SCOPE**

Audit procedures were performed to evaluate whether EH&S laboratory safety management practices and program procedures are adequate and appropriate, operating as intended, and effective and efficient to provide reasonable assurance that campus laboratories are safe and healthy environments for faculty, staff, students, and visitors.

The scope of the audit was limited to program activities during the fiscal year (FY) July 1, 2016 through June 30, 2017 and focused on the following laboratory safety program areas:

**Responsibility and Accountability**

* Reviewed campus management and EH&S announcements, online information, and other communication that convey the importance of laboratory safety, clarify roles and responsibilities for conducting safe work practices, and call attention to compliance with health and safety policies;
* Reviewed laboratory safety accountability reports prepared by EH&S, including underlying summaries, lab safety self-assessment data, and related information. Evaluated timeliness, quality, and effectiveness of reporting.

**Laboratory Safety Audits/Self-Assessments**

* Reviewed laboratory safety audits and self-assessment process narratives, workflow graphics, and plan summaries, and discussed procedural mechanics with the EH&S Research Safety Manager, Laboratory Safety Audit Specialist, and Safety Mentors;
* Reviewed and evaluated the laboratory safety self-assessment database and underlying records for data integrity as well as report accuracy and reliability;
* Reviewed lab safety inspection checklist for completeness. In May 2017, we observed the conduct of two (2) laboratory site inspections by Safety Mentors. Evaluated adequacy and effectiveness of the inspection, reporting, and resolution process as well as responsiveness of lab workers during inspections.

**Chemical Hygiene Plans**

* Reviewed online copies of departmental CHPs as posted in EH&S webpages and verified that CHPs are reviewed or updated annually, in accordance with applicable regulation;
* Verified that all departmental CHPs are accounted for as to existence and to current status and reported correctly in laboratory safety accountability reports;

**Laboratory Safety Training**

* Reviewed existing procedures for identifying personnel who may require general safety training or particular instruction appropriate for the nature of their work and potential exposures in laboratories;
* Reviewed documents supporting EH&S laboratory safety training program activities, including departmental training plans, analyses, and reports;
* Evaluated current training program methodologies and management resources for adequacy, effectiveness, and efficiency.

**D. INTERNAL CONTROLS AND COMPLIANCE**

As part of the review, internal controls were examined within the scope of the audit.

Internal control is a process designed to provide reasonable, but not absolute, assurance regarding the achievement of objectives in the following categories:

\* effectiveness and efficiency of operations

\* reliability of financial reporting

\* compliance with applicable laws and regulations

Substantive audit procedures were performed during March through June 2017. Accordingly, this evaluation of internal controls is based on our knowledge as of that time and should be read with that understanding.

**III. OBSERVATIONS, COMMENTS, AND RECOMMENDATIONS**

1. **Laboratory Safety Self-Assessments**

Not all campus departments with laboratory operations have completed their annual laboratory safety self-assessments. As of April 27, 2017, 444 (55%) of 806 laboratories designated to conduct safety self-assessments during FY 2016-2017 have completed the annual exercise.

COMMENTS

EH&S supports campus departments in the proper conduct of laboratory safety self-assessments, monitors the timely completion of the self-assessments according to annual schedules established by the departments, and compiles information on the status of laboratory safety self-assessments and the resolution of safety issues identified in the process.

Information on the number of research laboratories and the count of laboratories that have completed safety self-assessments as of April 27, 2017 is presented in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| **College / Department** | **Count of Labs (Locations)** | **Count of Labs that Completed Safety Self-Assessment** | **Percent of Labs that Completed Safety Self-Assessment** |
| CNAS |  |  |  |
| Biochemistry | 57 | 36 | 63% |
| Biology | 47 | 11 | 23% |
| Botany & Plant Sciences | 112 | 98 | 88% |
| Cell Biology & Neuroscience | 48 | 12 | 25% |
| Center for Nanoscale Science and Engineering | 4 | 0 | 0% |
| Chemistry | 128 | 121 | 95% |
| Earth Sciences | 23 | 23 | 100% |
| Entomology | 111 | 1 | 1% |
| Environmental Sciences | 34 | 27 | 79% |
| Nematology | 22 | 0 | 0% |
| Physics & Astronomy | 19 | 6 | 32% |
| Plant Pathology & Microbiology | 43 | 18 | 42% |
| CNAS – All departments | 648 | 353 | 54% |
| CHASS |  |  |  |
| Psychology | 18 | 11 | 61% |
| SOM |  |  |  |
| Biomedical Sciences | 47 | 42 | 89% |
| BCOE |  |  |  |
| Bioengineering | 23 | 23 | 100% |
| CE-CERT | 27 | 2 | 7% |
| Chemical and Environmental Engineering | 21 | 0 | 0% |
| Electrical and Computer Engineering | 8 | 6 | 75% |
| Material Science and Engineering | 3 | 0 | 0% |
| Mechanical Engineering | 11 | 7 | 64% |
| BCOE – All departments | 93 | 38 | 41% |
| **UCR – All colleges/departments** | **806** | **444** | **55%** |

In May 2017, EH&S Laboratory Safety Mentors started conducting detailed safety inspections of laboratories, with the goal of inspecting each campus laboratory at least once every fiscal year. As of September 18, 2017, 308 (36%) of 859 laboratory locations across campus have been inspected.

RECOMMENDATIONS

Department heads should ensure that all Principal Investigators (PIs) and/or their designates complete the laboratory safety self-assessment process at least once a year. EH&S should track the status of all laboratory safety issues reported and verify that timely corrective actions are taken. As deemed necessary, EH&S should conduct independent confirmation of selected information reported in safety self-assessments to evaluate the reliability of the self-assessment process.

MANAGEMENT RESPONSE

EH&S Management will work with department heads to ensure all PIs complete the self-assessment process and will keep track of the safety issues reported and verified. The Lab Safety Audit Specialist and Safety Mentors will be conducting follow-up inspections after the self-assessments to ensure confirmation of reported information in the self-assessment process is reliable. EH&S is planning to recruit a Supervising Safety Mentor/Specialist whose job will be to develop and implement processes that will determine accountability within EH&S and ultimately, the campus.

1. **Chemical Hygiene Plans**

The Chemical Hygiene Plans of some departments have not been reviewed and updated for more than a year.

COMMENTS

The California Code of Regulations (CCR) requires that where hazardous chemicals are used in the workplace, the employer must develop and carry out the provisions of a written Chemical Hygiene Plan (CHP) capable of protecting the employees from the health hazards of the work. The CCR also states that employers review and evaluate the effectiveness of CHPs at least annually and update them as necessary.

Based on EH&S records as of April 27, 2017, 7 (32%) of 22 department CHPs have not been reviewed and updated for more than a year.

RECOMMENDATIONS

Department management should ensure that CHPs are reviewed and evaluated for effectiveness and updated at least once a year. EH&S should monitor and report on the status of the annual review and update of all department CHPs.

MANAGEMENT RESPONSE

Chemical Hygiene Plan (CHP)-EH&S Management and specifically the EH&S manager over the area will ensure that the CHPs are reviewed and updated annually as a part of their accountability to the EH&S department and campus. The manager will work with department heads to ensure CHPs are current, updated, and reviewed annually.

1. **Laboratory Safety Training**

Completion of required safety training for all laboratory workers is an ongoing process. At present, not all personnel working in UCR laboratories have undergone specific laboratory safety training.

COMMENTS

The CCR requires that where hazardous substances and processes are present in the laboratory workplace, employers shall provide employees with information and training to ensure that they are apprised of the hazards in their work area. Information should be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. The frequency of refresher information and training shall be determined by the employer.

With a vision to achieving outstanding health, safety, and environmental performance, EH&S provides technical assistance, consulting, and regulatory compliance support to the campus community. EH&S also offers information resources, training, and education opportunities in the subject matter areas of laboratory safety, bio-safety, agricultural/field safety, hazardous waste management, and laser/radiation safety. EH&S may recommend and offer safety training courses to all personnel, but it is up to department management to enforce mandatory safety training for all laboratory workers.

EH&S has been working with departments in maintaining a complete list of laboratory workers with up-to-date information on every individual’s training records, identifying potential hazards and the associated safety risks, and determining appropriate training agenda to help manage those risks.

Based on data compiled by EH&S, information on the number of workers assigned to departments with laboratories and the count of individuals who have taken at least the laboratory safety orientation training, as of June 30, 2017, is summarized in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Department** | **Count of Individuals** | **Count of Individuals Who Completed Training** | **Percent of Individuals Who Completed Training** |
| Biochemistry | 98 | 94 | 96% |
| Bioengineering | 128 | 121 | 95% |
| Biology | 127 | 125 | 98% |
| Biomedical Sciences | 141 | 123 | 87% |
| Botany & Plant Sciences | 331 | 281 | 85% |
| CE-CERT | 91 | 74 | 81% |
| Cell Biology & Neuroscience | 135 | 123 | 91% |
| Central Facility for Advanced Microscopy and Microanalysis  | 2 | 1 | 50% |
| Chemical & Environmental Engineering | 250 | 218 | 87% |
| Chemistry | 410 | 372 | 91% |
| Center for Nanoscale Science and Engineering | 11 | 10 | 91% |
| Earth Sciences | 41 | 36 | 88% |
| Electrical Engineering | 61 | 44 | 72% |
| Entomology | 248 | 220 | 89% |
| Environmental Sciences | 71 | 62 | 87% |
| Mechanical Engineering | 85 | 62 | 73% |
| Nematology | 29 | 27 | 93% |
| Physics & Astronomy | 87 | 83 | 95% |
| Plant Pathology and Microbiology | 154 | 138 | 90% |
| Psychology | 35 | 26 | 74% |
| **UCR – All departments** | **2,535** | **2,240** | **88%** |

RECOMMENDATIONS

EH&S and campus departments should continue working together to maintain a complete and accurate database of laboratory workers and individual training records.

Department management must ensure that laboratory personnel undergo individualized training programs appropriate to the nature of each person’s work as well as the potential hazard exposures and safety risks in the laboratory workplace.

MANAGEMENT RESPONSE

Lab Safety Training – EH&S Management will work with department heads to ensure all PIs provide, complete and document required training. EH&S has recently embarked on a new training program and is working collaboratively with the Center of Excellence (COE) for Training and Education, a UCOP COE. EH&S will verify training completions during inspections and will “re-introduce” the Laboratory Safety Training policy issued by UCOP and effective 10/2013. The policy was not fully socialized to the campus when it was introduced. A directive from the Provost in November outlined the use of the Laboratory Safety Training policy as a starting point for UCR with an expectation it is followed and/or enhanced.