



THE UNIVERSITY
OF BRITISH COLUMBIA

DEPARTMENT OF EARTH, OCEAN AND ATMOSPHERIC SCIENCES (EOAS) INSPECTION REPORT

Submitted to:

Roger Beckie
Department Head
EOAS

Roger Francois and Renee Haggart
Local Safety Team Co-chairs
EOAS

Submitted by:

Teela Narsih
Occupational and Research Safety Associate
Risk Management Services

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October 20, 2017

Dr. Roger Beckie
Department of Earth, Ocean and Atmospheric Sciences
2020-2207 Main Mall
Vancouver BC V6T 1Z4

Dr. Beckie,

Risk Management Services audited research areas in the Department of Earth, Ocean and Atmospheric Sciences (EOAS) within the Earth Sciences Building and the Earth and Ocean Science Main Building from May 15 – July 27, 2017. The goal of the audit was to assess compliance with current provincial and federal health and safety regulations and support the efforts of the EOAS Local Safety Team. Each Principle Investigator (PI) has received an individual inspection report detailing the findings of their lab. All employees have been very cooperative and helpful in taking the time to provide the information necessary to complete the inspection. This is much appreciated, thank you.

Overall, the EOAS department takes safety seriously. The inspection revealed that lab personnel are safety conscious and follow the instructions that they are provided with. To strengthen this positive safety culture, the recommendations from this report can serve an opportunity to continue to improve safety. Oversight of the workshops in the basement of EOAS Main along with documentation of various items listed in this report should be the highest priority and implemented as soon as possible. The inspections revealed that ongoing efforts by the EOAS Local Safety Team are steadily improving safety culture and compliance.

Please provide written acknowledgement of this report within three weeks of receipt. Status updates for items of non-compliance are appreciated, but please note that it is the principal investigators in each lab that bear responsibility for corrective action implementation within individual research spaces or programs. The EOAS Local Safety Team may offer support or track progress but should not be expected to assume this responsibility.

For more information about this report or to discuss any other health & safety related matters, please contact me.

Sincerely,

Teela Narsih
Occupational and Research Safety Associate



PURPOSE

Risk Management Services audited research areas in the Department of Earth, Ocean and Atmospheric Science (EOAS) within the Earth Sciences Building and the Earth and Ocean Science Main Building from May 15, 2017 – July 27, 2017. The goal of the audit was to assess compliance with current provincial and federal health and safety regulations and support the efforts of the Earth, Ocean and Atmospheric Science Local Safety Team.

SCOPE AND LIMITATIONS

Five elements of a safety program were assessed: General Safety (28), General Lab Safety (28), Biological Safety (18), Radiation Safety (23), and Chemical Safety (24). Criteria for each element were created based on regulatory requirements and good industry practices. The total number of criteria for each element is indicated in parenthesis above.

Regulatory Requirements that were used to develop the criteria were:

- WorkSafeBC Occupational Health and Safety Regulation (OHSR)
- Workers Compensation Act (WCA)
- Transportation of Dangerous Goods Regulations (TDG)
- Nuclear Substances and Radiation Devices Regulations (NSRD)
- Radiation Protection Regulations (RP)

For links to these regulatory requirements and other UBC specific links, see Appendix A.

The complete list of laboratory spaces within the Earth Sciences Building and the Earth and Ocean Sciences Main Building was provided by the EOAS Local Safety Team. Thirty six Principal Investigators (PIs) and their laboratory spaces were inspected. Of these, ten principal investigators had laboratory spaces that were strictly equipment and/or computational and 26 had wet laboratory spaces. For those labs that were strictly computational, only the general safety questions were asked. Appendix B lists the labs that were inspected and their classification as wet or equipment/computational. The two workshops in EOAS Main were also inspected.

METHODS

The audit was carried out by conducting interviews, observing research spaces, and reviewing documents



STRENGTHS

GENERAL SAFETY

Within the EOAS Department, majority of the personnel (75%) stated that they would report incidents even if no injury was involved. This 'incident only' level of reporting is vital to prompt corrective action prior to a serious injury occurring. Although some personnel were unfamiliar with how to report incidents through the Centralized Accident Incident Reporting System (CAIRS), they knew who to go to in their department for assistance in reporting.

GENERAL LAB SAFETY

Labs in general have been well maintained. They are free of fire hazards and staff are upholding their responsibility for maintenance and housekeeping. Emergency exits and sprinklers were unobstructed everywhere. Labs are secure and only faculty and lab personnel have access. No Eating, Drinking and Smoking rules are adhered to and there was no evidence of any of this in roughly 80% of the labs. Lab personnel also practice good hand washing making sure to wash them after removing gloves, before leaving the lab, and after handling materials known/suspected to be contaminated.

BIOLOGICAL SAFETY

Only two principal investigators required a biosafety permit and have the permit in good standing. Lab personnel using biological materials were knowledgeable with respect to the required courses and equipment maintenance.

RADIATION SAFETY

Very few labs hold active radiation permits, although those who do have a permit have Intermediate level rooms. Lab personnel using radiation are knowledgeable with respect to the applicable required safe work practices. The required survey meters were calibrated and appropriate exposure control measures are in place.

CHEMICAL SAFETY

Chemicals are appropriately handled with only the minimum amount of chemicals kept in the working area. Ignition sources were kept away from the flammable area and compressed gas cylinders were secured to prevent falling.



AREAS FOR IMPROVEMENT

General areas for improvement within each element for all labs in the Earth Sciences Building and Earth and Ocean Sciences Main Building are described in this section and referenced with the appropriate regulation or good industry practice in parenthesis.

GENERAL SAFETY

Note: Percentages given in this section are based on all 36 laboratories inspected

1) Orientation (OHSR 3.23)

When a new worker starts in the Department of EOAS, it is the responsibility of the Principal Investigator to ensure that their staff and students complete the legally required courses. This is not clearly communicated as some PIs assume that the department is either overseeing this or should be. Some PIs indicated that there needs to be further guidance on what they should communicate to their staff and students. Four labs had heard of The New Worker Safety Orientation course and personnel in these labs had completed Part 1 of the course.

The New Worker Safety Orientation course is a two part course. Part 1 is online and Part 2 is the Site Specific Safety Orientation Checklist. Both parts must be completed. All the labs described that there is a verbal orientation with the new worker showing them their work area.

Unfortunately these verbal orientations are not documented as required and do not cover all of WorkSafeBC's required orientation topics. Without a thorough documented orientation, the department and the University are vulnerable to orders by applicable regulatory agencies, including WorkSafeBC and the Canadian Nuclear Safety Commission.

2) Job-Specific Training and Written Procedures (OHSR 3.23(j), 30.14, OHSR 3.3)

Once a worker commences work in the lab, job specific training is essential to ensure tasks are carried out appropriately and hazards are identified. Written procedures that enable consistent training delivery were available in 19% of the labs. There is flexibility in how job specific training can be documented but none of the wet labs had any documentation.

For field work, different Principal Investigators take different approaches. Some rely on a third party to train their students to the hazards and work in the different environments whereas others train them themselves. Documentation of field work training was also limited.



AREAS FOR IMPROVEMENT (CONT'D)

GENERAL SAFETY (CONT'D)

3) Inspections (OHSR 3.5)

WorkSafeBC requires that “inspections are made of all workplaces...at intervals that will prevent the development of unsafe work conditions.” At UBC it is expected that this requirement will be met by a combinatorial approach of RMS site visits, annual local safety team inspections and regular monthly inspections by lab personnel. From speaking with lab members, 33% of the labs stated that the annual local safety team inspections do occur, and 31% of the labs had documented monthly inspections of their space.

4) EOAS Health and Safety Committee (WCA 130, OHSR 3.23(m))

The purpose of the EOAS Local Safety Team is to ensure workplaces are safe. However, when lab personnel were asked if they knew that this was the committee’s mandate, 39% of the labs were unsure. Also, 50% of the labs did not know a member on that committee. Without widespread knowledge of the committee members and their duties and functions, the committee is not operating to its fullest capacity and safety issues may not be brought forward.

5) First Aid and Emergencies (OHSR 3.23, 3.3, OSHR 4.16(1), WCA 115(2)(e))

The Building Emergency Response Plan (BERP) is reader friendly version of the Fire Safety Plan but also incorporates other emergencies as well. While the document should be updated annually by the safety committee, it should be made available for everyone to access. The BERP was unfamiliar to 53% of the labs and 64% of the labs did not know where to access it. Emergency Procedures were posted in 44% of the labs to indicate actions to be taken during various emergencies like fire, earthquake, spills etc.

Floor wardens play a critical role in ensuring that everyone is out of the building in the event of a fire. However, two thirds of the labs were unable to identify the floor warden for their area. Lastly, calling first aid is a critical step to provide the first level of care and prevent injuries from worsening. Just under half the labs (47%) were not aware of the UBC First Aid System and the number (2-4444) to dial to summon first aid.



AREAS FOR IMPROVEMENT (CONT'D)

GENERAL LAB SAFETY

Note: Percentages given in this section are based on the 26 wet laboratories

6) Laboratory Safety Courses (WCA 117(1)(a), OHSR 3.23(d), TDG 6.1)

When a new worker starts to work in the Department of EOAS, it is the responsibility of the principal investigator to determine which safety courses and training required for their work. Of the 26 wet laboratories, 10 did not have the appropriate laboratory safety courses. The most common situation was that the Chemical Safety Course was not taken by an individual working with chemicals. There were 6 labs who transported dangerous goods without the appropriate training and certification.

7) Inventory (OHSR 5.98)

Access to a current chemical inventory is essential for first responders in the event of an emergency. An inventory must state the name, approximate quantity and storage location and be updated annually. An accurate chemical inventory provides the basis of accurate hazard communication as well as safe chemical segregation and storage. A complete inventory was available in only 7 wet laboratories.

8) Signage (WCA 115 (2)(e))

Laboratory Hazard Door Signage provides emergency responders with a comprehensive view of the hazard classes contained within a laboratory space to determine an appropriate and effective response to emergency situations. It also provides emergency contact information. RMS relies on lab personnel to provide regular update requests to keep this information current. Changes to the signs were required in 92% of the wet laboratories.

The Earth and Ocean Sciences Main Building only has one laboratory hazard door sign present. There are multiple labs in this building with hazards that would warrant the door signage. In addition, many outdated emergency number posters were seen throughout the building that had the Hazardous materials response number listed as 2-4567 which is incorrect. All these posters should be replaced with signage indicating that the correct number to call is 911.



AREAS FOR IMPROVEMENT (CONT'D)

GENERAL LAB SAFETY (CONT'D)

9) Eyewash Facilities (OHSR 5.93 (2))

Eyewash facilities are required to be tested monthly but it was found that 89% of the labs do not carry out a documented monthly test. While Plant Operations tests all the eyewash stations on an annual basis this is not sufficient to meet regulatory requirements.

10) Spill Kit (OHSR 5.101(c))

It is essential that there is an appropriate spill kit available for the hazardous substances used in the lab and it contains the necessary items. It was found that roughly two thirds of the labs either did not know where the spill kit was located or the spill kit in their lab was incomplete.

11) Personal Protective Equipment (OHSR 5.83, 8.9)

At UBC, when an individual walks in a lab, the minimum PPE that should be worn is: Lab coat, long loose fitting pants and fully covering liquid resistant shoes, however this was not observed in two thirds of the labs. Instead, lab coats are not always worn when working in the lab because certain work is considered “not hazardous” while other labs have established that it is “OK” to wear shorts. It was also noted that education around PPE requirements is provided using a reactive approach as opposed to proactively orienting the staff and students to the requirements.

Since incidents and accidents are by definition unplanned, it is essential that minimal PPE is always worn in laboratory space. This includes visitors to the space. It was noted that 73% of the labs indicated they had spare lab coats for visitors but the RMS Associate inspecting the labs was not offered a lab coat at any of the labs.

Respirators were observed in 11 labs but the individuals in those labs were not fit tested. Majority of the labs had the N95 respirators but were unaware that these were classified as respirators and they needed to be fit tested as well.



AREAS FOR IMPROVEMENT (CONT'D)

BIOLOGICAL SAFETY

12) Biosafety Permit

There are two PI's who have a biosafety permit in the EOAS Department but did not have it posted in the approved rooms where the biological material was used and/or stored. Biosafety permits must be posted in the lab as stated on the certificate itself. For more information on Biosafety permits, click [here](#).

RADIATION SAFETY

13) Radiation Permit

There are five radiation permit holders within the EOAS Department and four did not have their most recent permit posted in rooms where radiation is used/handled. It is essential to post the permit as it indicates what the specific lab is permitted for in terms of isotopes, quantities and authorized personnel.

14) Radiation Records (NSRD 36(1)(b)(c), (1)(d), (2))

An up to date record of radioactive inventory is essential. The first step in this process is to indicate the date the vial is received on the online system. It was found that 3/5 radiation labs had not updated this system to reflect this information. Training Certificates were not present in 3/5 labs to indicate that the authorized users of radiation had successfully completed the training. The CNSC regularly inspects laboratories to ensure the appropriate documentation is available and lines up with the work occurring in reality in the laboratory.



AREAS FOR IMPROVEMENT (CONT'D)

CHEMICAL SAFETY

Note: Percentages given in this section are based on the 26 wet laboratories

15) Labelling (OHSR 5.10)

When chemicals are transferred from their original container or new solutions are prepared, three pieces of information required on a workplace label: Name, Safe Handling Instructions, and Reference to SDS. It was found that in 69% of the labs, only the name is written on the workplace label. The product name should match what is found on the safety data sheet. This means that using chemical formulas to identify the product is not appropriate. A template for workplace labels can be found on the [RMS Website](#)

16) Storage Cabinets (OHSR 5.24)

The labs in the Earth Sciences Building commonly have fume hoods with cabinets underneath that are prelabelled as “Danger Acids.” This is not always correct as chemicals other than acids are stored in these cabinets and in some cases, the cabinets were used as general storage and not for chemicals at all. In the Earth and Ocean Sciences Main Building, cabinets are either not labelled or labelled incorrectly. Overall, 58% of the wet laboratories have incorrectly or unlabeled storage cabinets. Labelling cabinetry by hazard class prevents storage of incompatible chemicals together.

17) Storage of Chemicals (OHSR 5.24)

Incompatible hazard classes were observed to be stored together in one third of the wet laboratories. Most commonly, this was flammables stored with oxidizers. Issues with storage can be identified when an annual inventory is completed.



AREAS FOR IMPROVEMENT (CONT'D)

WORKSHOPS IN EOAS MAIN ROOM 20 (Prep Room/Rock Saw Room) and ROOM 24A (Crushing Room)

On July 12, 2017, an inspection of Room 20 and 24A was conducted by Teela Narsih, Occupational and Research Safety Associate and Lori Takenaka, Occupational Safety Associate. Tim Morgan, Assistant Director: Facilities, of the Earth Sciences Buildings showed us the rooms. The areas for improvement listed below were identified by combing information from the July 12 inspection, email conversation with the Engineering Technician/Machinist and the 36 lab inspections within the Department of EOAS.

18) Maintenance (OHSR 4.3, 5.67)

Room 20 and 24A are shared spaces without a designated personnel who oversees the space. As a result, regular documented inspections of the space and the equipment are not conducted. It is also not widely known across all the PIs within the department of EOAS that there is no “responsible person” for these rooms.

It was observed that Room 20 and 24A in EOAS Main contained equipment and machinery that requires to be inspected, tested, repaired and maintained in accordance to the manufacturer's instructions and any applicable standard found in the OHSR. These requirements would include pre-operational inspections and adhering to the maintenance scheduled as stated in the manufacturer's manual. The manuals for all the equipment were not found within these rooms. Documentation for when maintenance was performed is kept through the internal EOAS machine shop ticketing system. However, this is a reactive approach as it only details items that required attention and does not detail the checklist criteria that was inspected during a thorough preventative maintenance inspection.

Some labs brought forward issues like the dust extractor system does not have a sufficient capacity. Others indicated that drainage of water and water supply is not sufficient while others have mentioned that electrical safety is an issue. These items can be brought forward through scheduled preventative maintenance of the equipment.



AREAS FOR IMPROVEMENT (CONT'D)

WORKSHOPS IN EOAS MAIN (CONT'D)

ROOM 20 (Prep Room/Rock Saw Room) and ROOM 24A (Crushing Room)

19) Inspections (OHSR 3.5, 4.42)

Fire Extinguishers require a monthly inspection. The nearest fire extinguisher to Room 20 and Room 24 were outside the rooms and due for service July 13, 2017. Housekeeping in Room 24 had a lot of dust accumulation.

Eyewash facilities are required to be tested monthly. The nearest eyewash station and emergency shower was located by EOAS stores and it was found that the last annual test inspection was carried out by Plant Operations on May 23, 2017. While Plant Operations tests all the eyewash stations on an annual basis this is not sufficient to meet regulatory requirements. There is no tag to show that a monthly inspection was completed.

Compressed air was present next to the eye wash facility but the usage was unknown. If it is used for cleaning, the appropriate controls need to be in place and meet the criteria listed in OHSR 4.42.

20) Orientation and Training (OHSR 3.23, 30.14)

There are a wide variety of personnel who use rooms 20 and 24A however they are not all trained in a consistent manner. The lab inspections revealed that some PI's train their students on the equipment themselves, while others coordinate training with the Engineering technician/Machinist, and others assume there is a responsible individual overseeing the rooms so they direct their students to go to the rooms where they will meet a "responsible individual who oversees the workshop" who will train them. In addition, safe operating procedures for the various equipment and machinery are not available.

Since training is conducted by multiple personnel without clear documented procedures, it is difficult to determine if everyone is using the equipment in a safe, correct, and consistent manner. In addition, it is unclear if the personnel who are providing the training also orient the individual to the space and show them locations of fire extinguishers, eye wash station, emergency exit, emergency numbers etc.



AREAS FOR IMPROVEMENT (CONT'D)

WORKSHOPS IN EOAS MAIN (CONT'D)

ROOM 20 (Prep Room/Rock Saw Room) and ROOM 24A (Crushing Room)

21) Personal Protective Equipment (OHSR 8.4)

The PPE required for using the various equipment is not clearly communicated through signage or written procedures. This means that the same PPE is not consistently worn by everyone using that equipment since this is dependent on what the trainer communicates to the trainee.

There was conflicting information received for room 24A with respect to the need for respirators. Some indicated it was mandatory in the area while others said it was simply “nice to have.” The sign on the Room 24A did not indicate the need for respirators. Almost half of the wet laboratories had respirators for use in these rooms but the users were not fit tested with these respirators. Many had the N95 respirators but were unaware that these were classified as respirators and they needed to be fit tested as well.

22) Working Alone (OHSR 3.23(e), 4.20.2)

Throughout the inspections, it was established that the rooms are used after hours. A worker working after hours in one of these rooms would qualify as working alone. In this scenario, a working alone risk assessment is required to assess the hazards but was not conducted. A procedure for checking in on a worker working alone after hours is also required but not available. The entrance to Room 20 indicates to “Follow UBC’s Work Alone Policy when you are the only one in the lab.” However, the users of the room were unfamiliar with the document and it was assumed that the [RMS Working Alone or in Isolation Guidelines](#) were being referenced. This document details the requirements of a working alone procedure but is not the procedure itself.



AREAS FOR IMPROVEMENT (CONT'D)

WORKSHOPS IN EOAS MAIN (CONT'D)

ROOM 20 (Prep Room/Rock Saw Room) and ROOM 24A (Crushing Room)

23) Signage (WCA 115(2)(e))

A Laboratory Hazard Door Sign was not present on room 24A which has ethanol. Door signs help identify hazard information to first responders in the case of an emergency.

First aid and emergency contact information poster was posted within these rooms but certain names and numbers were not up to date. Without up to date numbers, workers in the area would not receive the prompt response required during an emergency.

There is a sign in sheet posted on the door to Room 20 and 24A to indicate who uses the room but it is not consistently filled out so it does not provide accurate information.

Room 20 and 24A both have PPE requirements written on the door but according to interviews with several labs that use the space, the posted requirements differed from what was used in practice in the rooms.

24) Lockout (OHSR 10.4, WCA 115(2)(e))

A procedure for locking out the equipment needs to be made available however, there are no documented lockout procedures. Once procedures are established, personnel who will be performing maintenance on equipment requiring lockout need to be trained on these procedures. Currently, the individual who performs maintenance on the equipment is well versed in lockout principles but has not had formal UBC lockout training.

25) Ladders (OHSR 13.4, 13.5)

Two wooden step ladders without duty or load ratings were present in Room 24A. The ladders were unstable and had poor footings and one ladder had a broken section. The purpose of the ladders in the space was unclear as there were no tasks that would require use of a ladder.



RECOMMENDATIONS

Recommendations in this section are numbered identical to the “Areas for Improvement” Section so the same number corresponds to the same topic. The recommended group/individual responsible for carrying out the recommendation is listed in parenthesis.

- 1) Create a systematic process for having new lab personnel complete the required “New Worker Safety Orientation” as well as other [UBC Mandatory Courses](#) for all UBC workers. The process must be robust to ensure that personnel are in fact completing the courses. This can be on the department level where a form is provided to the new workers which indicates the courses that need to be completed prior to gaining independent access to the lab (keys). Completion in this case means that the required courses have been completed, certificate numbers indicated on the form, form signed by PI and the new worker, and the form is returned to the Earth Sciences Admin Office. This can also be accomplished at the PI level where each PI has a similar form, ensures all their students have completed the required training, keeps training records at the level of the lab. *(To create the form – Earth Sciences Local Safety Team)*

Instruct personnel to complete the online portion of the New Worker Safety Orientation Complete and print out Part 2: Site Specific Orientation document and go over it with the individual (undergrad, grad, visitors) and have a copy available in the lab. *(PI of the lab)*

- 2) Written procedures should exist for critical tasks with an element for safety included in it if not already present. A safety component of a procedure/protocol includes what PPE to wear, training required or when engineering controls are to be used. To identify a critical task, select the job, break the job down into a sequence of steps, identify hazards at each step, and then determine preventive measures. If there are no preventive measures or minimal measures, write a procedure. *(PI of the lab and/or lab personnel)*

For existing procedures numerous methods can be used in order to document that personnel have been trained on those procedures. Procedures may be numbered or named, and then referred to on a training records document indicating which procedures an individual has been trained on. For each procedure, the date trained and the signatures of the trainer, and trainee would be required to satisfy documentation requirements. Where procedures are written directly into lab books, signing and dating the lab book by the trainer and trainee would suffice. *(PI of the lab)*

For field work, create a list of courses that a student has to take or topics covered by the PI with the student in the form of a training log. If courses are taken by outside companies, keep a syllabus and create a training log. *(PI of the lab)*



RECOMMENDATIONS (CONT'D)

- 3) Inspect Laboratory spaces on a monthly basis to prevent development of unsafe conditions. The [RMS Monthly Inspection Checklist](#) can be customized to fit the specific needs of the lab. For example, testing emergency eye wash stations and checking the spill kits to ensure they contained all the necessary items would be included as a line items.
(To customize the checklist – EOAS Local Safety Team or PI of the lab. To carry out the checklist – PI of the lab and/or lab personnel)

- 4) Communicate topics discussed at local safety team meeting at individual group meetings, faculty meetings, lab manager's meetings etc. *(EOAS Local Safety Team)*

Communicate to new workers during their Site Specific Orientation, the names of the people on the EOAS Local Safety Team or where they can be found and their role on the committee.
(PI of the lab)

- 5) Post sections of the Building Emergency Response Plan (BERP) in the lab that contain procedures on how to respond to different emergencies. Communicate the location and contents of the BERP during the site specific orientation to lab members. Also, during that orientation, walk the individual around the space and show them emergency equipment including the location of emergency shower, eye wash station, fire extinguisher, pull station, and posted emergency procedures. Lastly, during that orientation educate the individual on how to contact First Aid and current Floor warden for the area. Document things shown and topics discussed on the orientation form. *(PI of the lab)*

- 6) Instruct personnel working with chemicals to take the “Chemical Safety Training” course
(PI of the lab)

Instruct UBC personnel purchasing, importing, preparing for shipment, shipping, handling, or receiving dangerous goods, to take [TDG training](#) as it is a mandatory requirement for anyone in that role. Instruct UBC personnel working with chemicals to take the Chemical Safety Course. *(PI of the lab)*

- 7) Complete an annual chemical inventory that contains all 3 pieces of information (name, location and approximate quantity). Printed copies must indicate the date the document was last revised. Ensure lab personnel know where the inventory is located and requirement to annually update. Once updated, it should be compared to the lab door hazard sign and a [Laboratory Hazard Signage Form](#) should be completed to request any changes.
(PI of the lab, and/or lab personnel)



RECOMMENDATIONS (CONT'D)

- 8) Communicate the importance of updating the [Laboratory Hazard Signage Form](#) when there are changes in hazards and emergency contact personnel.

Remove the emergency number posters throughout the EOAS Main building and replace them with the [UBC Emergency & Safety Contacts Poster](#) and the [UBC Vancouver Occupational First Aid Poster](#).

- 9) See Recommendation 3.

- 10) See Recommendation 3.

- 11) Communicate the PPE requirements for the lab proactively whenever someone new starts in the lab as a part of their orientation to the lab. Educate anyone who requires a respirator that a fit test is required and can be obtained through [RMS](#). *(PI of the lab and/or lab personnel)*

- 12) Post Approved Biosafety Permit(s) in all approved rooms. *(PI of the lab)*

- 13) Post Approved Radiation Permit(s) in all approved rooms *(PI of the lab)*

- 14) Update the [Radiation Purchasing/Inventory System](#) to accurately reflect current inventory. Print out Radiation training certificates and keep a copy in the Radiation Records Binder. *(PI of the lab and/or lab personnel)*

- 15) Create [workplace labels](#) with all three pieces of information: product name, safe handling instructions and reference to SDS. The product name should match what is found on the safety data sheet. This means that using only chemical formulas to identify reagents is not appropriate. *(PI of the lab and/or lab personnel)*

- 16) Label all storage cabinets with the class of hazards stored within that cabinet. Use secondary containment in the following situations:

- Carcinogens
- Environmental Toxins
- Segregating Acids from Bases in the same cabinet
- Corrosives stored in the Flammable Cabinet

(PI of the lab/lab personnel)

- 17) Consult the inventory before storing new chemicals in cabinets to verify that incompatible classes of hazards are not being stored together *(PI of the lab and/or lab personnel)*



WORKSHOP RECOMMENDATIONS

Recommendations in this section are numbered identical to the “Workshops in EOAS Main” sub heading under the “Areas for Improvement” Section so the same number corresponds to the same topic. There are no recommended groups/individuals listed who are responsible for carrying out the recommendations as this would best be decided by the department as a whole for this shared space.

18) Communicate the location of the manufacturer’s manual for each equipment to the user.

Perform preventative maintenance on the equipment/machinery as per the manufacturer’s manual.

19) Conduct monthly inspections of the area to identify unsafe conditions. [The LST General Inspection Template](#) can be customized to fit the needs of the space. For example, testing emergency eye wash stations inspecting fire extinguishers would be included as a line items.

Contact ACME to review whether or not a fire extinguisher is required to be present in Room 20 and 24A.

Review the location of emergency washing equipment to ensure that it is within 10 seconds walking distance of the hazard area (Room 20 and 24A) but no further than 30 m (100ft)

Review the usage of compressed air and ensure controls are in place to minimize the use of compressed air.

20) Orient new workers to the room and surrounding space using the Part 2: Site Specific Safety Orientation form found within the New Worker Safety Orientation Course. See Recommendation 5 for details.

Develop and Safe Operating Procedures (SOPs) for each equipment and have them readily available in the room. Consider eliminating and/or minimizing the amount of dust generated when creating these procedures and also incorporate clean up procedures for after the equipment has been used.

Train workers on the SOP for each equipment they will use.

Create a binder of training logs to document personnel trained as per the SOP on a particular equipment. There should be a separate training log for each equipment and should include the name of the trainer and trainee and the date of training.



WORKSHOP RECOMMENDATIONS (CONT'D)

- 21) Review PPE requirements for each piece of equipment and document it as part of the SOP and communicate to the worker during training. In addition, signage can be posted by the equipment to remind the user of the PPE requirements. Posting PPE requirements on the door would mean anyone entering the room requires the indicated PPE.
- 22) Conduct a Working Alone Risk Assessment and establish a procedure to check in on the worker specifically for working in Room 20 and 24A.
- 23) See recommendation 8 for Laboratory Hazard Door Signage and Emergency information. Communicate the importance of completing a Laboratory Hazard Signage Form when rooms begin to store chemicals and the room history does not have a sign to reflect the hazards.

Replace the sign in sheet with training records for each equipment. See recommendation 20 for full details. Note: The training records do not have to be posted on the door.

See recommendation 21 for PPE signage.

- 24) Develop lockout procedures specific to the equipment. These procedures can be sent to RMS for review. Contact Tariq Din (tariq.din@ubc.ca) to enroll personnel who perform lockout in lockout training
- 25) Submit a service request to destroy the ladders. In the meantime, they should be tagged to indicate they are out of use.



APPENDIX A: RESOURCES

LINKS TO REGULATORY REQUIREMENTS

- [WorkSafeBC Occupational Health and Safety Regulation \(OHSR\)](#)
- [Workers Compensation Act \(WCA\)](#)
- [Transportation of Dangerous Goods Regulations \(TDG\)](#)
- [Nuclear Substances and Radiation Devices Regulations \(NSRD\)](#)
- [Radiation Protection Regulations](#)

UBC SPECIFIC LINKS

- [UBC Chemical Safety Manual](#)
- [UBC Biological Safety Manual](#)
- [UBC Radiation Reference Manual](#)
- [UBC Radiation Purchasing and Inventory System](#)
- [Radiation Permit Termination Protocol](#)
- [UBC Hazardous Waste Management Manual](#)
- [Hazardous Waste Information Sheet](#)
- [Decommissioning Protocol](#)
- [UBC Centralized Accident Incident Reporting System \(CAIRS\)](#)
- [Risk Management Services Website](#)
- [Risk Management Services Course System](#)
- [Laboratory Hazard Door Signage Form](#)
- [Monthly Inspection Checklist](#)
(Please note that an updated monthly inspection checklist will be available soon on the RMS website)
- [LST General Inspection Checklist](#)
- [Occupational and Preventive Health](#)
- [Risk Management Services Respirator Fit Test](#)



APPENDIX B: PRINCIPLE INVESTIGATORS AND THEIR LABS

The following tables details the principle investigators and the rooms that were inspected and how they were classified. If chemicals were present, it was designated as a wet laboratory space. Where Principle Investigators had a wet laboratory and a computational lab, only the wet laboratory was inspected. If a Principle Investigator only had a computational/equipment lab then that was the space inspected.

WET LABORATORIES

	Principle Investigator	Room Number
Earth Sciences Building		
1	Susan Allen	B1006
2	Mark Jellinek	B1006
3	Richard Pawlowicz	B1009, B1011, B1014, B1016
4	Ulrich Mayer	B1018
5	Kelly Russell	B1032
6	Lori Kennedy	B1032
7	Curtis Suttle	2042
8	Evgeny Pakhomov	2052
9	Sean Crowe	2052
10	Maite Maldonado	2062
11	Philippe Tortell	2062
12	Raymond Andersen	3042
13	Roger Francois	3052
14	Kristin Orians	3062
15	Stephanie Waterman	3062
16	Craig Hart	4042
17	Ken Hickey	4042
18	Peter Winterburn	4052
19	Gregory Dipple	4052
Earth and Ocean Sciences Main Building		
20	Mati Raudsepp	34, 44, 45, 47, 313
21	Marc Bustin	35, 213, 213A, 217, 233
22	Maya Koplava	323C
23	Lee Groat	313E-L
24	Roger Beckie	229, 231
25	Dominique Weis	26, 36A-E, 102/103/104, 305, 309/309A, 313C-D, 331, 331A-G
26	James Scoates	305, 313C-D



APPENDIX B: PRINCIPLE INVESTIGATORS AND THEIR LABS (CONT'D)

EQUIPMENT/COMPUTATIONAL LAB

	Principle Investigator	Room Number
Earth Sciences Building		
1	Christian Schoof	B1007
2	Michael Bostock	B1008
3	Valentina Radic	B1012
4	Erik Eberhardt	B1032
5	Felix Herrmann	4033A
6	Doug Oldenburg	4033B
Earth and Ocean Sciences Main Building		
7	Roland Stull	224
8	Matthijs Smit	301A
9	Catherine Johnson	302
10	Phil Austin	310

LABS NOT INSPECTED

The following labs were not inspected with the reasoning provided in the right hand column

Principle Investigator	Room Number	Reason
Earth Sciences Building		
Oldrich Hungr	B1018	Retired
Eldad Haber	4033B	RMS Associate completing the lab inspections was unable to successfully contact the PI.
Scott MacDougall		New to UBC, no lab set up yet
Earth and Ocean Sciences Main Building		
Paul Smith	207/207A	Retired and Decommissioning
James Mortensen	219	Retired and Decommissioning
Lee Smith	229/229B, 231/231A/231B	Emeritus professor not using the lab
Douw Steyn	310	Retired
William Hsieh	310	Retired