

Appendix B

GENERAL HAZARDOUS MATERIALS PROVISIONS

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A. Scope

1. This guide provides information to assist the designer plan, program, and design teaching and research laboratory facilities. It also provide information on permit application. It applies to all University facilities including leased facilities.

B. Hazardous Materials Inventory Statement

1. A Hazardous Materials Inventory Statement (HMIS) is typically required to confirm the occupancy classification of the building or area. Depending on jurisdiction, an HMIS might be requested at building permit application and again at final inspection prior to issuance of the certificate of occupancy for new buildings.
2. In Seattle, to obtain a building permit the city usually requires an inventory statement and a summary report for each control area, but they do not typically require a hazardous materials management plan.
3. Data for developing an HMIS for a new facility where its use has not been determined, or when researchers are not yet assigned, can be developed with the assistance of EH&S. EH&S will copy data from other similar university laboratories and scale and modify it to fit the planned facility. If speculative data is provided to the building official or fire official for a permit the source of the data and assumptions need to be disclosed.
4. The fire official or building official will usually require an HMIS to include space beyond the boundary of the project, potentially the entire control area or building.
5. For University projects the HMIS and summary reports should be developed using MyChem, the EH&S proprietary chemical management program. For assistance contact EH&S.
6. When a project is nearing substantial completion, EH&S can assist the prospective tenant with permit application; often a condition for the certificate of occupancy for new buildings. Ideally a single application is made for a building or for each department occupying the building. In Seattle the fire official will often issue a permit and allow teaching and research to proceed and give us three to six months to develop an accurate inventory statement and summary report.

C. Occupancy Classification

1. Almost all of the existing research buildings at the UW Seattle campus are classified as B occupancies. While uncommon, some building have small centrally managed accessory rooms classified as H occupancies. These spaces, if

effectively managed, can be a way to reduce material quantity in the control area.

2. In rare cases it may be necessary to consider an alternate occupancy classification if it is not possible to stay within MAQs. In this case an H occupancy classification may be necessary. Potentially, with approval of the AHJ, a code alternate based upon other precedent such as California's L occupancy may be considered. EH&S must be included in these discussions.
3. EH&S discourages the provision of shared accessory storage rooms for hazardous materials due to the administrative challenge to effectively manage the space and keep them compliant, organized and safe.
4. Centralized compressed gas storage areas located outside or near the loading dock can be a very effective way to reduce excess storage in control areas. This allows vendors to drop off and pickup cylinders on a regular basis. Labs should be designed so that no more than one backup cylinder is stored in each laboratory.
5. Waste pickup on the Seattle campus is conducted at the laboratory where it was generated. However, satellite facilities may need to be provided with a chemical waste bulking room that is located near the loading dock or other convenient, safe and secure location. This room is typically provided with a fume hood and spill containment so the EH&S staff may bulk materials into drums. Depending upon waste stream volume, it may be possible to classify the space as a B occupancy control area rather than an H occupancy accessory room. For more information on this topic and requirements for the bulking room contact EH&S.

D. Control Areas

1. Control areas should be established early in design when the general layout and ventilation shaft locations are being considered so that the ventilation design may be optimized. Preliminary HMIS and control zone reports can be helpful in determining control areas.
2. When two control areas are needed on a floor more advance planning is required. Ideally ventilation ducts should not pass through control area walls; a shaft is preferred in or adjacent to each control area. Confer with EH&S during schematic design for control area layout.
3. Buildings with an atrium or other floor opening require special attention to control area layout. The code requires a 2 hour separation in some cases which can be onerous and limit architectural design.
4. For the Seattle campus, an agreement was reached with SFD and DPD to allow buildings constructed prior to the adoption of the IFC to continue to use 1997 UFC (Uniform Fire Code) requirements to manage control areas. This code

allows up to four control areas without reduction for above or below grade floors. For specific information on this agreement contact EH&S.

E. Maximum Allowable Quantity (MAQ)

1. The MAQ for a control area is reduced on floors above and below grade. The University often finds it difficult to conform to quantity limitations in some hazard classes when this reduction in MAQ occurs. Building design should consider the following options to address this constraint especially for upper stories.
 - a) Recommendations for floors four through six:
 - Locate labs with more chemicals and high chemical density on lower floors
 - For a single control area limit the total space of labs on these floors; less than 3500 square feet as a starting point for planning purposes.
 - Provide a second control zone
 - Consider a code alternate (Seattle has one code alternate published to address this issue for biomedical and other research laboratories)
 - b) For floors above seven through nine:
 - Limit these floors to labs using minimal chemicals
 - For a single control area, limit the total space of labs on these floors to less than 1500 square feet as a starting point for planning purposes.
 - Provide a second control zone but also limit space for labs in each area
 - Consider a code alternate
 - Program the space for other use such as vivarium or office space
 - c) Floors nine or more stories above grade can only have one control area and hazardous materials are very strictly limited unless the Seattle code alternate is applied.
 - d) For floors more than two levels *below* grade, hazardous materials are not allowed.
2. The code also limits the quantity of hazardous materials in use. If buildings are designed appropriately to accommodate materials in storage, the conditions that apply for materials in use can usually be met, but there are exceptions. The following procedures and operations are examples that require special consideration:
 - Dispensing and handling flammable liquids especially in containers larger than five gallon
 - Solvent distillation stills
 - Scintillation units

3. Hazard categories most likely to present an issue with respect to MAQs include flammable liquids, flammable gases, oxidizing gases, pyrophoric, water reactive, and highly toxic materials. Accurate estimates for these materials are critical.
4. Compressed gas and cryogen storage is also regulated under the same section of the code. Bulk storage and storage in laboratories must be carefully considered in order to comply with the MAQ limits.

F. Equipment and Egress Corridors

1. Hazardous materials should not be stored or used in equipment and exit corridors. For more specific guidance and exceptions refer the [Use of Corridors and Unassigned Spaces](#) policy on the EH&S web page, This policy represents a compliance plan with the Seattle Fire Department and applies to all Facilities in Seattle.

G. Increases to the Maximum Allowable Quantity

1. All laboratory buildings should be provided with fire protection which allows doubling of the MAQ for most hazard categories for every control area. Use of approved storage cabinets is much less common, except for flammable liquids. Do not assume a doubling will be allowed for cabinet use without conferring with EH&S and the occupants on the long term practicality of keeping all materials in cabinets.
2. Flammable liquid cabinets should be provided in all spaces with permit threshold quantities (> 5 gallons) so that the University may double the MAQ for this very common material.

H. Control Area Design Alternatives

1. Adding control areas can be an effective way to increase total storage amounts for a building. The nature of the teaching and research provide a significant variability and use changes regularly in research laboratories. For planning purposes, additional control areas should be considered when the lab portion of a control area exceeds:
 - a) 12,000 square feet if at grade level;
 - b) Smaller control areas above and below grade level.
2. A control area can be designed with spaces on more than a single floor. This was very common under the Uniform Codes since the total number of control areas per building was four. However, newly adopted codes limit the MAQs for control areas and require greater fire resistive construction based on how far above (or

- below) ground floor they are located. If designing a control area that will extend to two or more floors without rated construction, such as one that will include a convenience stair or atrium, the design criteria should use the most restrictive construction elements. For example, if extending from the second to fourth floors, the fire resistive rating for the fourth floor should be used.
3. Another strategy that might be proposed, subject to approval from the local jurisdiction, would be to request multiple “Ground Floors” for the purposes of designating control areas. If a facility is constructed on a slope, this could provide some relief to the above grade/below grade quantity limitations. This could be shown to still meet the intent of the restrictions from a code standpoint, in that evacuation time and emergency response capabilities are not impacted.
 4. Provide accessory H occupancy storage rooms on ground floors where research groups on upper floors can store larger quantities of reagents. If shared the rooms should be provided with cabinets assigned to each laboratory with no storage allowed outside of cabinets. Accessory occupancies are limited to 10% of the building area under the current Building Code.