

# News to Use

## Design Requirements Manual

The formulae  $\frac{\partial U}{\partial x} + \frac{\partial}{\partial x}(\rho U) = -\frac{\partial P}{\partial x} + \frac{\partial}{\partial x}(\mu \frac{\partial U}{\partial x}) + \rho(\rho - \rho_0)$  for building  $\frac{\partial}{\partial x}(\rho U U) = -\frac{\partial P}{\partial x} + \frac{\partial}{\partial x}(\mu \frac{\partial U}{\partial x} - \rho \overline{u'u'}) + \rho(\rho - \rho_0)$  state of the art  $\frac{\partial}{\partial x}(\rho U U) = -\frac{\partial P}{\partial x} + \frac{\partial}{\partial x}(\mu \frac{\partial U}{\partial x} - \rho \overline{u'u'}) + \rho(\rho - \rho_0)$  biomedical research facilities.

'Design Requirements Manual (DRM) News to Use' is a monthly ORF publication featuring salient technical information that should be applied to the design of NIH biomedical research laboratories and animal facilities. NIH Project Officers, A/E's and other consultants to the NIH, who develop intramural, extramural and American Recovery and Reinvestment Act (ARRA) projects will benefit from 'News to Use'. Please address questions or comments to: [ms252u@nih.gov](mailto:ms252u@nih.gov)

## Special Requirements for Laboratories using Radioactive Materials

All laboratory modules using radioactive materials shall be designed for the safe storage of radioactive waste. The volume of radioactive waste generated by a laboratory is a function of the type of work being performed. The A/E shall gather information regarding the function of the laboratory to determine the space necessary for radioactive waste storage; recognize that some types of radioactive waste require segregation from other types; and design the radioactive waste storage area to accommodate multiple containers. All laboratories shall be designed to fit the appropriate low-level radioactive waste (LLRW) storage receptacles and/or containers. NIH Division of Radiation Safety (DRS) provides specifications on these containers. Five LLRW streams have been identified from the NIH Waste Disposal Calendar, current edition:

- Liquids - Aqueous waste and/or solvents/other hazardous chemical constituents (mixed waste)
- Dry or solid waste (dry active waste) - Disposable lab ware and/or sharps (can also be categorized as Medical Pathological Waste - MPW)
- Liquid scintillation vials and/or bulk liquid scintillation media
- Animal carcasses and/or tissues
- Animal bedding and/or solid excreta

Radioactive waste management policies and procedures are available in the radioactive Waste Disposal guide available at <http://orf.od.nih.gov/NR/rdonlyres/7F729619-4E2F-4A21-8281-0724E5E6840C/25635/RadioactiveWastesection508.pdf>.

A standard location of the radioactive waste storage in laboratories shall be established to assist emergency response personnel. For laboratory modules with a service corridor, this storage shall be located near the service entrance rather than the hall entrance, eliminating the need for moving radioactive waste through the main corridors of the laboratory building. The configuration of the radioactive waste storage area in the laboratory shall be designed to facilitate radioactive material spill cleanup and decontamination. Interior surfaces of the storage area shall be readily

cleanable for ease in decontamination. Corridors and public space shall not be designated and used for storage, and equipment such as refrigerators and freezers shall not be designated to store this material in these areas. The A/E shall include the following in the design:

- Physical security measures and mechanisms against unauthorized access in all laboratories.
- Security for all radioactive materials in laboratories when unattended.
- Space for shielding waste containers.
- Appropriately sized laboratory and marshaling areas for reduction of storage and/or waste accumulation.
- Appropriate spill containment for all storage areas.
- Potential shielding requirements between adjoining or adjacent laboratory bench areas for high-energy beta emitter radionuclides.
- Compensation for the additional weight required for lead shielding in the design of countertops and hoods if the laboratory is used for high-energy gamma emitter radionuclides.
- Secure equipment alcoves for storage of radioactive materials and/or irradiator equipment.
- Security provisions in construction specifications (e.g., locks as part of the integrated system, to secure this equipment) when storing radioactive materials in refrigerators and/or freezers.

Beta barriers for shielding energetic beta emitters (P-32), often transparent plastic sheets, 0.95 cm to 1.27 cm thick, shall be provided to protect personnel in adjacent and close work areas.

All radioisotope fume hoods shall meet requirements identified in DRM Chapter 6, Section 6-1-00 D.7.d.

Refer to Section 1-9 F for Ventilation System, Radioactive Airborne and Liquid Effluent discharge and Vacuum requirements.