

News to Use

Design Requirements Manual

The formulae $\frac{\partial \rho_i}{\partial x_i} + \frac{\partial (\rho U_i)}{\partial x_i} = \frac{\partial \rho}{\partial x_i} + \frac{\partial (\mu \frac{\partial U_i}{\partial x_i})}{\partial x_i} + z_i(\rho - \rho_0)$ for building $\frac{\partial (\rho U_i)}{\partial x_i} = \frac{\partial \rho}{\partial x_i} + \frac{\partial (\mu \frac{\partial U_i}{\partial x_i} - \rho U_i)}{\partial x_i} + z_i(\rho - \rho_0)$ state of the art $\frac{\partial (\rho U_i)}{\partial x_i} = \frac{\partial \rho}{\partial x_i} + \frac{\partial (\mu \frac{\partial U_i}{\partial x_i} - \rho U_i)}{\partial x_i}$ 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'.

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Project Close-out

The close-out of a project is a major milestone, and the culmination of the design and construction process. All parties are usually anxious for completion of close-out: the Architect/Engineer (A/E) and contractor can receive final payment, and the Project Officer (PO) can move on to other projects, and the Institute or Center (I/C) can plan occupancy. The objectives of project close-out should be defined, however, so that the process can go smoothly and successfully, without unforeseen problems or delays.

Definitions

The definition and process of close-out for a particular project will depend on the specific contracts and contract documents governing that project. The following are some widely recognized industry close-out terms:

Punch List

The punch list is a list, developed by the contractor and reviewed by the A/E and PO, of all items on a construction project that must be finished to fulfill the construction contract. When complete, a punch list is a set of mutually agreed items necessary for the project to attain final completion. If the items on the punch list are relatively minor the punch list can be a trigger for substantial completion and beneficial occupancy.

Substantial Completion

Substantial completion is the point where the project is completed to the point where it can be functional for its intended use. Typically substantial occupancy is attained when the punch list contains only minor items and all systems are operational.

Beneficial Occupancy

Beneficial Occupancy is the full or partial use of the facility by the I/C for its intended use prior to Final Completion. For beneficial occupancy to occur, remaining punch list items should be minor, so that remaining contractor activities will not be a nuisance or hazard to occupants. Before beneficial occupancy occurs, a formal agreement with the contractor should be developed to define the obligations of the contractor and occupants relative to maintenance, utilities, security and other responsibilities. A drawback to beneficial occupancy is that damage or loss resulting from occupancy is not the responsibility of the contractor, so conditions prior to beneficial occupancy should be carefully and thoroughly documented. The PO, the Division of the Fire Marshal (DOFM) and other Authorities having Jurisdiction (AHJ) must approve all space for occupancy. In addition, Division of Health and Safety (DOHS) certification is required for occupancy of all containment laboratories.

Final Completion

Final completion is that date that all punch list items are complete, the terms of the construction contract are complete, and the project is accepted. Final completion is the traditional date for the contractor to submit for final payment.

Close-out Activities

Between the Punch List and Final Completion a number of activities must be scheduled and completed to ensure that the close-out procedures go smoothly and without delay to ensure that the transition from contractor

management to I/C management and occupancy goes smoothly. These include:

Operations and Maintenance (O&M) Training

Substantial completion is often the time when responsibility for operations and maintenance transfers from the contractor to permanent O&M staff. It is important to schedule training of the permanent operations and maintenance staff of all systems and the transfer of O&M manuals.

As-built Drawings and Project Records

All documentation required to record the construction process, document the as-built construction conditions and to manage the facility. These may include CAD drawings or BIM models, testing reports, construction reports and photographs, RFIs, change orders and other project documentation. Documentation should be neatly organized and indexed, in paper and/or electronic format, as required in the contract documents.

Testing and Balancing of Systems

All systems are inspected, tested and adjusted to ensure that operation, performance, energy efficiency and occupant comfort meet design criteria. This may be part of a more comprehensive commissioning procedure. Systems that are utilized on a seasonal basis must be tested and used through a complete annual load cycle (i.e. cooling systems must be tested, even in the winter).

Warranties

Substantial completion is the traditional start date for warranties associated with the project. Complete warranty paperwork for all systems should be indexed and organized in a binder for future reference. Information should include warranty terms, conditions and durations, as well as the names and contact information for warranty holders.

Delivery of Attic Stock

Attic stock must be delivered and stored in a location specified in the contract documents or as specified by the PO. Attic stock should be in unopened containers, labeled and neatly organized.

Installation of Government Furnished, Contractor Installed (GFCI) Equipment

The delivery of GFCI equipment should be coordinated with the contractor and scheduled prior to final completion. If equipment arrives on-site too early it may be subject to damage, and if it arrives too late the contractor may have demobilized.

Contractor Demobilization

The contractor must remove trailers, temporary fencing and barriers, and all other construction-related items not wanted by the Government, and the project area must be cleaned and restored.

Summary

It is important for close-out procedures and schedule to be understood and acknowledged by all parties. Close-out requirements, procedures and responsibilities should be included in the contract documentation, and a schedule of activities covered in a close-out conference.