

# News to Use

## Design Requirements Manual

*The formulae  $\frac{\partial U_i}{\partial x_i} + \frac{\partial}{\partial x_i}(\rho U_i) = -\frac{\partial \sigma}{\partial x_i} + \frac{\partial}{\partial x_i}(\mu \frac{\partial U_i}{\partial x_i}) + s_i(\rho - \rho_0)$  for building  $\frac{\partial}{\partial x_i}(\rho U_i) = -\frac{\partial \sigma}{\partial x_i} + \frac{\partial}{\partial x_i}(\mu \frac{\partial U_i}{\partial x_i} - \rho U_i^2) + s_i(\rho - \rho_0)$  state of the art  $\frac{\partial}{\partial x_i}(\rho U_i) = \frac{\partial}{\partial x_i}(\lambda \frac{\partial T}{\partial x_i} - \rho U_i^2)$  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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## Managing the Commissioning Process (Part I)

It is not uncommon to see a project schedules with a two week block of time labeled "commissioning". As the schedule moves toward completion the block of time gets absorbed by the activities around it with no change to the end date, and commissioning becomes a coincident activity with TAB, installation of electrical devices, final controls check out, and final finishes. This results in an occupied space with an incomplete commissioning issues log, unhappy occupants, and an owner having to decide to write off issues that should have been resolved months earlier. This can be the result of "commissioning lite", the base minimum that needs to be done to check off whatever box is necessary to say the project requirements have been met.

The purpose of this series of articles is to present commissioning not as a box to be checked, but as an integral part of an integrated approach to overall project management, which maximizes value to a project.

### Commissioning Definition.

ASHRAE's guideline 0 defines commissioning as "A quality-focused process for enhancing the delivery of a project. The process focuses on verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the owner's project requirements"<sup>1</sup>. By this definition commissioning is not a two week EVENT tacked on to the end of a project, but a project delivery PROCESS. The commissioning process can be used as a valuable tool to evaluate the performance of the project's designers, contractors, consultants and facility personnel throughout the entire project, for design conception to facility turnover.

Project management and Commissioning Agent (CxA) should work hand in hand throughout the project, from design conception through construction turnover. Unfortunately many project managers' view commissioning as a quality control program. When working together project management and commissioning are mutually compatible, delivering a complete and satisfactory project:

Key commission process components include:

### The Owner's Project Requirements (OPR) and the Basis of Design (BOD).

The OPR provides the narrative for the original intent of the project, including the expectations of how the facility is to be used and the overall goals for the project. The BOD is a record of the design team's technical response to the OPR; including, but not limited to, a narrative of the facilities systems; calculations of load analysis for environmental systems; equipment and product selections intended for use in the facility. These documents need to be the foundation from which the entire commissioning process is built. Unfortunately these documents are often prepared long after design has started or even after construction has begun. The OPR and BOD are living documents and should be maintained and updated throughout the life of the project. As decisions are made and changes considered they should always be measured against and documented in the OPR and BOD. Updates to

these documents should be issued to and reviewed by the project and commissioning team, including user groups and facility maintenance personnel. This will help to maintain project expectations by keeping the team informed.

### Transfer of Commissioning Knowledge.

It is critical that the knowledge developed in creating the OPR and BOD is transferred from design into construction. Transfer of these documents and the decision making process contained therein will help the contractors understand the original intent of the project. The project manager, working with the CxA, should develop a plan to incorporate this information into the bidding and construction documents. Whether they are specifically in the bidding documents or as sections within the commissioning specifications and project special conditions, their inclusion will provide important historical knowledge to the contractor and give the project manager another layer of enforceable contractor documents to drive the commissioning process. One of the most important reasons for providing this information is to give the contractor the background knowledge to understand how their work fits into the entire commissioning process, this allows them to take that knowledge and project it into their master project schedule.

### Commissioning in the Master Schedule.

There are five major commissioning milestones that need to be captured in the contractor's master schedule.

1. Development and approval of Pre-Functional Checklists (PFCs)
2. Development and approval of Functional Performance Tests (FPTs)
3. Field completion of PFCs
4. Submission of Statement of Preparedness
5. Field completion of FPTs

The health of a project's schedule can be clearly gauged by the status of the CxA's creation and approval of their two major test documents: the PFCs and FPTs. Development and approval of the PFCs indicates that the submittal process is complete and equipment is ordered and on its way. If development and approval of the PFCs is not a milestone in the schedule, this important trigger can be missed. If the PFCs development is not complete it is usually because there are issues with the submittals being issued and approved, or the CxA is behind schedule. Either way this situation needs to be addressed and corrected. Without a milestone in the schedule the trigger date will pass without the project manager taking action.

Part 2 of this article will include other important commissioning milestones that need to be included in the master project schedule. Also included will be the importance of the owner's facility and maintenance personnel participation in the commissioning process.

Reference: <sup>1</sup>[www.ashrae.org](http://www.ashrae.org)

Further details on this month's topic are available on the DRM website

<http://orf.od.nih.gov/PoliciesAndGuidelines/BiomedicalandAnimalResearchFacilitiesDesignPoliciesandGuidelines/Pages/DesignRequirementsManualPDF.aspx>  
DRM Chapter 1 Section 7 Interior Commissioning