COMMISSIONING GUIDE SPECIFICATIONS

**SECTION 16999
SAMPLE FUNCTIONAL TEST PROCEDURES**

ELECTRICAL

Spec writer:

The following example functional test procedures are provided for reference and do not necessarily reflect equipment or conditions in this project. The commissioning agent will write specific functional test procedures for this project.

SECTION 16999

SAMPLE FUNCTIONAL TEST PROCEDURES

ELECTRICAL

A.   GENERAL

This section contains sample Functional performance Test procedures in a form format (FT).

The sample FT procedures displayed in a form format here are intended to provide the Subs and CA with an example of a format and an indication of the rigor of the required testing and documentation for various equipment types. They were not developed for this project. Other forms and formats are acceptable if they comply with the rigor, clarity and intent of all the commissioning specifications. The CA will use the functional testing requirements in Sections 15997 and 16997 and the testing protocols specified in Section 17100 for developing site-specific functional test procedures and forms for this project. For illustrative purposes, sequences of operation associated with a few pieces of the equipment for which tests are included are also provided.

B.   SAMPLE FUNCTIONAL TESTS (Examples only, not for this project)

Spec Writer: Select one or two sample checklists and include in this specifications section for reference.

The sample functional tests referred to in this section are found later in the document under the "Functional Test Forms" tab.

The tests are provided in electronic file format (Word 6.0 for Windows 3.1). The file name is at the bottom of each page. The file name extension "ft__" stands for Functional Test and the last digit is the version number.

Any MS Excel spreadsheet files are noted with their usual .xls extension. Some of the equipment also has a file with its full sequences of operation, for reference when viewing the test procedures, and to illustrate the desired rigor of sequences of operation.

Additional example functional tests for mechanical equipment are found in Section 15999.

SYSTEM	ELECTRONIC FILE NAME
Emergency power and UPS	
(comprehensive, big)	e-powbig.ft_
Emergency power and UPS	e-power.ft_
Exterior lighting controls	extlight.ft_
Lighting sweep controls	sweep.ft_

C.   SUGGESTED NUMBERING KEY FOR COMMISSIONING PROCEDURES

The checklists, functional tests, documentation and training use the following identification numbering:

At the beginning of the identification number is a text abbreviation for the following:

Document or Event Abbreviations
DOC   = Documentation
PC   = Prefunctional Checklist
SP   = Start-up Plan
SR   = Start-up Report
FT   = Functional Test
R   = Review
TR   = Training Record

Numbering Key
FT-0102.3:   The first four digits uniquely identify the piece of equipment to the component level. The first 2 digits are the System Type, the second 2 digits are an arbitrary component number (not necessarily the same as the specified ID number). The number after the decimal is the test number. For example, FT-0102.3 = Functional Test 3 of system Type 1, component number 2 (e.g., 0102.3 = Chiller #2, FT #3, because chillers are System Type 1). Other components under chillers are: additional chillers, pumps, valves, piping, VFDs. The component number of 00 means "general" or "all" components, as with the entire system. All tests, procedures, trainings and records should have the same first 4 digits for any given equipment component.

Another example is TUs. If there were only 1 TU type, then tests would be numbered FT-0500.1, 0500.2, etc. If there were 2 types of TUs: FT-0501.1, 0501.2, etc. and 0502.1, 0502.2, etc.

An *example* of the number system follows:

0100	Chilled Water System	0200	Boiler System
	0101 Chiller 1		0201 Boiler 1
	0102 Chiller 2		0202 Boiler 2
	0103 Cooling tower 1		0203 Pump HWP-1
	0104 Cooling tower 2		0204 Pump HWP-2
	0105 Pump CHWP-1		0205 HW piping
	0106 Pump CHWP-2		0206 Sensor calibration
	0107 CHW piping	etc.	
	0108 CDW piping		
	0109 Sensor calibration		

Numbers for Primary System Types and Components
  Components are in parentheses.

01   Chilled water system (chillers, cooling towers, pumps, condensers, piping, valves)

02   Hot water system (boilers, hot water pumps, valves, piping)

03   Air handler units (SF, RF, coils, valves, VFD, ducts, dampers)

04   Packaged, AC or HP units (SF, RF, coils, valves, VFD, ducts, dampers, compressors, condensers)

05   Terminal units

06   Computer room AC units

07   Unit heaters or AC spot coolers

08   Heat exchangers

09   Service water system

10   Test and balance (TAB)

11   Building automation system (controls)

12   Lighting controls

13   Specialty fans

14   Fume hoods

END OF SECTION