SECTION 26 36 23A
COMMISSIONING REQUIREMENTS FOR ATS

1.1 SUMMARY

A. Commissioning is the responsibility of the Contractor, with the cooperation and assistance of the Owner's commissioning authority (CA). The following information is intended to give the commissioning team the basic parameters for developing a project specific commissioning plan and documents including procedures and check lists.

B. This specification section provides supplemental information to the testing required in the individual equipment specification sections of Division 26. Should there be a conflict, the Contractor shall notify the COR immediately through the RFI process and request direction.

C. Commissioning of the systems described in the specifications and required by contract will be accomplished at specific times acceptable by the Owner. There will be limited access and availability to many areas of the facility. Weekend and night time hours will be required for the majority of the commissioning efforts. Contractor shall include these costs along with assistance from ATS Vendor and other subcontractors involved in the commissioning process. Commissioning will be accomplished with each individual new ATS and associated connection(s) to the monitoring system.

D. The goal of the commissioning process is to:

1. Deliver an Automatic Transfer Switch and control and automation system that operates as it was intended.
2. Provide test and measurement records for an operational baseline to compare future operational measurements against and identify operational performance issue that require maintenance and correction

E. Commissioning Team: Successful commissioning requires the efforts and collaboration of the entire design and construction team and demands exceptional communications and coordination between all participants. The Team shall be composed of individuals, each having the authority to act on behalf of the entity he or she represents and shall be organized to implement the commissioning process through coordinated action. The Commissioning Team includes:

1. Owner’s Project Management
   a. Engineer and Design Team
   b. Owner’s Facilities and Operations Staff
   c. Owner’s Commissioning Authority (Dunham Associates)
2. Contractor
3. Subcontractors
4. Manufacturer’s Representatives

F. Commissioning Plan

1. Typically required documentation includes the following which must be collected by the Contractor and inserted in the Commissioning Manual Binder(s):

a. Commissioning Roster
b. Commissioning schedule and sequence integrated into the Project Construction Schedule
c. Delivery, Installation and Pre-start check lists
d. Functional Acceptance Testing procedures and checklist

1.2 REFERENCES and STANDARDS

A. The Contractor shall perform commissioning activities in accordance with recognized and applicable standards and guidelines including the following:

1. NETA ATS 2006
2. ASHRAE Guideline 0-2005, *The Commissioning Process*; ASHRAE Publications Dept., 1791 Tullie Circle, NE, Atlanta, GA 30329
3. ASHRAE Guideline 1-1996, *The HVAC Commissioning Process*; ASHRAE Publications Dept., 1791 Tullie Circle, NE, Atlanta, GA 30329
4. ASHRAE Guideline 5-1994, *Commissioning Smoke Management Systems*; ASHRAE Publications Dept., 1791 Tullie Circle, NE, Atlanta, GA 30329
5. “Building Commissioning Guide”, US General Services Administration and United States Department of Energy, 1995 Prepared by Environmental Management & Research, Inc.

1.3 DEFINITIONS

A. CA: Commissioning Authority

1. The Owner's designated person, company, or entity coordinates with the commissioning team to implement the commissioning process. The Owner has designated Dunham Associates as the Commissioning Authority.

B. CMN: Commissioning Manual

1. The full document describing all of the commissioning process and, planning, procedures and results. The Commissioning Manual is prepared by the Contractor. The Commissioning Manual is made up of the following which must be collected by the Contractor and bound per specification:
   a. Commissioning schedule and sequence integrated into the Project Schedule.
   b. Manufacturer's factory testing certificates.
   c. Delivery, installation and pre-start check lists.
   d. Functional acceptance testing procedures and results.
   e. Closeout procedures and documents.

C. FAT: Functional Acceptance Test

1. Testing and placing into operation units of equipment that must operate together as a system (ex: ATS, Generators, Controls, etc).

1.4 SUBMITTALS

A. Submittal Format and Organization

1. Format: Submittals shall be delivered in both hard copy form and electronic format (Adobe Acrobat Version 8.0 or later .pdf files (unlocked without copy protection), Microsoft Office 2007 or later .doc and .xls files, AutoCAD 2007 or later .dwg files, etc.) to match the hard copy.
2. Closeout submittal.
   a. All test procedure documents modified to reflect changes made during the field testing.
   b. Delivery, installation, and pre-start check lists.
   c. All original test forms with signoffs.
   d. Corrective action reports.

B. Closeout submittal requirements

1. Complete, revised to reflect as-left conditions, commissioning plan binder set. Closeout documents shall meet all the requirements of Division 01.

1.5 COORDINATION

A. Schedule
1. The commissioning activities must be integrated into the project construction schedule so there is no construction impact.
2. Contractor shall coordinate all building fire alarm and power shut downs with owner.
3. Allow adequate time for preparation, review and approval of the testing procedures.
4. Some testing will impact the building power and could impact the other trades as they try to install and test their equipment.
5. Failures of equipment and systems will also introduce potential delays for repair and replacement parts. Contractor should coordinate with major vendors and suppliers to have spare parts readily available to mitigate potential delays.

B. Advance Notice Requirements
1. FAT Execution 1 week

1.6 COMMISSIONING DESCRIPTION

A. The commissioning process shall be completely documented by the contractor in the form of the commissioning manual.

1. Functional Acceptance Testing: These are the efforts by the contractor, subcontractors, third party testing company and factory representatives to operate the individual components as part of a system and to verify the systems operated as specified. The procedures and testing shall be designed by the commissioning authority with assistance from the equipment manufacturers, contractor and subcontractors. Procedures shall be submitted for review by the Commissioning Team and approval by the Commissioning Authority. The commissioning will need to be performed based on the construction sequencing set forth in the specifications and in accordance with the contractors phasing of work. Commissioning will be completed in phases and will occur during off hours on an area basis. Final testing will incorporate all areas and floors and will incorporate areas already tested.

   a. Perform Functional Acceptance Testing for each of the following systems. See enclosed typical Functional Test Procedure for ATS equipment located at the end of this section.

      1) Electrical
         a) Automatic Transfer Switches (ATS)
         b) ATS Manual Control
         c) ATS Automated Control
         d) ATS Fiber and Copper Wiring

2. Closeout and Documentation: These are the efforts by the Contractor, subcontractors, third party testing company, factory representatives and the Commissioning Authority to complete, modify and compile all testing documentation, modify all record documents and O&M Manuals to reflect the conditions and changes observed during the commissioning. The Commissioning Authority will review and approve and compile and index all closeout commissioning documents.

1.7 RESPONSIBILITIES

A. Owner

Provide the functional acceptance testing documentation to the Commissioning Authority and Contractor for information, distribution and use. Designate a primary and alternate Owner’s Commissioning Manager who can make decisions for and obligate the Owner during commissioning activities and who can accept successfully commissioned equipment. Schedule for the necessary activities including but not limited to:

a. Review and approve commissioning plan, schedule and procedures documents
b. Review and approve any changes resulting from commissioning activities
c. Review and accept test results

2. Designate operations and maintenance personnel and schedule them to participate in commissioning team activities.
3. Provide the Basis of Design documentation, prepared by Engineer and approved by Owner, to the Commissioning Authority and Contractor for distribution and use in commissioning.

B. Commissioning Authority (Dunham Associates)

1. Organize and lead the commissioning team
2. Provide project-specific commissioning FAT test procedures
3. Prepare and maintain an Issues Reports
4. Recommend acceptance of successfully tested systems to Owner

C. Contractor

1. Include the cost of the commissioning activities in the contract price
2. Include Commissioning requirements, activities, including Vendors and manufacturers' support staff cost in every applicable equipment and system purchase order
3. Obtain commissioning cooperation and required support from all subcontractors and equipment vendors
4. Assign representatives with expertise and authority to act on its behalf and be responsible for the Commissioning activities
5. Schedule representatives to participate in and perform commissioning process activities
6. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
7. Cooperate with the CA for resolution of issues recorded in the Issues Log
8. Integrate and coordinate commissioning process activities with construction schedule
9. Review and approve construction checklists provided by the CA
10. Assign a Commissioning Document Controller to manage, distribute, file, assemble and track all Commissioning documentation and reports
11. Complete commissioning process test procedures

D. Subcontractors (electrical)

1. Assign representatives with expertise and authority to act on its behalf and be responsible for the Commissioning activities.
2. Schedule representatives to participate in and perform commissioning process activities
3. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action
4. Cooperate with the CA for resolution of issues recorded in the Issues Log

E. Manufacturer's Factory Support (start-up, engineering, service, etc.) for:

1. Equipment Requiring Manufacturer's Support:

1) Electrical
   a) ATS Equipment
   b) ATS Controls
   c) ATS Integration

2. Commissioning Support

a. Provide all field startup staff, engineering and technical support required to complete commissioning and rapidly resolve any testing failures
b. Send additional senior factory support to the site if any testing issue cannot be resolved within 24 hours after an issue is identified by the manufacturer's on-site commissioning support staff
c. Air freight repair parts to site if equipment fails commissioning testing at any stage
d. Provide all information required by specification in a timely manner, reviewed for legibility and accuracy
e. Provide clear direction to the Contractor on activities that must be taken prior to acceptance in order to meet warranty requirements
f. Provide clear direction to the Contractor on activities that must be taken prior to acceptance in order to meet warranty requirements
g. Provide clear direction to the Owner with the manufacturer's closeout documentation, what must be done to meet warranty requirements
h. Demonstrate complete equipment operation in all modes as specified

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

A. Review and obtain Owner approval of the Commissioning Schedule.

B. Prior to the testing, all locations for required testing equipment shall be identified and approved.

C. All necessary testing power, equipment including personnel support shall be the responsibility of the Contractor.

D. Provide all required notification for safety when appropriate.

3.2 FIELD QUALITY CONTROL

A. Verification

1. Verify that all permanently installed measuring has been successfully calibrated and readings can be relied on during testing
2. Verify all necessary equipment and personnel have been notified and will be available at the required time
3. Verify the necessary documentation is posted and on hand
4. Verify appropriate utility has been informed of the testing activity and the duration
5. Verify all communications channels are operational and data at the point of origin matches the communicated data at the received end-point
6. Verify the addresses of all monitored and controlled points with labeling and screen displays

B. Perform tests and inspections and prepare test reports.

1. Certify compliance with test parameters
2. Perform functional tests of equipment throughout their operating ranges
3. Test each monitoring, status, and alarm function
4. Simulate all likely failure modes and verify correct system responses
5. Test Maintenance modes of each system (disconnect/bypass modes).
6. Remove malfunctioning equipment, repair or replace with new equipment and retest as specified above

FUNCTIONAL TEST: Automatic Transfer Switch

Date: **TBD**
Project Name: Veterans Administration Design Electrophysiology Lab
Owner: Veterans Administration

Equipment Information:

Equipment Tag:	**ATS**	Manufacturer:	**ASCO**
System:		Model:	
Location:	**Room#**	Serial Number:	
Area Served:		Volt/Ø/# of Wires	

1. PARTICIPANTS

Name of Participant	Initial	Participation
		Performing the tests
		Performing the tests
		Witnessing the tests
		Witnessing the tests

Party filling out this test form and witnessing test:

Date of Test:
Date of Test:

2. TEST PREREQUISITS

All control system functions for this are programmed and operable per contract documents with sensor and device calibrations necessary being completed.

_____ _____
Contractor Signature or Verbal Date

☐ This functional test procedure reviewed and approved by installing contractor

3. VERIFICATION AND MISC. PREFUNCTIONAL CHECKS.

☐ Misc. site checks of the pre-functional checklist and startup reports completed successfully.

4. TESTING PROCEDURES AND RECORD

Preliminary Checks	Yes	No	Comments
Verify the following preliminary tasks are complete: ☐ Identification labels/nameplates provided. ☐ Manufacturer performed check-out/ start-up procedures. ☐ Verify generator(s) are ready for normal building operation. ☐ Verify appropriate amount of fuel is available for testing operations. ☐ Verify all circuit breakers are in normal building operation mode (NO/NC). ☐ Verify generator controls are in the 'Auto' mode. ☐ Verify and check all systems for alarms or abnormal conditions. ☐ Verify all circuit breakers on line side of closed transition ATS equipment include shunt trips and properly wired.			

Bypass Sources	Pass	Fail	Comments
Perform the following: ☐ Bypass ATS to normal source. Verify correct LED comes on. ☐ Bypass ATS to emergency source. Verify correct LED comes on.			

Isolate ATS (for maintenance issues)	Pass	Fail	Comments
Perform the following: ☐ Isolate the ATS (for maintenance issues). Verify correct LED comes on.			

Test Auto Start-up of Generator - Attempt #1	Pass	Fail	Comments
Perform the following: ☐ Open normal source breaker to ATS. ☐ Verify start-up of generator. ☐ Generator start in _____ seconds. ☐ Transfer in _____ seconds. ☐ Closed transition transfer. ☐ Record electrical data on ATS: ☐ _____ kW. ☐ _____ Amps. ☐ _____ Volts. ☐ Verify operation of remote manual controls for operation and visual indication.			

Test Auto Stop of Generator	Pass	Fail	Comments
Perform the following: ☐ Close normal source breaker to ATS. ☐ Transfer in __ minutes. ☐ Verify retransfer time settings __ minutes. ☐ Verify generator cool down and shut down. ☐ Cool down in ___ minutes.			

Verify manual test of switch of ATS	Pass	Fail	Comments
Perform the following: ☐ Simulate failure through test switch and record operation. ☐ Verify operation of the following LED indicators: ☐ CPU running. ☐ ATS in normal position. ☐ ATS in emergency position. ☐ Normal position indicator. ☐ Normal power available. ☐ Transfer to normal. ☐ Engine start relay status. ☐ Emergency position indicator. ☐ Emergency power available. ☐ Transfer to emergency.			

Verify ATS Settings	Pass	Fail	Comments
Perform the following: ☐ Verify ATS Settings. (Record results in data tables).			

Verify ATS Circuit Breaker Settings	Pass	Fail	Comments
Perform the following: ☐ Verify ATS Circuit Breaker Settings. (Record results in data tables). ☐ Simulate extended parallel timer relay and shunt trip input breaker, (closed transition ATS only).			

Conductors	Pass	Fail	Comments
Perform the following: ☐ Initial thermal scanning during maximum load to check for loose connections per specifications. ☐ Follow-up thermal scanning during maximum load to check for loose connections per specifications.			

ATS Settings

Normal Voltage	
Dropout	
Pickup	
OV Trip	
Normal Frequency	
Dropout	
Pickup	
OV Trip	
Normal Voltage Unbalanced	
Enable	
Dropout	
Pickup	
Emergency Voltage	
Dropout	
Pickup	
OV Trip	

Time Delays	
Normal Fail	
N > E	
Emergency Fail	
Engine Cool Down	
TD E > N IF	
Normal Fail	
Test Mode	
TD E > N Transfer Signal	
Bypass If E Fail	
Pre-Transfer	
Post-Transfer	
CTTS Time Delay	
Sync Monitor Time Delay	
Fail to Sync Time Delay	
XTD Parallel Time Delay	

Verify ATS Monitoring System	Pass	Fail	Comments
Perform the following: ☐ Verify ATS has been correctly connected to the ATS monitoring system and is functional.			

Notes:

*****END OF TEST*****

ATS Representative:	ATS Rep Name, Company	
	Signature	Date
Dunham Associates, Inc. Representative:	Commissioning Agent, Dunham Associates	
	Signature	Date

End of Section