

Commissioning Requirements and Commissioning Report Requirements

Overview

The Public Purpose Charge (SB 1149) Schools Program Guidelines require School Districts completing certain energy-related projects to have commissioning completed. Commissioning is the systematic process of ensuring that heating, ventilation, air-conditioning, lighting and other building systems perform according to the design intent and owner's needs.

The following energy-related capital projects that utilize SB 1149 Program funds are required to have commissioning by a qualified Commissioning Firm:

- All boiler or chiller measures exceeding \$100,000
- All other HVAC measures and all HVAC controls measures exceeding \$50,000
- All lighting control measures exceeding \$100,000
- Other measures in which commissioning is critical for successful implementation and operation of the measure, as deemed appropriate by the auditor.

This document sets forth the expected standards for all commissioning services and commissioning Report provided by a qualified Commissioning Firm to ensure that Contracting Agencies receive complete and accurate information pertaining to the Equipment / Systems included in the scope of work.

General Responsibilities

General responsibilities of being a qualified Commissioning Firm include but not limited to the following activities:

- A. Have primary responsibility for commissioning the project.
- B. Provide the Contracting Agency an unbiased, objective and factual report of the Equipment/ Systems including installation, documentation, operation and performance.
- C. Prepare a commissioning plan and commissioning specifications relating to the commissioning of all Equipment / Systems in the construction bid specifications (which has its basis of design in the Energy Audit Report) and as determined and requested by the Contracting Agency.
- D. Prepare reports for commissioned Equipment / Systems.
- E. Coordinate services to accomplish commissioning objectives. The Commissioning Firms' services in the commissioning of the building shall adhere to the definitions, requirements, and scope delineation outlined in the following publication which is incorporated herein by this reference:

The Building Commissioning Handbook
By: John A. Heinz, P.E. and Richard A. Casault, P.E.

The Building Commissioning Handbook is available on multiple on-line sites and from the Association of Higher Education Facilities Officers (APPA) online bookstore at www.appa.org.

Adherence to The Building Commissioning Handbook is waived to the extent it is inconsistent with the requirement of the Prequalified List Agreement for Commissioning Services, or the requirements of the Scope of Work Approval Form.

Additional informational resources are available from Oregon Department of Energy:

New Construction Commissioning Handbook for Facility Managers
Retro-commissioning Handbook for Facility Managers

The above publications are available for download at:

<https://www.oregon.gov/energy/energy-oregon/Pages/Schools-Commissioning-Firms.aspx>

- F. Prior to signing any contracts with Contracting Agencies, the Commissioning Firm shall attend an ODOE sponsored orientation. This orientation covers the SB 1149 Program Guidelines; the use of the Schools Database for tracking and monitoring SB 1149 energy audits and commissioning costs related to EEMs.
- G. As requested by ODOE, the Commissioning Firm shall attend annual ODOE-sponsored Program meetings and trainings. These meetings cover any changes to the SB 1149 Schools Program and its requirements. Attendance at these meetings is required to maintain qualified status.
- H. Present the SB 1149 Schools Program to Contracting Agencies in a professional and positive manner. Firms will ensure information provided to Contracting Agency and other entities is accurate and communicate to Program staff when clarification or further information is needed.
- I. Provide all required written reports in accordance with the SB 1149 Schools Program Requirements for commissioning report document and the work descriptions provided in the Prequalified List Agreement for Commissioning Services. Ensure all Reports contain all required content and backup documentation. Should ODOE or Contracting Agencies request information to substantiate any aspect of the Report, firms shall provide information in a timely manner and without repeated requests from SB 1149 Schools Program staff.
- J. Upon request, provide any additional data, narrative, supporting documents and files, pictures, and any other information generated or acquired during the performance of

commissioning services or other SB 1149 Schools Program related work to ODOE or Contracting Agency.

- K.** Work with ODOE, Contracting Agencies and other entities to identify improvements and resolve issues related to the SB 1149 Schools Program or any work completed on its behalf. Provide feedback to ODOE on possible improvements to SB 1149 Schools Program policies, procedures, and requirements.
- L.** Work with ODOE staff to meet all requirements and resolve issues relating to or resulting from ODOE's review of the commissioning process and commissioning documentation. Failure to resolve these issues may result in termination of the Prequalified List Agreement for Commissioning Services.
- M.** Provide ODOE with a single point of contact for performance in this SB 1149 Schools Program and Quality Control/ Quality Assurance. This individual will be responsible to resolve all Quality Control issues that are not resolved by a lead commissioning agent or that are chronic in nature.
- N.** Communicate staff changes to ODOE. If a qualified Commissioning Firm loses qualified staff before the completion of all tasks and consequently is incapable of completing all tasks, the Commissioning Firm may subcontract another ODOE qualified Commissioning Firm.

Services

The Commissioning Firm, at a minimum, shall be responsible to:

1. Provide the Contracting Agency with a written comparison between the energy audit report identifying the energy efficiency measures to be implemented and the preliminary construction bid documents created for implementation of those energy efficiency measures. The comparison shall detail the discrepancies that exist between the energy audit and the construction bid documents. The analysis should include both a comparison of construction bid Equipment/ Systems specifications to the recommended Equipment/ Systems in the applicable energy audit as well as a comparison of Equipment/ System usage or strategy (e.g., control strategies) differences between the energy audit and the construction bid documents. If the Commissioning Firm is contracted after construction has started, the comparison should be made between the measures described in the energy audit report and the As-Built conditions. All comparisons should be included in the preliminary and final commissioning reports. If during the course of analysis the Commissioning Firm identifies significant discrepancies between the measures as described in the energy audit report and the measure being implemented, especially those that affect energy savings, the Commissioning Firm shall notify the contracting agency and ODOE immediately.
2. Review the preliminary construction bid documents and provide written comments to the design professional pertaining to the commissioning contract requirements that affect all the parties involved in the construction process (construction

manager, general contractor, construction contractors and any subcontractors), as well as any items that would aid in the proper commissioning of the Equipment/ Systems. When necessary, the Commissioning Firm shall develop and provide appropriate specification sections for inclusion into the final construction bid documents. The Commissioning Firm shall attend a contract documents review session to present and discuss comments prior to the issuance of the final construction bid documents.

3. Write the commissioning plan. The commissioning plan shall include a detailed description of the roles and responsibilities of all firms (by industry), a description of the commissioning process, and a schedule of all commissioning activities. The commissioning plan shall identify the following items for each test: a) a list of the equipment to be commissioned, b) function to be tested (e.g., calibration, economizer control, etc.), and c) measurable criteria for acceptable results. The commissioning plan must be submitted even if only a single system is being commissioned or no interaction with other trades is anticipated. The Commissioning Firm shall submit the commissioning plan to the Contracting Agency for review and approval by the design professional and Contracting Agency within 30 calendar days after the final construction bid documents have been issued or as required by Contracting Agency's schedule.
4. Submit a commissioning schedule (e.g., scheduling of meetings, document due dates, and testing dates) to the Contracting Agency for review and approval by the design professional and Contracting Agency, within 30 calendar days of the commissioning plan's approval by the Contracting Agency or as required by Contracting Agency's schedule.
5. Meet with the Contracting Agency, design team, general contractor, and subcontractors to describe commissioning and to discuss individual roles and responsibilities for completing the commissioning process as specified in the commissioning plan and construction bid specifications. Schedule regular commissioning progress meetings with all participants. Include copies of minutes in the final commissioning report.
6. Facilitate the integration of the commissioning process into the construction bid specifications and into the overall construction schedule.
7. Review Equipment/ Systems submittals for commissioning related issues.
8. Submit a start-up plan to the Contracting Agency that establishes Equipment/ Systems formal start-up criteria and procedures. For Equipment/ Systems identified in the energy audit, and for which formal start-up is required, coordinate start-up with the general contractor and its subcontractors. Submit a start-up plan for Contracting Agency's approval. The start-up plan should include a list of firms and individuals required to participate, and detailed start-up data forms as set forth in The Building Commissioning Handbook for complete documentation of the process. Monitor the start-up of all Equipment/ Systems.

9. Functional Performance Testing (FPT) services.

- a. Develop test procedures and forms for documentation as specified in The Building Commissioning Handbook to demonstrate that all Equipment/ Systems tests and FPT services are performed completely and accurately and that the Equipment/ Systems are operating correctly. FPT shall demonstrate the correct installation and operation of devices, systems and system-to-system inter-tie relations in accordance with approved plans and specifications. Test procedures shall be in accordance with the Equipment/ Systems manufacturers' recommendations, where applicable. Test procedures shall fully describe Equipment/ Systems configuration and steps required for each test, appropriately documented so that another party can repeat the tests with virtually identical results. Submit test procedure schedule, procedures, forms, and other documentation to the Contracting Agency for approval within 30 days after approval of the commissioning plan or at least 30 days prior to starting any testing required.
- b. Submit FPT procedures to the Contracting Agency for approval. Each procedure shall reference the applicable specification, shall have a unique alpha-numeric designator, shall identify the target setpoints and inputs, shall identify the range of acceptable results for each condition tested, and shall include detailed test instructions such that the test could be repeated under identical conditions with repeatable results. Upon completion of FPT, prepare a preliminary commissioning report that includes commissioning plan and FPT deficiency report forms. These deficiency reports shall include cause of the failure, corrective action to be taken, and schedule for retest.
- c. In coordination with the construction contractors and the construction schedule, develop schedules for all testing and coordinate all testing with the construction schedule.
- d. With the assistance of the construction contractors and subcontractors, perform all performance tests. Fully document tests for all Equipment/ Systems.

10. If required by a contract with a Contracting Agency, provide any and all testing and balancing services identified in the construction bid documents.

- a. Equipment/ Systems identified in the construction bid documents shall be tested in all operating modes to include the full range of potential operating conditions up to and including maximum load.
- b. Provide air system balancing, including Variable Air Volume (VAV) boxes, air handling units, Lab Airflow Control System components and controls, exhaust fans, complete grille and register reports, and duct traverse reports for each main duct system riser.

- c. Provide hydronic balancing for the heating water system, chilled water system, and heat recovery systems, including coils and pumps that are within those Equipment/ Systems.
 - d. Testing and balancing shall be substantially complete prior to FPT, especially where unbalanced conditions would affect the results of the FPTs.
- 11. Perform the commissioning procedures detailed in The Building Commissioning Handbook.
- 12. Commission at least the following Equipment/ Systems as included in construction bid documents.
 - a. Chilled Water Systems (chillers, pumps, cooling towers, condensers, piping, valves, VFD, etc.)
 - b. Hot Water Systems (boilers, hot water pumps, valves, piping, VFD, etc.)
 - c. Steam Distribution Systems (boilers, piping, hot well, steam traps, condensate pumps)
 - d. Air handling units (supply fans, return fans, coils, valves, variable frequency drives (VFD), ducts, dampers, filters)
 - e. Packaged air conditioning (AC) or heat pump (HP) units (supply fans, return fans, coils, valves, VFD, ducts, dampers, filters, compressors, condensers)
 - f. Terminal Units
 - g. Unit Heaters
 - h. Variable Frequency Drives (VFD)
 - i. Heat recovery coils and pumps
 - j. Domestic Water Systems (steam water heaters, backflow preventers, recirculating pumps, and booster pumps)
 - k. Building Automation Systems (controls - pneumatic, electric, and digital controls)
 - l. Lighting controls (sensors, light sweep, and daylight dimming)
 - m. Testing and balancing (if previously completed)
- 13. Ensure that training on the systems commissioned has been provided to the Contracting Agency. Provide documentation of training dates and scope of training in the commissioning report. Training should include start up, operation, and maintenance plans for all major equipment commissioned and should be supplemented with manuals, written or electronic, for the Contracting Agency to keep for reference.

14. Verify that Operations and Maintenance materials specified in the construction bid documents are complete and delivered to the Contracting Agency.
15. Document all commissioning procedures completed. Submit a final commissioning report to the Contracting Agency, detailing all commissioning services provided, upon completion of all commissioning services. Verify that all deficiencies stated in the preliminary commissioning report have been corrected.
16. Submit a final commissioning report to ODOE for review that includes:
 - a. The commissioning plan
 - b. The commissioning specifications for the equipment
 - c. The functional testing procedures for the equipment
 - d. The commissioning schedule
 - e. The inspection checklist
 - f. The commissioning issues/deficiencies log
 - g. The executive summary of the final commissioning report
 - h. Summary of training dates and scope provided to contracting agency.
17. Enter commissioning cost and final details in the Schools Database per measure.
18. Work with ODOE staff to resolve problems, issues, and concerns relating to or resulting from ODOE's review of the commissioning process and commissioning documentation. Failure to resolve technical and program issues will result in termination of the Prequalified List Agreement for Commissioning Services and could also result in the denial of reimbursement to the Contracting Agency.
19. Provide other services related to building commissioning. A Contracting Agency may contract with a qualified commissioning firm to perform other work that utilizes the training, expertise, and experience required to qualify for the Prequalified List Agreement for Commissioning Services. The work may include, but is not limited to document review, site visits, investigation, research, reports, training, presentations, or other services related to building commissioning.