

STATEMENT OF WORK
FOR NON-REACTOR NUCLEAR FACILITIES DIVISION
ARCHITECT-ENGINEER SERVICES

January 2024

1.0 INTRODUCTION

UT-Battelle's (the Company) Non-reactor Nuclear Facilities Division (NNFD) is responsible for the planning, design, project management, and construction management of nuclear facility infrastructure investments that involve Nuclear Hazard Category 2, Category 3, and supporting facilities at Oak Ridge National Laboratory (ORNL). The NNFD intends to expand its capability in providing these services by using both Company engineering personnel and subcontracted services provided through Architect-Engineering (A-E) firms. This statement of work defines the A-E technical, engineering, and design services and capabilities required to support NNFD's staff and services.

2.0 SCOPE OF WORK FOR GENERAL SERVICES

The scope of work includes the technical services (personnel, support resources, and tools) and engineering and design services necessary to support NNFD in:

- conceptual planning, programming, design, and construction for facility construction and renovation projects.
- utility infrastructure development and renovation including conceptual, planning and general programming support.
- general design engineering, start-up testing, operational commissioning (Cx) and support for ongoing infrastructure projects; and
- other miscellaneous studies and technical activities necessary to successfully accomplish future projects.

The A-E shall provide qualified staff in architectural and engineering disciplines to perform the work elements described below. All architectural and engineering design work shall comply with ORNL Work Smart Standards. *All deliverables shall be approved by the NNFD Design Authority prior to acceptance.* The A-E shall have established policies, systems, procedures, and tools in place to ensure the quality of the services and deliverables provided. Details of the services to be provided are included in the following sections.

Work shall be performed in accordance with NQA-1 / Price-Anderson Amendment Act (PAAA) quality requirements. Seller shall implement quality assurance standards that meet and/or exceed the Company's quality management needs and requirements. Quality requirements shall be based on existing proven work routines and practices described in written Seller documents reflecting a planned and systematic approach to achieving and maintaining quality.

AE must have an established NQA-1-2008 (including Part 2.7 for software) or later edition, compliant Quality Program that will be audited by ORNL for inclusion on the ORNL Evaluated Supplier List and follow up audits on a triennial basis. Successful completion of the audit must be performed prior to any work being performed.

a. Pre-design Services

The objective of the pre-design services work element is to define project needs, under the technical direction of NNFD, and to support ORNL program requirements. The major deliverables may include system requirements documents (SRD), conceptual design reports (CDR), feasibility study reports, preliminary proposals, evaluation of project alternatives, economic analyses, and cost estimates for conventional facilities as well NNFD infrastructure renovations, repairs, or construction projects. Additional projects may range from utility upgrades to equipment installation. The potential key activities involved in accomplishing the objective of these work elements are as follows:

1. Perform conceptual design and engineering feasibility studies, including preparing calculations, computer analyses, and generating feasibility reports
2. Assist NNFD Project Management Team (PMT) in developing project execution plans
3. Develop project functional/operational system requirements documents (SRDs)
4. Generate programming documents and design criteria documents, including room data sheets
5. Study alternatives with conceptual level cost estimates to support budgetary development efforts
6. Perform appropriate technical reviews/analysis
7. Generate preliminary cost estimates and economic analysis of alternatives, including both life cycle cost (LCC) analysis and present worth (PW) analysis
8. Generate CDR's including the technical information documentation, outline specifications, and supporting electronic drawings and BIM models in Revit/AutoCAD, or Bentley MicroStation.
9. Develop conceptual design BIM models and architectural renderings using Revit or other rendering software.
10. Develop safety documentation
11. Develop risk assessments and contingency analysis
12. Develop Safety Fire & Hazardous analysis, and Reliability Analysis

b. Design Services

The objective of the design services work element is to provide for the detailed design of architectural and engineered systems and generate contract document packages for engineering and architectural design services. All work shall be performed under the direction of the NNFD technical and project management personnel. Specification format shall adhere to CSI Masterformat 2016. Design packages shall result in constructible projects with performance meeting the attributes stated in the customer SRD. The potential key activities in accomplishing the objectives to this work element are:

1. Develop design criteria documents
2. Review and comment on project functional/operational requirements (SRD or program documents)
3. Prepare Preliminary Design (programming, schematic design, design development) and Design Development (contract document preparation) designs for all disciplines (architectural, civil,

structural, environmental, electrical, instrument, piping, HVAC, nuclear, machine/manufacturing, fire protection and process). Contract document design packages shall consist of stamped design calculations, drawings, specifications, and other miscellaneous deliverables sealed by Professional Engineers or Registered Architects licensed in the state of Tennessee.

4. Perform design reviews of the work of others. This may include providing subject matter experts (SMEs) to act as NQA-1 independent technical reviewers (ITRs).
5. Perform constructability reviews
6. Provide design and modeling services in Revit, Inventor or SolidWorks (scope dependent) and 2D CAD drawings in AutoCAD.
7. Prepare commissioning (Cx) plans and specifications
8. Prepare Energy Efficiency / Sustainability Reports
9. Prepare LCC analyses
10. Perform Value Engineering studies.
11. Prepare cost estimates and detailed bill of material drawing take offs
12. Prepare Economic Analysis using PW analysis
13. Provide sustainable designs utilizing the Guiding Principles for Sustainable Federal Buildings and, where applicable, meeting LEED Gold requirements. Provide documentation and tracking.
14. Provide packages in building information modeling (BIM) software such as Revit and employ 3-D clash modeling where required by the project scope of work.
15. Prior to performing any work, successful completion of a NQA-1 audit performed by ORNL and inclusion to the ORNL evaluated supplier list is required. NQA-1 qualifications must be maintained and follow on audits will be performed on a triennial basis.

c. Construction Support Services (Title III support)

1. Assist NNFD during construction contractor selection as a supporting consultant (i.e., bid evaluation and negotiation, construction administration).
2. Provide home office support during construction by reviewing vendor submittals, respond to contractor requests for information, and generating sketches and drawings required to address contractor questions due to changed conditions and/or design omissions/errors
3. Inspect work during construction. Inspections shall be performed by engineers and architects (or their field inspectors) to ensure design intent is met, address unforeseen conditions, identify items not addressed during design phase, and ensure a quality product is provided.
4. Review construction submittals and shop drawings and provide feedback to inform NNFD approvals.
5. Address construction contractor requests for information (RFIs), change order requests (COs) and provide prompt responses.
6. Investigate options for field change requests (FCRs), supporting the NNFD SMEs as solutions are developed or contractor requested changes are approved.

d. Start-Up and Commissioning

The objectives of the start-up and commissioning work element is to support initial start-up, operational tests, and CX activities on facilities and new equipment. The major deliverables for this effort will be test results, start-up reports, CX reports, and project critiques. The key activities involved in accomplishing the objective of this work element are as follows:

1. Assist/direct start-up operations
2. Provide operational test support
3. Conduct Cx activities in accordance with Cx plans and specifications. Develop Cx Report to compile technical and process-related documentation associated with the Cx process.
4. Perform field surveillance and Cx activities
5. Provide training to operations personnel
6. Compile and submit all product documentation, including but not limited to user manuals and operation guides.
7. Perform project critiques and report Lessons Learned

e. Miscellaneous Support Services

The following miscellaneous architectural and engineering support services may be required under this contract, to include the following:

1. As-built drawings
2. In field verification of existing building/system configurations
3. Technical advisory assistance and A-E consultation services
4. Provide full documentation of the seller's implementation of engineering management processes (architectural, civil, structural, environmental, electrical, instrument, piping, HVAC, fire protection and process) in accordance with NQA-1 requirements.
5. Provide documentation supporting the seller's software system acquisition, implementation and training in accordance with NQA-1 requirements.
6. Prepare shielding calculations or process design/evaluation
7. Perform IEBC evaluations
8. Complete RadWorker training for select members of Seller's staff (provided by the company) and/or acquire and maintain a security "Q" clearance.