

**Critical Decision-1, Approve Alternative Selection and Cost Range
for the Modernization of Laboratory Facilities
at the Oak Ridge National Laboratory**

**Office of Safety, Security and Infrastructure
Office of Science**

A. Purpose

The purpose of this paper is to document the review by the Office of Science (SC) Energy Systems Acquisition Advisory Board-equivalent for the Critical Decision, “Approve Alternative Selection and Cost Range (CD-1)” for the Modernization of Laboratory Facilities (MLF) project at the Oak Ridge National Laboratory (ORNL).

B. Mission Need

The mission of the Science Laboratories Infrastructure Program within SC is to support the conduct of Departmental research missions at SC laboratories by funding line item construction to revitalize and repair the general-purpose infrastructure.

ORNL is the Department of Energy’s (DOE’s) largest science laboratory. Six core competencies underpin activities at ORNL.

- Neutron Science
- Leadership Computing and Simulation Science
- Energy Engineering Sciences
- Advanced Materials and Interfacial Chemical Processes
- Biological and Environmental Systems
- Science and Technology for National Security

For the past six years, ORNL has applied substantial resources to modernize its facilities and infrastructure to ensure continued support of the science mission in these areas. Today, many of ORNL’s scientific facilities are new or have been recently upgraded. However, this is not the case for facilities housing our materials and chemical sciences organizations, the Chemical Sciences and Materials Science and Technology Divisions. Research programs affected by this acquisition include the following:

- Chemical Transformations at Interfaces (e.g., catalysis, corrosion)
- Synthesis Science for Materials by Design
- Materials Under Extreme Conditions
- Science to Energy
- Biological Mass Spectrometry
- Separation Science
- Geochemistry
- Chemical and Materials Characterization

The current building space housing these programs, the 4500 North and South Complex, is aged and difficult to maintain. As a result, the science operations of these research groups are already being affected by the functionality of the old, deteriorating building facilities. The condition of the building threatens the viability of several research programs and no longer adequately supports DOE mission accomplishment. Frequent failures of the utility systems that support the

labs result in lost time and inefficiencies during research experiments. It is a deterrent in attracting and retaining scientific staff. Immediate action to house programs in modern, reliable laboratory space is required.

C. Project Preliminary Scope Baseline

The facility will be located on a site currently used for parking (Flagpole Parking Lot) adjacent to Building 4500N. The work outlined in the Conceptual Design Report dated December 2007 forms the preliminary basis for establishing the performance parameters. The scope of the project includes design and construction of a new facility at ORNL, installation of standard office and laboratory furniture, and building system start-up. The facility will consist of 140,000-170,000 gsf of laboratories, equipment rooms, offices, and support space

D. Project Preliminary Cost and Schedule

The preliminary Total Estimated Cost range is \$90-95M. Table 1 shows the funding profile for this project.

Table 1 – Funding Profile (\$000)

FY	Total Estimated Cost		Other Project Costs	Total Project Cost
	Project Engineering and Design	Construction		
Prior Years			700	700
2008	8,700	629	500	9,829
2009		8,700	100	8,800
2010		35,000		35,000
2011		32,378		32,378
2012		9,593		9,593
Total	8,700	86,300	1,300	96,300

The preliminary schedule baseline is shown in Table 2.

Table 2 - Schedule

CD-0	Approve Mission Need	September 2007 (A)
CD-1	Approve Alternative Selection and Cost Range	January 2008
CD-2	Approve Performance Baseline	December 2008
CD-3A	Approve Start of Construction - Early Construction and Long Lead Procurement	3Q FY2009
CD-3B	Approve Start of Construction - New Laboratory Building	1Q FY2010
CD-4	Approve Start of Full Operations	3Q FY2012

The Preliminary Schedule is driven by the funding profile. CD-4, “Approve Start of Full Operations,” is scheduled for March 30, 2012, which includes 13 weeks of float.

E. Acquisition Strategy

The ORNL Management and Operating (M&O) Contractor, University of Tennessee – Battelle, LLC, under the direction, guidance, and oversight of DOE ORO Office of the AMS, will manage and administer a Fixed-Price Architectural-Engineering (A-E) Design subcontract, a Fixed-Price Construction Management/General Contractor (CM/GC) subcontract that consists of two phases, and any other service-type subcontract required by UT-Battelle. This approach helps to mitigate the major risk of receiving construction bids that are much higher than the construction estimate.

The solicitation for the A-E will be for a fixed price subcontract that utilizes the design-to-cost approach. The subcontract will be inclusive of all material, equipment, labor, etc., necessary to perform the work, which includes delivery of technical specifications, drawings, and bills of material. The A-E firm selected will be one that has experience in the design-to-cost approach for laboratories and is familiar with and utilizes the Green Building Rating System – LEED in their designs. They will perform the preliminary and final design and provide support during the construction phase of the project. The A-E will prepare all drawings, calculations and specifications for the construction activity. The A-E will coordinate with the CM during the design phase and provide support during the construction phase.

The solicitation for the CM/GC will be for two phases of work. Phase 1 will be for the CM/GC firm to provide support services to the A-E, including input regarding the selection of materials, building systems and equipment, construction feasibility, and factors related to construction, and cost estimates including estimates of alternative designs or materials. The CM/GC will also provide recommendations of actions designed to minimize adverse effects of labor or material shortages, time requirements for procurement and installation and construction completion. Phase 2 will be to execute construction, including the management, ES&H oversight and the administration of all construction subcontracts. Phase 2 will be inclusive of all material, equipment, labor, etc., necessary to perform the work in accordance with the contractual requirements in order to meet the defined schedule. As part of this phase, the CM/GC is responsible for all construction related to this project, except tie-in work designated to be done by the M&O and Government Furnished Equipment (GFE).

CD-3A approval will authorize early construction and long lead procurement, which includes site work, building foundations and structural steel procurement and erection. This will allow an efficient construction schedule and avoid delays for site work and the long lead times needed for structural steel fabrication.

Each procurement action (the A-E Design and the CM/GC) will be performed in a competitive environment based on the best value determined from an evaluation of technical criterion such as technical qualifications, approach, past performance, experience, capabilities, personnel qualifications and resource availability to meet the schedule requirements.

G. Environmental Strategy

No environmental issues have been identified to date that would significantly impact this project. The environmental risk is low. The project will comply with all requirements of the NEPA and its implementing regulations. A NEPA determination has been completed for this project, and the proposed action is covered by the approved Environmental Assessment (EA) – ORNL Facilities Revitalization Project (DOE/EA-1362). That assessment resulted in a Finding of No Significant Impact issued in June 2001. No additional permits will be required. Construction of the facility will not impact ongoing research at ORNL. The facility will be constructed in an existing parking lot.

H. Preliminary Hazards Analysis

A Preliminary Hazards Analysis Report for the MLF has been completed and issued in December 2007. A preliminary HA report has been issued, and a final HA will be issued for CD-2. It identifies construction and operational hazards, as well as mitigation plans for the hazards. The primary operational hazards are due to work activities and building design features associated with the research usage and storage of chemicals and hazardous materials in the new building. The preliminary HA report serves as the basis for planning physical and administrative controls to protect the health and safety of workers, contractors, and the environment. A project specific ES&H Plan per 10 CFR 851 will be prepared for the construction phase.

I. Energy Conservation and Sustainable Design

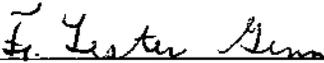
MLF will be designed to comply with 10CFR435. Decisions regarding the planning, acquisition, siting, designing, building, operating, and maintaining this proposed facility will be based on the DOE Guiding Principles of High Performance and Sustainable Buildings. New equipment and systems will be selected to maximize energy efficiencies and “green” building technologies. The proposed building will be a Leadership in Energy and Environmental Design (LEED) certified gold facility.

J. Risk Management

The Risk Management Plan (RMP) has been issued that identifies the potential risks and provides a comprehensive strategy for management of these risks. Adequate contingency has been included for these risks. The RMP will be maintained to ensure that the project incorporates appropriate, efficient and cost-effective measures to handle project risks. The risks anticipated during implementation of the proposed facilities are typical of standard industrial building design and construction. The risks associated with this project and acquisition strategy are judged to be manageable. Facility design technology and construction methods for this type of facility exist and will be utilized. The probability of success of the Modernization of Laboratory Facilities is considered high based on comparisons to similar facilities.

Modernization of Laboratory Facilities
at the
Oak Ridge National Laboratory
CD-1 Review

Submitted by:



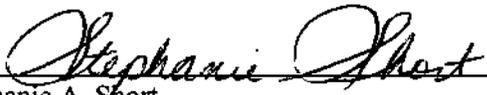
F. Lester Ginn
Federal Project Director
Assistant Manager for Science, SC-12, ORO

Date 1/25/2008



Johnny Q. Moore
Assistant Manager for Science, SC-10, ORO

Date 1/25/08



Stephanie A. Short
Office of Safety, Security and Infrastructure
Office of Science

Date 1-28-08

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CD-1 Review**

Recommendations:

The undersigned "Do Recommend" (Yes) or "Do Not Recommend" (No) approval of CD-1, for the Renovate Science Laboratories. Phase 1 as noted below.

Ken Z. Chao 11/30/08 Yes No
ESAAB Secretariat, Office of Project Assessment Date

David E. ... 11/30/08 Yes No
Representative, Non-Proponent SC Program Office Date

[Signature] 1-30-08 Yes No
Representative, Office of Budget Date

Mr. B. H. 1-30-08 Yes No
Representative, Environmental, Safety and Health Division Date

[Signature] 11/30/08 Yes No
Representative, Security Management Team Date

[Signature] 1-30-08 Yes No
Representative, Laboratory Infrastructure Division Date

Representative, Grants and Contracts Division Date

Approval:

Based on the information presented above and at this review, Critical Decision-1, Approve Alternative Selection and Cost Range, is approved and authorization is provided to proceed to Preliminary Design.

Marcus E. Jones 11/30/08
Date
Marcus E. Jones
Office of Safety, Security and Infrastructure
Office of Science