

**Critical Decision-3B, Approve Remaining Construction
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 Remaining Construction (CD-3B)" 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 multi-program 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 seven 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 Scope Baseline

The facility will be located on a site currently used for parking (Flagpole Parking Lot) adjacent to Building 4500N. 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 120,000 to 160,000 gsf of laboratories, equipment rooms, offices, and support space.

D. Project Cost and Schedule

The Total Estimated Cost is \$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	6,000	3,329	400	9,729
2009		25,103	100	25,203
2009 ARRA		60,568		60,568
2010		0		0
2011			100	100
Total	6,000	89,000	1,300	96,300

The schedule baseline is shown in Table 2.

Table 2

CD-0	Approve Mission Need	September 2007 (A)
CD-1	Approve Alternative Selection and Cost Range	January 2008 (A)
CD-2	Approve Performance Baseline	December 2008 (A)
CD-3A	Approve Start of Construction - Early Construction Package and Long Lead Procurements	May 2009 (A)
CD-3B	Approve Start of Remaining Construction - New Laboratory Building	December 2009
CD-4	Approve Start of Full Operations	December 2011

CD-4 completion date includes seven months of float.

The cost estimate is shown in Table 3.

Table 3 - Cost Estimate (\$)

WBS	Description	Cost	Total Cost
1.1	Design Phase		\$ 5,480,000
1.1.01	Preliminary & Final Design (A-E)	\$ 3,398,000	
1.1.02	Design Support	\$ 491,000	
1.1.03	External Reviews	\$ 180,000	
1.1.04	Procurement	\$ 195,000	
1.1.05	Pre-Construction Project Management	\$ 561,000	
1.1.06	Pre-Construction Construction Mgmt (CM) ¹	\$ 655,000	
1.2	Construction Phase		\$ 75,468,000
1.2.01	Construction Management (CM)	\$ 7,415,000	
1.2.02	Conventional Facilities Construction CM) ¹	\$ 56,895,000	
1.2.03	Construction Support	\$ 721,000	
1.2.04	Field Support	\$ 962,000	
1.2.05	Subcontract Administration	\$ 374,000	
1.2.06	Facility Management Division	\$ 276,000	
1.2.07	Commissioning	\$ 634,000	
1.2.08	AE-Home Office Support (A-E)	\$ 804,000	
1.2.09	Government Furnished Equip	\$ 6,075,000	
1.2.10	Construction Project Management	\$ 1,312,000	
	Total Contingency		\$ 14,052,000
	Total Estimated Cost		\$ 95,000,000
	Other Project Cost		\$ 1,300,000
	Total Project Cost		\$ 96,300,000

¹ This reflects the transfer of funds for design assist scope from the CM Constructions Services (Option) portion of the contract to the Pre-Construction Services Support portion of the contract per CD-2 recommendation.

E. Acquisition Strategy

The ORNL Management and Operating (M&O) Contractor, UT-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. Both contracts have been awarded. 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 was based on a fixed price subcontract that utilized the design-to-cost approach. The subcontract was 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 was selected based on experience in the design-to-cost approach for laboratories and familiarization with and usage of the Green Building Rating System – LEED in their designs. They have performed the preliminary and the final design and are providing support during the construction phase of the project. The A-E has prepared all drawings, calculations and specifications for the construction activity. The A-E has coordinated with the CM during the design phase and is providing support during the construction phase.

The solicitation for the CM/GC was for two phases of work. Phase 1 was 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 has also provided recommendations of actions designed to minimize adverse effects of labor or material shortages, time requirements for procurement and installation and construction completion. Phase 2 is to execute construction, including the management, ES&H oversight and the administration of all construction subcontracts. Phase 2 is 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). Phase 2 has been awarded.

CD-3A approval authorized early construction and long lead procurement, which includes site work, building foundations and structural steel procurement and erection, and the purchase and installation of the exterior precast system. This has allowed an efficient construction schedule and avoided delays for site work and the long lead times needed for structural steel fabrication.

CD-3B will authorize the construction of the remainder of the building. This includes all construction activities beyond CD-3A.

Each procurement action (the A-E Design and the CM/GC) was 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. Hazards Analysis

The Hazards Analysis Report for the MLF has been completed, was updated in October 2008, and reviewed prior to the Independent Project Review for CD-3B. 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 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 has been prepared for the construction phase.

I. Energy Conservation and Sustainable Design

MLF will be designed to comply with 10 CFR 435, as well as DOE O 430.2B. Decisions regarding the planning, acquisition, siting, designing, building, operating, and maintaining of this proposed

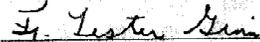
facility are based on the DOE Guiding Principles of High Performance and Sustainable Buildings. New equipment and systems will be selected to maximize energy efficiencies and “green” building technologies. The MLF project has as one of its overall goals to achieve Leadership in Energy and Environmental Design (LEED) certification.

J. Risk Management

A Risk Management Plan (RMP) has been completed, was updated in March 2009 prior to the CD-3a Independent Project Review, and was revised after the review to incorporate a recommendation. This document identifies the potential risks and provides a comprehensive strategy for management of these risks. Adequate contingency has been included for these risks. The RMP is being 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 completion of a Monte Carlo Analysis.

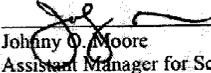
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at the
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Submitted by:



F. Lester Ginn
Federal Project Director
Assistant Manager for Science, SC-11, ORO

August 7, 2009
Date



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

8/6/09
Date



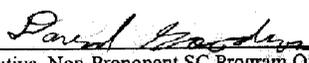
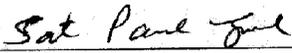
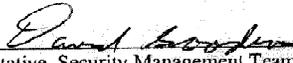
Gordon Fox
Office of Safety, Security and Infrastructure
Office of Science

8/13/09
Date

**Modernization of Laboratory Facilities
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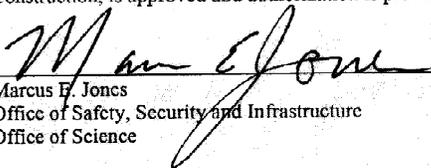
Recommendations:

The undersigned "Do Recommend" (Yes) or "Do Not Recommend" (No) approval of CD-3B, for the Modernization of Laboratories Facilities project as noted below.

	<u>8/14/09</u>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
ESA AB Secretariat, Office of Project Assessment	Date	
	<u>8/14/09</u>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Representative, Non-Proponent SC Program Office	Date	
_____	_____	Yes <input type="checkbox"/> No <input type="checkbox"/>
Representative, Office of Budget and Planning	Date	
	<u>8/14/09</u>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Representative, Environmental, Safety and health Division	Date	
	<u>8/14/09</u>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Representative, Security Management Team	Date	
_____	_____	Yes <input type="checkbox"/> No <input type="checkbox"/>
Representative, Laboratory Infrastructure Division	Date	
_____	_____	Yes <input type="checkbox"/> No <input type="checkbox"/>
Representative, Grants and Contracts Division	Date	

Approval:

Based on the information presented above and at this review, Critical Decision-3B, Approve Remaining Construction, is approved and authorization is provided to proceed to initial construction.

	<u>8/14/09</u>
Marcus F. Jones	Date
Office of Safety, Security and Infrastructure	
Office of Science	

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