Office of Basic Energy Sciences
Office of Science

CD-4a, Approve Start of Initial Facility Operation for the Center for Nanophase Materials Sciences (CNMS) A Nanoscale Science Research Center at Oak Ridge National Laboratory

A. Purpose

The purpose of this document is to support the review and to seek approval by the Office of Basic Energy Sciences Acquisition Executive for the Critical Decision "Approve Start of Initial Facility Operation (CD-4a)" for the Center for Nanophase Materials Sciences (CNMS), a Nanoscale Science Research Center (NSRC) at Oak Ridge National Laboratory (ORNL).

B. Mission Need

ORNL will establish a highly collaborative and multidisciplinary CNMS that will provide a unique resource for nanoscale science research. The CNMS will integrate nanoscale research with neutron science, synthesis science, and theory/modeling/simulation (TMS).

The CNMS will provide the research infrastructure and environment needed for a user facility with highly collaborative and interdisciplinary research. The user community will include resident scientific collaborators and both long- and short-term visiting scientists. The CNMS will also provide the necessary infrastructure for the research including technical support personnel, synthesis and characterization facilities, high quality and novel research materials, properties measurement facilities, and nanofabrication capabilities, within its research focus areas. This will permit assembling teams to tackle research problems of a scope, disciplinary breadth, and complexity that cannot be done by small-group efforts. More than half the users of the Center will be researchers from academia, industry, and other national laboratories. The Center will provide a unique training opportunity to introduce young scientists and engineers to nanoscale science, neutron science, and advanced synthesis and TMS tools.

C. Performance Scope Baseline

The CNMS facility consists of a multi-story building including the main laboratory and office building and a single-story Nanofabrication Research Laboratory (NRL). The total gross area of the new building is approximately 80,000 square feet, providing state-of-the-art clean rooms, and general laboratories for sample preparation, fabrication and analysis. Included will be initial equipment for nanoscale materials research such as surface analysis equipment, nanofabrication facilities, etc. A list of this equipment will be maintained under configuration control as part of the Systems Requirements Document. The facility, co-located with the Spallation Neutron

Source (SNS) complex, will house ORNL staff members and visiting scientists from academia and industry.

D. Performance Cost and Schedule Baseline

The performance baseline Total Estimated Cost (TEC) of $64 million and performance baseline Total Project Cost (TPC) of $65 million is based on receiving the following funding levels (in thousands of dollars):

The minor difference in the TEC BA Plan total versus the TEC BA Actual total is due to Congressional Budget Rescissions and Reductions.

Fiscal Year	TEC BA Plan		TEC BA Actual	Other Project Costs	Total Project Cost
	Project Engineering & Design	Construction		Conceptual Design, NEPA, Hazard Analysis, Other, and Pre-Operations	
Prior				250	250
2002	1,500		1,500	225	1,725
2003	1,000	24,000	24,689	100	24,789
2004		20,000	19,882	250	20,132
2005		17,500	17,669	100	17,769
2006				75	75
Total	2,500	61,500		1,000	64,740
	64,000		63,740		

The project schedule baseline is as follows:

CD-0	Approve Mission Need	June 2001
CD-1	Approve Preliminary Baseline Range	February 2002
CD-2	Approve Performance Baseline	September 2002
CD-3	Approve Start of Construction	February 2003
CD-4a	Approve Start of Initial Facility Operation	April 2005
CD-4b	Approve Start of Full Operations	September 2006

E. Beneficial Occupancy and Critical Decision-4a

Beneficial Occupancy is the stage in the progress of the work when the facility is sufficiently complete in accordance with the construction subcontract documents so that the owner can occupy the facility. The determination of the acceptance of the CNMS facility for beneficial occupancy will be accomplished by a joint walk through inspection by the ORNL and DOE project managers and project directors.

The CNMS definition for Beneficial Occupancy and CD-4A is below.

	Status	Comments
1. The building structures are complete. All permanent walls, floors, ceiling roofs, structural members, foundations, stairways, and elevator are installed according to specification.	complete	
2. All the clean rooms meet their respective clean criteria and are ready for hookup and installation of the tools and hoods.	complete*	
3. All surface treatments (paint, carpet, tile, protective coatings, etc.) have been properly applied.	complete*	
4. All doors, windows, lights, etc. have been installed and are functioning properly.	complete	
5. The fire alarm and fire suppression systems are fully operational and turned over to the ORNL fire department.	complete*	
6. All conventional facility utility systems (HVAC, sanitary water, chilled water, electricity, lighting, compressed air, public address, etc.) internal to the building have been installed and operational in their final permanent configuration and accepted for operation. All wiring, piping, pumps, motors, outlets, fixtures, hangers, hardware, etc. are properly installed and complete with no temporary pieces remaining.	complete*	
7. All utility connections are complete and provide the final required level of service.	complete	
8. There shall be a clear path for exterior access to the facility.	complete	
9. Minor architectural and utility system punch list items can be outstanding at Beneficial Occupancy.	complete*	

Items with an asterisk (*) have punch list items that are not necessary to be completed before beneficial occupancy.

The punch list of outstanding items is attached.

F. Project Status Review

On April 4-5, 2005, the Office of Basic Energy Sciences conducted a status review of the CNMS to assess the readiness of the project to proceed with CD-4a. The recommendation of the committee was to request CD-4a approval by the CNMS Acquisition Executive.

G. Transition to Operations

The CNMS has issued a Transition Plan that defines the roles and responsibilities of the project participants involved in the transition to operations phase of the facility. During this phase, the contractor project team will verify that the completed structures and systems are in compliance with the requirements and specifications for the CNMS design and will turn over the facility to the operations staff.

Center for Nanophase Materials Sciences at ORNL
CD-4a ESAAB-Equivalent Review

The undersigned verify that the CNMS project has completed the items for beneficial occupancy as noted and request the CNMS Acquisition Executive approve CD-4a.

Submitted by:

4/26/05
Date

David K. Arakawa
Federal Project Director
Programs and Projects Division
Oak Ridge Office

4/27/05
Date

George J. Malosh
Assistant Manager for Science
Oak Ridge Office

Concurred by:

5/3/05
Date

Kristin A. Bennett, CNMS Program Manager
Materials Sciences and Engineering Division
Office of Basic Energy Sciences
Office of Science

Recommendations

The undersigned "Do Recommend" (Yes) or "Do Not Recommend" (No) approval of Critical Decision-4a, Approve Start of Initial Facility Operation, for the Center for Nanophase Materials Sciences at ORNL as noted below.

ESAAB Secretariat, Construction Mgmt Support Division	4/27/05 Date	Yes ✓	No ___
Representative, Non-Proponent SC Program Office	4/27/05 Date	Yes ✓	No ___
Representative, Financial Mgmt. Division	4/27/05 Date	Yes ✓	No ___
Representative, Environmental, Safety and Health Division	4-27-2005 Date	Yes ✓	No ___
Representative, Security Mgmt. Team	Date	Yes ___	No ___
Representative, Laboratory Infrastructure Division	4-27-2005 Date	Yes ✓	No ___
Representative, Grants and Contracts Division	Date	Yes ___	No ___

Approval:

Based on the information presented above, Critical Decision-4a, Approve Start of Initial Facility Operation, is approved for the ORNL Center for Nanophase Materials Sciences, a Nanoscale Science Research Center.

Patricia M. Dehmer — 4/27/2005 Date

Patricia M. Dehmer
Associate Director of the Office of Science
for Basic Energy Sciences (CNMS Acquisition Executive)

Attachment

Center for Nanophase Materials Sciences
CF Beneficial Occupancy Definition (BOD)
Punch list

1. Several office, hallway and lobby areas need touch up painting and completion of flooring.

2. Completion and testing of the PA system on the ground floor.

3. Compressed Air System final blowdown and testing.

4. Completion and testing of exterior lighting.

5. Fire Alarm punchlist items. The fire alarm system has been tested; it is operational and is being monitored by the ORNL fire department. The punchlist items are not necessary for beneficial occupancy.

6. Cleanroom punchlist items. All areas tested for airborne particle counts have met their design classifications. The punchlist items are not necessary for beneficial occupancy.