

**Office of Basic Energy Sciences  
Office of Science**

**CD-3, Approve Start of Construction  
for the  
Center for Nanophase Materials Sciences (CNMS)  
A Nanoscale Science Research Center  
at Oak Ridge National Laboratory**

**A. Purpose**

The purpose of this paper is to document the review by the Office of Science Energy Systems Acquisition Advisory Board-equivalent for the Critical Decision “Approve Start of Construction (CD-3)” 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. Project Performance Scope Baseline**

The final CNMS Project Execution Plan has been revised for Critical Decision-3 and to incorporate comments from the recent Execution Readiness Independent Review.

The CNMS facility will consist of a multi-story building including the main laboratory and office building and a single-story Nanofabrication Research Laboratory (NRL). Based on the Title II (final) design, the total gross area of the new building will be 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

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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. Project Performance Cost and Schedule Baseline

The performance baseline Total Estimated Cost (TEC) of \$64.0 million and performance baseline Total Project Cost (TPC) of \$65.0 million are based on receiving the following funding levels (in thousands of dollars):

Fiscal Year	Total Estimated Cost		Other Project Costs	Total Project Cost
	Project Engineering & Design	Construction	Conceptual Design, NEPA, Hazard Analysis, Other, and Pre-Operations	Total
Prior			250	250
2002	1,500		225	1,725
2003	1,000	24,000	100	25,100
2004		20,000	250	20,250
2005		17,500	100	17,600
2006			75	75
	2,500	61,500		
<b>Total</b>	<b>64,000</b>		<b>1,000</b>	<b>65,000</b>

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 Operations	February 2005*
CD-4b	Approve Start of Full Operations	September 2006

\*CD-4a delayed from December 2004 due to impact of FY2003 Continuing Resolution constraints on new construction starts. Date based on construction funds available early February 2003.

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### **E. Final Design, Procurement Package, and Execution Readiness Independent Review**

The CNMS final design drawings are complete and the conventional facilities procurement bid package is in preparation by the construction manager. In December 2002, the Office of Science conducted the Execution Readiness Independent Review and issued the final report in January 2003. The CNMS project team has adequately responded to the Independent Review action item and recommendations.

### **F. Safety Documentation**

The CNMS Environment Safety and Health plan was revised to include the latest chemical and gas inventory projections. In addition, the hazards screening/safety assessment has been revised to incorporate the broad range of hazards (e.g., lasers, high pressures, etc.) and a brief description of how such hazards are controlled (e.g., relevant procedures) at ORNL. The updated documents will also reference the current ISM procedures and processes that will be used for CNMS operations.

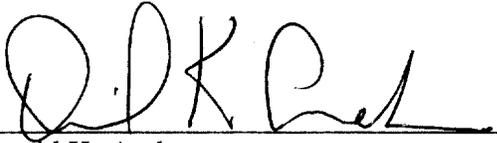
### **G. Risk Assessment/Plan**

The CNMS project risk assessment/plan was revised to describe the methodology used in preparing/assessing the risks. Risk assessment will be performed periodically during the duration of the project.

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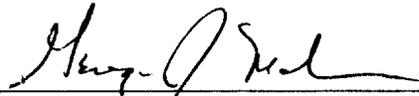
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Submitted by:



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DOE Federal Project Manager  
ORNL Site Office

1/28/03  
Date



George J. Malosh  
Site Manager  
ORNL Site Office

1/30/03  
Date

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

Iran L. Thomas  
Director, Materials Sciences and Engineering Division  
Office of Basic Energy Sciences  
Office of Science

Date

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## Recommendations

The undersigned “Do Recommend” (Yes) or “Do Not Recommend” (No) approval of CD-3, Approve Start of Construction, for the Center for Nanophase Materials Sciences at ORNL as noted below.

\_\_\_\_\_  
ESAAB Secretariat, Construction Mgmt Support Division      Date

Yes \_\_\_\_ No \_\_\_\_

\_\_\_\_\_  
Representative, Non-Proponent SC Program Office      Date

Yes \_\_\_\_ No \_\_\_\_

\_\_\_\_\_  
Representative, Financial Mgmt. Division      Date

Yes \_\_\_\_ No \_\_\_\_

\_\_\_\_\_  
Representative, Environmental, Safety and Health Division      Date

Yes \_\_\_\_ No \_\_\_\_

\_\_\_\_\_  
Representative, Security Mgmt. Team      Date

Yes \_\_\_\_ No \_\_\_\_

\_\_\_\_\_  
Representative, Laboratory Infrastructure Division      Date

Yes \_\_\_\_ No \_\_\_\_

\_\_\_\_\_  
Representative, Grants and Contracts Division      Date

Yes \_\_\_\_ No \_\_\_\_

## **Approval**

Based on the information presented above and at this review, Critical Decision-3, Approve Start of Construction, is approved. Therefore, the Oak Ridge Operations Office is authorized to expend construction funds when they are in a HQ approved funding program and there are no Continuing Resolution constraints for the Center for Nanophase Materials Sciences, a Nanoscale Science Research Center.

\_\_\_\_\_  
Patricia M. Dehmer  
Associate Director of the Office of Science  
for Basic Energy Sciences

\_\_\_\_\_  
Date