

Oak Ridge National Laboratory

The image shows the exterior of the Oak Ridge National Laboratory building at dusk. The building is a large, modern structure with a prominent glass facade that is illuminated from within, creating a warm glow. The sky is a deep blue, and the ground in the foreground is wet, reflecting the lights from the building. A central courtyard area is visible, featuring a pergola structure and some trees. The overall scene is a mix of architectural detail and natural elements.

- **\$1.2 billion budget**
- **4,500 employees**
- **3,500 research guests annually**

ORNL East Campus as it appeared in March 2002



ORNL East Campus in May 2006



Chemical and Materials Sciences Bldg



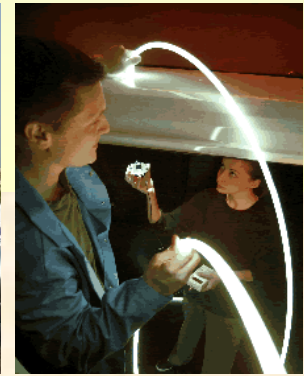
Project scope

Modern research space needed more than ever for global energy challenge

- **The new 3 story building will have 160,000 gsf with 300 staff**
- **56 - 21st century research labs**
 - 16 heavy instrument labs
 - 22 synthesis labs
 - 16 light instrument labs
 - 1 ea, NMR and Microscopy lab
- **Offices**
 - 51 large
 - 95 small
 - 124 Modular
- **Support Space**
 - 3 break rooms
 - 6 copy rooms
 - 5 conference rooms
- **170 fume hoods**

Efficient, modern chemical and material sciences laboratory facility

- Meet Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings
 - Equipment and systems selected to maximize energy efficiencies and "green" building technologies
 - Achieve LEED Certification
 - Strategies such as super windows, deep day lighting, hybrid lighting and photovoltaic panels considered
- Open, collaborative, flexible laboratory and office environments responsive to future mission changes
 - Maximize chemical loading, vibration mitigation, HEPA filtration for nanotechnology research, and fume hoods



Funding/cost profile

| | Prior years | FY08 | FY09 | FY10 | FY11 | Total |
|------------------------|-------------|----------|-----------|-----------|-----------|---------|
| TEC Funding Baseline | | \$9.329M | \$85.671M | | | \$95.0M |
| TEC Cost Profile | | \$1.509M | \$14.379M | \$49.892M | \$29.220M | \$95.0M |
| TEC Cost + Commitments | | \$3.70M | \$22.50M | \$80.30M | \$95.0M | \$95.0M |
| Contingency | | | \$14.052M | | | |
| | | | | | | |



It's the Risk and Schedule -

- **Identify, mitigate and reduce project risks**
- **Reduce schedule**
 - Reduces project cost
 - Reduces ORNL manpower needs
 - Improved start date for research

Risk management:

- **The Project Team works together to identify and evaluate risks and develop response plans to manage risks**
- **Risks and control actions are reviewed and updated monthly**
- **The largest risks were schedule delay due to the DOE 413.3 Critical Decision Process – specifically CD-1 and CD-3, high bids from the construction contractor and design errors which cause field changes.**
 - **The original 4 - 5 year funding profile would have prevented us from any improvement of the schedule.**

Improved MOA maximizes delivery of laboratory facilities

- **Shorter schedules and risk management result in lower cost**
 - Delegate/streamline 413.3A critical decision process
 - Design-to-cost A&E contract
 - Construction manager ensures design constructability via pre-construction services subcontract
 - 2 phase construction contract with “construction manager at risk”
 - Early start of construction: Early construction package (CD-3A) for site work and foundations. This eliminates the long lag time between the end of design and the start of construction.



Architect-Engineering Design

- Fixed Price Design-to-Cost Approach
- 15, 30, 60 & 90 Percent Design Reviews
- Value Engineering Study prior to 30%
- LEED Gold Certification
- Independent Commissioning Agent and CM provide support to AE during design phase.
- CD-3A Early Construction Package Issued by AE for Site, Foundations, Structural Steel and Precast Panels.

Construction Manager Procurement

- **Two Phases – Design Support Services and Construction**
- **Retain CM before 30% design to provide pre-construction CM services**
 - **If satisfied with phase 1 performance, exercise option for phase 2 construction services**
 - **CM becomes general contractor for a firm fixed-price and bears risk for completion**

CM/GC Selection Process

- Pre-qualification
- Receive technical and price proposals:
 - Firm fixed price for pre-construction services (Phase 1)
 - Firm fixed price for specified general conditions and OH&P based on an established range of anticipated construction costs (Phase 2)
 - Designated staff, management approach, safety plan and past performance
- 'Best Value' source selection:
 - Pricing for Phase 1 and 2
 - Safety performance/program
 - Experience & demonstrated prior performance
 - Project team experience

Pre-Construction Services

- Estimating
- Constructability review
- Market analysis
- Design review
- Pre-qualification of subcontractors
- Subcontractor bidding
 - Bid process subject to ORNL procedures and approvals
 - Evaluate bids with ORNL

Phase 2 Construction Services

Unilateral option held by ORNL

- If option exercised, accepted bid packages will be added to the CM contract as award is authorized at fixed prices approved by ORNL
- ORNL could elect not to exercise the Phase 2 option and to bid the work to other GC's.
- McCarthy Construction selected for Project
- Authorized Early Construction in May 2009

Advantages for ORNL

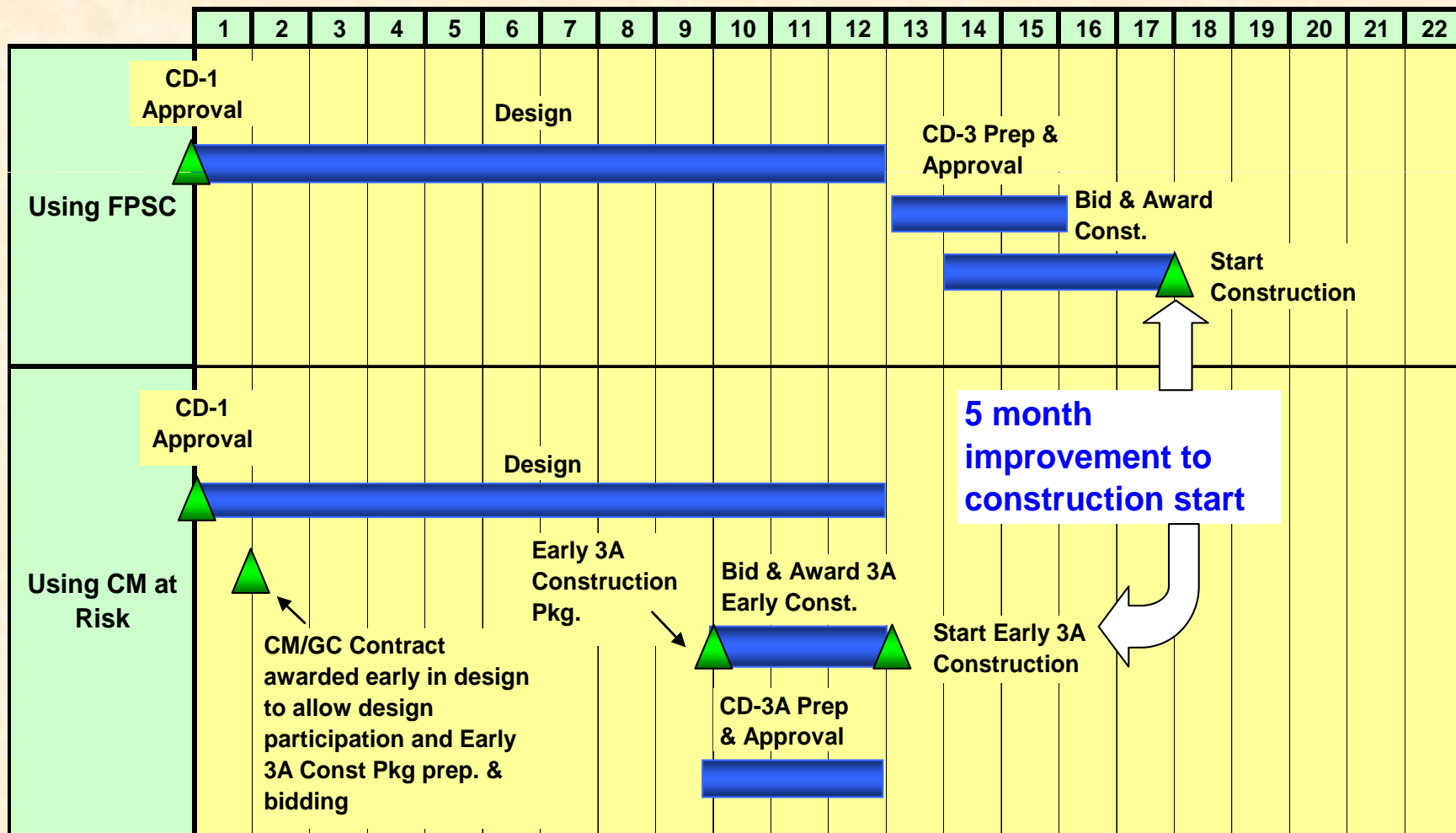
- Attracted high quality construction firms not usually interested in ORNL projects. They cannot compete on low bid awards.
- Best Value source selection balances pricing against other valuable features and attributes
- CM participation in design results in higher quality (more constructible) design and fewer design errors that get to the field
- contractor-driven change orders
 - Contractor has bought in to design choices, schedule, plan coordination, etc.
 - Prenegotiated fee for changes
- More cost effective project

Advantages for CM

- They have more complete information about design
 - Performed constructability reviews
 - Plan check and coordination
- More control over subcontractor selection
 - Time to pre-qualify
 - Time to fully evaluate bids for accuracy and completeness

Schedule Improvement Using CD-3A and CM at Risk

Schedule Timescale = Mos.
Based on MLF Project











Critical Decision Milestones

| Critical Decision Point | Completion |
|---|---------------------------|
| CD-0 Approve Mission Need | September 2007 (A) |
| CD-1 Approve Alternative Selection and Cost Range | January 2008 (A) |
| CD-2 Approve Performance Baseline and | December 2008 (A) |
| CD-3A Approve Start of Construction (Early Construction and Long Lead Procurement) | May 2009 (A)) |
| CD-3B Approve Start of Construction - New Laboratory Building | August 2009 |
| CD-4 Approve Start of Full Operations | June 2011 |

Questions?