Laboratory Reorganization 2001

1. Introduction

On Monday, April 30, 2001, Bill Madia sent an e-mail message to ORNL staff announcing the creation of an Organizational Review Task Force (see Exhibit 1). In this message, Dr. Madia stated, "A more effective management structure is critical to our ongoing effort to reduce the cost of doing business at the Lab. Equally important is the need for a staff-friendly management structure aligned more closely with the Lab's mission." The creation of the task force was also announced in *ORNL Today*.

Exhibit 1
Organizational Review Task Force Announcement

Date: Mon, 30 Apr 2001 08:07:13 -0400 (EDT)
From: Bill Madia (madia@ornl.gov)
Subject: Organizational Review Task Force
Sender: owner-ornl_staff@mailhub.ornl.gov
To: ornl_staff@mailhub.ornl.gov

An important part of our agenda during the next year will be a review of the lab's organizational structure. Such a review is necessary for a number of reasons. A more efficient management structure is critical to our ongoing effort to reduce the cost of doing business at the lab. Equally important is the need for a staff-friendly management structure aligned more closely with the lab's mission.

I have created an Organizational Review Task Force that will recommend how we might improve our present management structure. I have asked Lee Riedinger and Jeff Smith to serve as co-chairs of the task force. They will work with a diverse team of ORNL staff that will seek input from all parts of the organization.

I will urge that the task force not feel constrained in its recommendations. Eliminating a layer of management or realigning existing organizations should be considered if the changes serve the goal of making the lab more efficient or more responsive to our customers' needs.

I have asked that any initial recommendations be provided by this summer. We will be developing a website in order to enable ORNL staff to provide input to the task force. We will provide information about the website in ORNL Today. After a review of the recommendations, my goal is to implement organizational changes by October 2001 at the earliest.

I have found at ORNL a tremendous reservoir of creativity among our staff at all levels. As we move forward with this initiative, I encourage you to share any suggestions you may believe would contribute to improving the lab's efficiency and effectiveness as a research organization.

The task force was charged with reviewing

- the alignment of the Laboratory's capabilities,
- the number of management layers and spans of control, and
- the alignment of organizations with the Laboratory's customers from a funding perspective.

The goals were to determine what would make sense for the Laboratory in terms of resource alignment, customer alignment, avoidance of overlap, and reduction in layers of management.

Lee Riedinger, Deputy for Science and Technology, and Jeff Smith, Deputy for Operations, were named as co-chairs of the task force. Other members of the task force included associate Laboratory directors (ALDs), division directors, section heads, program directors, senior scientists, the director of the Human Resources organization, a representative from the Business and Information Services (B&IS) organization, and a former ORNL deputy director. Appendix A lists the task force membership.

Dr. Madia requested that the task force provide its initial recommendations in early summer, with a goal of implementing organizational changes by October 2001. Figure 1 shows the schedule that was established for the organizational review effort.

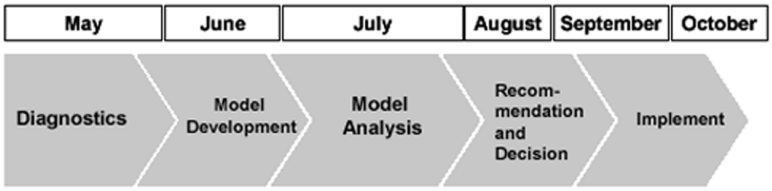


Figure 1. Reorganization time line.

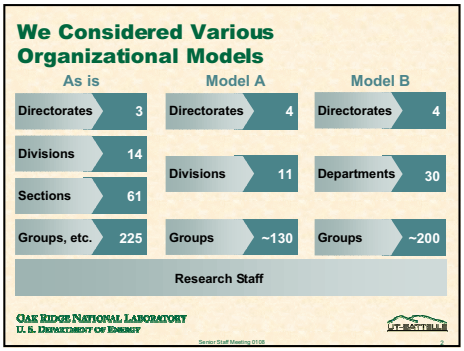
In accordance with this schedule, the task force established five diagnostic tasks to obtain the information needed to carry out its assigned tasks and then developed and analyzed proposed organizational models that responded to the key findings from the diagnostic efforts. The proposed models also addressed the needs established through a review of key functions that was commissioned by Dr. Madia in mid-July.

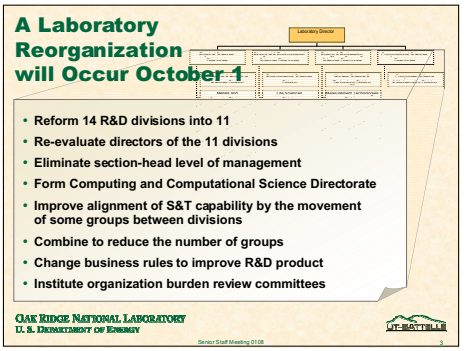
The task force provided the Leadership Team with its recommendations in early August. One of two recommended organizational models was selected and announced in mid-August 2001. Details associated with implementing this model were addressed during the remainder of the fiscal year, with implementation largely completed by October 1, 2001.

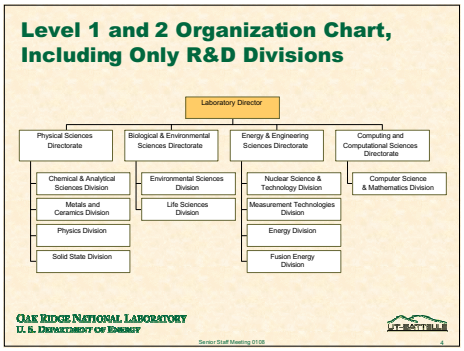
An Organizational Review Web site was established to provide staff with information about the progress of the task force and to collect staff input. In addition to posting information about its meetings to the Web site, the task force provided periodic summaries to Laboratory staff, using *ORNL Today* as the primary means of keeping staff

informed about its actions. Dr. Madia also devoted much of his presentation at the August 16, 2001, Senior Staff Meeting (see Exhibit 2) to issues relating to reorganization.

Exhibit 2
Reorganization viewgraphs from August 16, 2001, Senior Staff Meeting







2. Diagnostics

2.1 Development of Diagnostics

The task force established 5 diagnostic tasks designed to produce the information that it needed to proceed and chartered subteams to carry out these tasks. Assignments were as follows:

- Develop an understanding of customer alignment
  - Develop a picture of ORNL's R&D portfolio by customer base
  - Develop an understanding of how work is passed from one ORNL organization to another
  - Determine whether resources are aligned with customers and whether marketing is aligned with sponsors and opportunities
- Develop an understanding of capability alignment, with an emphasis on understanding the Laboratory's capabilities and identifying where similar and/or complementary capabilities exist

- Develop an understanding of levels of management and spans of control (number of reports) at each level
- Review existing studies and benchmarks
  - Benchmark other laboratories (particularly Argonne, Los Alamos, and Pacific Northwest national laboratories)
  - Benchmark other institutions (academic and industrial) that are relevant to ORNL
  - Review previous organizational studies conducted at ORNL
- Collect staff input
  - Establish a Web site to collect staff questions and comments and communicate task force actions
  - Conduct focus groups with staff

2.2 Key Findings from Diagnostics

Key findings in each of the five diagnostic areas were reported at a July 13, 2001, meeting of the task force.

2.2.1 Customer Alignment

The Customer Alignment subteam found that most ORNL R&D divisions were located within directorates that focused on their major DOE programs. Notable exceptions were Robotics and Process Systems Division (RPSD), which received 91% of its DOE Financial Plan (FinPlan) budget from the Biological and Environmental Sciences Directorate; the Metals and Ceramics (M&C) Division, which received 82% of its DOE FinPlan budget from the Energy and Engineering Sciences Directorate; and the Computational Physics and Engineering Division (CPED), which received 61% of its DOE FinPlan budget from the Biological and Environmental Sciences Directorate.

In considering the problem of stovepiping, the subteam concluded that no firm conclusions could be drawn for R&D divisions. The subteam found that most programs supported multiple divisions, although some sponsors targeted specific divisions. Program directors were associated with directorates within which the majority of their funding was located, raising the question of whether this influenced future program development on a Lab-wide basis. The subteam also observed that most Work for Others (WFO) projects are single-division activities.

The subteam also investigated the relationship between divisions' financial health and the number of full-time equivalent (FTE) employees charged to organization burden. The average across the Laboratory was 18%; five divisions had significantly higher averages: Instrumentation and Controls Research, 33%; RPSD, 29%; Environmental Sciences (ESD), 25%; Engineering Technology (ETD), 22%; Life Sciences (LSD), 21%. Possible causes included program development, unique ES&H needs, unfunded staff, and Y-12 interface issues.

The subteam also reviewed division size. On average, divisions had 150 total FTEs and 96 direct-charged FTEs; individually, they spanned a range from RPSD (56 and 33) to

M&C (265 and 175). Many small divisions were found to be well aligned with their DOE customers (based on primary funding for the organization).

A review of the distribution of Laboratory Directed R&D (LDRD) funding showed a high concentration in Solid State Division, where 14% of total FTEs and 23% of direct program FTEs were supported by LDRD. No other division exceeded 7% of total FTEs or 13% of direct FTEs.

The subteam found that most ORNL divisions were supported by multiple programs. The Office of Basic Energy Sciences in the Office of Science (DOE-SC) was the primary sponsor for Research Reactors (97%) and Solid State (89%) and the SNS project (100%). Physics Division was largely supported by the DOE-SC Office of High Energy and Nuclear Physics (89%), Fusion Energy Division by the DOE-SC Office of Fusion Energy Sciences (79%), and RPSD by the Assistant Secretary for Environmental Management (DOE-EM, 61%). Some single-program divisions were found to exist in response to sponsor requirements or expectations.

The Laboratory's WFO portfolio was also reviewed to address whether reliance on non-DOE sponsors was a concern. On the average, divisions received 70% of their funding through in-division DOE FinPlan accounts. Outliers included I&C Research (9% of division cost) and CPED (40% of division cost), in which large fractions of the staff were supported by other divisions, and Chemical and Analytical Sciences (CASD; 41% of cost). The average division received 18% of its cost from WFO; in four divisions, WFO represented more than 33% of division cost: I&C Research (50%), CPED (43%), CASD (39%), and Life Sciences (33%).

A review of project size [with "project" defined as a Field Work Proposal (FWP) or an Internal Activity Number (IAN) for WFO] revealed that projects at ORNL and Pacific Northwest were roughly the same size. About 90% of ORNL's cost was associated with projects larger than $200K, and the average DOE project size was $693K (compared with $127K for WFO projects). While 83% of ORNL's cost was covered by projects funded by DOE or other DOE sites, this represented only 54% of the projects (i.e., WFO projects accounted for 46% of the number of projects but only 17% of the cost).

The subteam conducted a focus group with program directors and managers and incorporated comments from the group into its recommendations.

Specific recommendations from the Customer Alignment subteam were as follows.

- Noting that the distribution of program development funds is not obviously an organizational issue, the subteam recommended that the Laboratory reconsider how these funds are allocated. An increase in program development funding was suggested.
- The subteam recommended that the current organization should be retained to meet the needs of DOE program directors. Further investigation of the adequacy of coverage for DOE customers was suggested, with attention directed to lower (but significant) tiers within programs, Defense Programs, and DOE-EM.

- The subteam called for modification of the organizational structure for WFO and National Security and recommended the establishment of a clear marketing strategy, especially for WFO. It was suggested that ORNL may need additional customer-specific program directors/managers (relationship managers) for WFO activities.
- The subteam recommended that consideration be given to aligning all R&D divisions with the ALD responsible for major programs.
- The subteam raised the question of whether funding/division metrics suggest consolidation of divisions and, in this light, asked whether ORNL divisions should have a close alignment with DOE customers and what financial metrics define a successful R&D division.

The subteam identified several further issues that, although they do not relate to the question of organizational structure, should be evaluated:

- Work for other DOE sites should not be considered WFO
- Tracking data with SAP is difficult because of inconsistent practices related to assignment of project owners, account owners, etc.
- Tracking of cost data below the division level is not easily accomplished
- Service centers should be used instead of subaccounts for LDRD project funding distribution to multiple divisions
- Program development funding cannot be tracked for ORNL

2.2.2 Capability Alignment

The Capability Alignment subteam established three operating principles:

- Directorates have competencies.
- Divisions have capabilities.
- Programs make use of capabilities.

The subteam observed that, in general, programs and capabilities in basic research divisions were well aligned and do not change quickly, while in applied research divisions, directions change and these organizations must be able to make adjustments to align programs and capabilities as well as possible.

The subteam analyzed division, group, and section structure and found large variations in the health of divisions and groups. The Laboratory's 14 R&D divisions represented a total of 1722 FTEs. Within these divisions, there were 62 sections, with indirect management chargers accounting for 34 FTEs and another 50 FTEs of other indirect support. Among the 250 groups were 25 "virtual" groups (no chargers), 44 groups with $\leq$2 FTEs, and 181 groups with >2 FTEs. The number of group members ranged from 1 to >25, with an average of 8.

With assistance from division directors and ALDs, the subteam identified 107 capabilities and then related divisional group structures to capabilities. The number of direct, externally supported FTEs was used to measure the size of the research effort in each group. The subteam identified 1186 FTEs on direct support in 14 R&D divisions, plus 121 postdocs, and mapped 251 groups to the list of 107 capabilities, producing a

distribution of direct FTEs by divisional capability. Exhibit 3 shows the groupings of these capabilities by division.

The subteam then grouped the capabilities into 11 major units:
- Chemical and analytical sciences: fundamental and applied molecular chemistries.
- Computational sciences: computer science, mathematics, and algorithm development.
- Energy: energy analysis, building and transportation technologies.
- Environmental sciences: ecological experimentation, theory, and modeling.
- Fusion: magnetic fusion energy science and technology.
- Life sciences: genetics, genomics, and computational biology.
- Measurement technologies: electronics, signal processing, diagnostics, and power electronics.
- Metals and ceramics: structural materials theory, characterization, processing, and development.
- Nuclear science and technology: nuclear chemical engineering and technology.
- Physics: nuclear and atomic physics.
- Solid state: condensed matter physics.

The subteam concluded that the capabilities of some divisions and groups had drifted and could benefit from realignment, noting that any realignment of capabilities to better meet program needs should fulfill the following objectives:
- Maintain the strength of single-program basic research divisions (Fusion Energy, Physics, Solid State).
- Strengthen materials and chemical sciences.
- Grow computation.
- Position for growth in nuclear R&D.
- Strengthen instrumentation research.

The subteam also raised the question of how best to align capabilities in the life sciences to spur growth in business for the DOE-SC Office of Biological and Environmental Research (OBER) and the National Institutes of Health (NIH).

2.2.3 Levels of Management

The Levels of Management subteam worked to develop an understanding of the current levels of management and spans of control at each level. Its analysis revealed that multiple management structures and models were in use across the Laboratory, with wide variation in spans of control (number of direct reports). These differences were attributed to a combination of:
- legacy (a tradition of division and program autonomy),
- business drivers such as customer alignment, and
- differences in management preferences and philosophies.

Exhibit 3
Grouping of capabilities by division

CASD	Mass spectrometry	Hydrothermal and geochemistry	Actinide science and radioactive materials charac-terization	Separations chemistry	Materials and polymer chemistry	Interface and surface chemistry	Chemistry of energy and fuels	Nanoscale chemistry and analysis	Analytical chemistry, miniaturized instruments	
CTD	Nuclear technology	Radioactive materials transportation and packaging	Physical properties research	Advanced computational chemical technology	Separations and chemical processing	Materials chemistry	Bioprocessing			
CPED	Nuclear science, radiation transport, criticality safety nuclear data, physics modeling	Computational modeling: thermal, structural, fluid dynamics, transportation, biomedicine	Geographic information systems and remote sensing	Data management: decision support, information systems						
CSMD	High performance computing: GTL, climate, materials, fusion, chemistry, astrophysics	Distributed and cluster computing	Networking and visualization	Software tools for high-performance computing	Math and algorithms	Statistics and data science	Intelligent machines: nano robots, human/machine interfaces, sensors	Future technologies: optical computing, quantum computing		
ETD	Power electronics, electric machinery	Propulsion, power technology	Industrial systems, energy efficiency	Photonics	Microelectro-optics, sensors	Gas centrifuge	Structural mechanics: pressure vessel design	Carbon fiber, polymeric composites	Nuclear plant design	Thermal hydraulics: modeling, experimental heat transfer and flow
RPSD	Nuclear and chemical process systems	Nuclear and hazard environment	Robotics and intelligent machines							
I&C	Advanced nuclear measurement controls	Sensor and instrument research	Laser and optical technologies	Real-time systems	Advanced signal processing: intelligent systems, quantum entanglement	Experimental and operational facilities: design, fabrication, software development	Image science, machine vision	Monolithic systems circuits, MEMS, sensors	RF and microwave	Analog and digital systems
M&C	High-performance structural alloys	High-performance structural ceramics	Carbon materials	Function materials, fuel cells, sensors, high-temperature super-conductors	Synthesis and joining of metals and ceramics	Theory of materials	Microstructure and microchemical charac-terization	Mechanical and physical properties	Radiation effects in materials and nuclear applications	
ESD	Ecosystems and global change	Environmental data systems	Microbial ecology, bio-geochemistry, biotechnology	Ecological management science	Renewable resources					
LSD	Functional and comparative genomics	Mammalian genetics	Computational biology	Bioinformatics	Biophysics and biomedical technology	Structural biology	Nuclear medicine	Toxicology and risk assessment		
Energy	Integrated assessment of energy and environment	Social science research	Economic modeling and analysis	Energy-efficient buildings	Electrical power systems modeling	Transportation policy and planning	Geospatial analysis	Emergency planning	Transportation safety	Logistical and supply chain tools	Intelligent transportation systems
FED	Fusion concept development	Plasma technologies	Plasma theory and computation	Experimental plasma physics	Magnetics and super-conductivity	High-voltage, high-power systems	RF and plasma processing of materials	Engineering: structural magnetic and thermal analysis		
Physics	Nuclear structure	Nuclear astrophysics	Relativistic heavy ions	Development and production of accelerated radioactive ions	Accelerator operations	Atomic, molecular, and optical physics				
SSD	Materials synthesis	Materials charac-terization	Materials theory	Low dimensional physics	Neutron scattering					

Broadly speaking, management distribution was fairly consistent across ORNL; supervisors and managers represented 16% of employees in R&D divisions and 13% in non-R&D divisions, yielding a Lab-wide representation of 15%. However, the average number of direct reports varied widely, with several instances of 1 supervisor to more than 20 employees and a report of 1 supervisor for 59 employees. A number of recent activities (development of R2A2s, mapover to new compensation program, review of SAP supervisor codes) demonstrated that supervisors and managers did not share a common set of responsibilities, so the data collected by the subteam may not have presented the full story.

The subteam concluded that, even though ORNL is a diverse organization, our management approach should be tied to functional requirements. Specifically, we need to understand our core functional requirements and ensure that they are appropriately reflected in the design of the organization. The subteam recommended a review of the Laboratory's approach to supervisor accountabilities and of direct report ratios to ensure

that supervisory/manager responsibilities are identified and accountabilities are understood.

2.2.4 Staff Input

The task force conducted focus groups with a variety of staff members:

- a group of senior research staff,
- the Laboratory's Corporate Fellows,
- division directors,
- group leaders and section heads (one group) and newer employees (two groups) in the Biological and Environmental Sciences Directorate,
- group leaders and section heads (one group) and newer employees (one group) in the Energy and Engineering Sciences Directorate, and
- group leaders and section heads (one group) and newer employees (one group) in the Physical and Computational Sciences Directorate.

Summaries of focus group comments were provided to task force members and posted on the Organizational Review Web site.

Task force members also reviewed comments submitted via the Web site and staff input to the Quality of Work Life (QWL) and Quality of Work Environment (QWE) surveys.

Four themes were heard in almost all focus groups:

- Costs are too high.
- Staff development needs more attention.
- Working across organizational boundaries needs to be easier.
- More clarity with respect to program development responsibilities is needed.

These themes were also reflected in the QWL and QWE surveys.

2.2.5 Benchmarking

Information from a 1995 task force on organizational effectiveness and from a 1996 study conducted by Ernst and Young (E&Y) was collected and reviewed, and a literature search was performed. The 1995 task force identified weak strategic management, the high cost of doing business, antiquated facilities, and a tendency for the Laboratory to function as "a holding company for R&D entrepreneurs" as key weaknesses and recommended changes to address these problems. These changes included reducing the number of R&D divisions from 15 to 10 or fewer, maintaining the number of research ALDs at 4 or fewer, and making a radical change in the organizational structure, such as placing programs under a single ALD with other ALDs being responsible for disciplines.

The 1996 E&Y study identified two major issues:

- The organization had too many managers, too many management levels, and too little employee empowerment and decision-making.
- Organizational barriers prevented the Laboratory from being as efficient, flexible, and responsive as it needed to be to remain competitive.

This study proposed a "nonhierarchical, fluid, and customer-oriented" organization structure, generally aligned along core competencies with one director (and cost center)

for each competency, and the creation of a support services organization with support functions matrixed to R&D organizations.

The Organizational Review Task Force was briefed on the organizational models and practices at Argonne, Los Alamos, and Pacific Northwest national laboratories. The report from Los Alamos warned of the need to avoid "Flatland" (moving to an organization with too few layers), based on experience in the mid-1990s. The briefing from Pacific Northwest described the laboratory as organized around mission areas/customers and traditional functions and cautioned against "complexity" (defining too many distinct roles).

3. Key Functions

At the Organizational Review Task Force meeting on July 13, 2001, Dr. Madia asked the task force to determine the key functions of the Laboratory and to map responsibility for these functions to the recently developed job ladders (see Exhibit 4).

The task force reached agreement on four key functions:

- Capability development: Develop the equipment and facilities necessary to execute our programs
- Program development: Develop and market R&D programs
- Program execution and operations: Complete assigned tasks
- Staff development: Attract, motivate, and retain staff

Dr. Madia also presented a set of three organizational design principles to be used in determining the level at which the core functions are carried out:

- Level 1 research organizations are "customer-focused" entities responsible for a major block of Laboratory business (and strategy) with key customers.
- Level 2 (and lower level) organizations represent "Lab-wide" capabilities (under the stewardship of their Level 1 manager). These organizations serve all Lab customers, have a critical mass of skill, and ensure ORNL quality and excellence.
- An individual's "career path" should be used to determine "line" versus "matrix" assignment.

Figure 2 shows a mapping of the core functions to these principles.

4. Model Development and Analysis

Dr. Madia requested the development of one or more organizational models that would (1) respond to the key findings from the diagnostic efforts and (2) address the needs established through review of the key functions. He also asked that task force members consider the impact of these models for

- reducing cost,
- maximizing capability consolidation,
- enhancing staff development, and
- supporting customer alignment.

Exhibit 4
Key function viewgraphs from the July 13, 2001, Organizational Review Task Force meeting

Core ORNL Functions

ORNL Ladders	Staff Development	Operational & Capability Development	Program Development & Management	Other?
R&D Staff				
Program Management				
Line Management				
Technical Staff				
Admin/Business Management Staff				

Staff Development

Attract, motivate, and retain staff

- Hiring
- Performance management
- Mentoring
- Reward and recognition system
- Staff development
- Allocate PDM/LDRD

Operational & Capability Development

Maintain the equipment and facilities necessary to execute our assigned programs

- Compliance
- Equipment/instrument calibration
- Maintenance
- Modernization
- Facility operations
- Manage user facilities

Program Development & Management

Develop, market and execute R&D programs

- Proposal writing
- Marketing
- Selling
- Strategy setting – ORNL "strategic directions"
- Allocate investments
  - PDM
  - LDRD
- Develop new lab-level initiatives
- Understanding customer needs
- Project management
- Assuring quality
- Commercialization
- Project management systems
- Customer relations
  - Senior
  - General

Organizational Design Principles

- Level 1 Research Organizations are to be "customer focused" entities responsible for a major block of lab business (and strategy) with key customers.
- Level 2 (and below) organizations represent "lab-wide' capabilities (under the stewardship of their level 1 manager). These organizations serve all lab customers, have a critical mass of skill and ensure ORNL quality and excellence.
- An individuals "career path" should be used to determine "line" versus "matrix" assignment.

As you develop and evaluate organizational models, consider their impact on

- Cost (reducing layers of management)
- Maximizing capability consolidation
- Enhancing staff development
- Supporting customer alignment

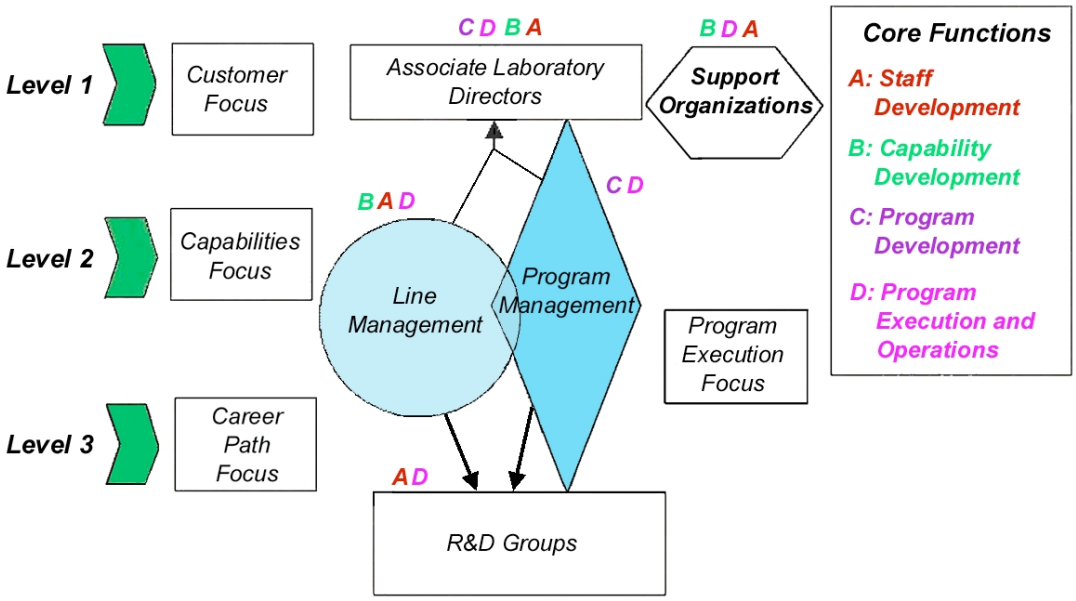


Fig. 2. Mapping of core functions to organizational design principles.

In its model development efforts, the Organizational Review Task Force devoted considerable effort to two questions:

- Could Level 2 functions be carried out with one level of management rather than two?
- Could capabilities at Level 2 be consolidated by reducing the number of divisions?

Jeff Smith reviewed these efforts in a July 23, 2001, presentation to Leadership Team (see Exhibit 5).

The task force generally agreed that the number of ALDs should be maintained or expanded to increase customer focus and provide additional control points. Two approaches to reducing the number of levels were proposed:

- reducing the number of divisions and collapsing sections and R&D groups into a single level, and
- collapsing divisions and sections into a single level and retaining the existing R&D groups.

Two models that reflect these approaches are shown schematically in Fig. 3.

- Model A focused on the alignment of research capabilities into a smaller number of divisions, complemented by an effort to expand the average size of groups by eliminating redundancy and subcritical groups.
- Model B proposed the creation of about 30 “departments” as line management units, intermediate between the existing division and section, that would house an average of 35 to 45 S&T FTEs, with a focus on strengthening leadership roles of R&D groups and enhancing staff development and mentoring.

Advantages and disadvantages of each model were reviewed and analyzed.

Exhibit 5
Viewgraphs from July 23, 2001, presentation to Leadership Team

Our current status:

1. **Understand our core functions**
2. **Revisit alignment with major customers to establish level 1 structure**
3. **Develop two models, each with a separate primary driver**

Defined four core functions

- **Staff Development**
  - Attract, motivate, and retain staff
- **Capability Development**
  - Develop the equipment and facilities necessary to execute our programs
- **Program Development**
  - Develop and market R&D programs
- **Program Execution and Operations**
  - Complete assigned tasks

Staff Development

Attract, motivate, and retain staff

- Initiate staffing actions
- Monitor staff performance on assigned work and provide meaningful and effective feedback
- Ensure that staff are effectively utilized, motivated, trained, and rewarded
- Support professional development consistent with Laboratory objectives and personal goals

Capability Development

Develop the equipment and facilities necessary to execute our programs

- Understand technical advances and their relevance to future R&D challenges
- Allocate resources to acquire new capabilities and sustain existing ones
- Acquire strategic personnel
- Protect and utilize intellectual property to advance/sustain capabilities
- Provide for the retirement of capabilities that are no longer needed

Program Development

Develop and market R&D programs

- Understand customer needs and translate those needs into R&D opportunities (i.e., plan, prioritize, and pursue new work)
- Identify specific capabilities that can be leveraged against specific customer needs
- Ensure the quality of proposals and the availability of staff to support successful proposals
- Allocate resources to develop proposals
- Write proposals
- Maintain strong ongoing customer relations

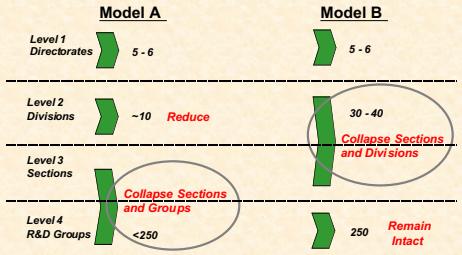
Program Execution & Operations

Complete assigned tasks

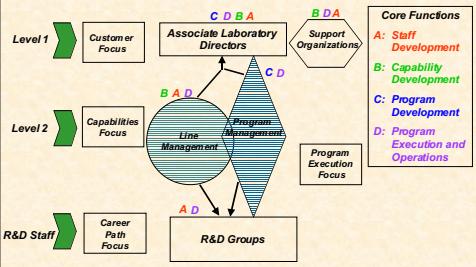
- Assign work to qualified staff and assemble teams
- Plan work activities and establish performance expectations
- Execute tasks consistent with project plans and SBMS
- Ensure quality of work
- Monitor performance on assigned work and provide meaningful and effective feedback to staff
- Report status of work to customers

Exhibit 5 (continued)
Viewgraphs from July 23, 2001, presentation to Leadership Team

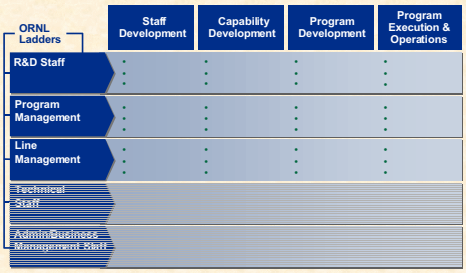
Summary of two models



Mapping Core Functions Onto the Context:



Core ORNL Functions



Can Level 2 Functions Be Carried Out With One Level of Management Rather Than Two?

Level 1
- *Expand number of ALDs to increase customer focus and provide more control points: 5 or 6 (+ SNS)?*
- *Move certain compliance and other administrative responsibilities from Level 2 to Level 1*

Level 2
- *Create a single, line management unit*
  - *Intermediate between current divisions and sections 30-40? (average size 35-45 S&T FTEs)*
- *Simplify administrative and compliance roles and responsibilities*

R&D Groups and Staff
- *Strengthen leadership roles*
- *Enhance staff development and mentoring roles*

Can we consolidate capabilities at Level 2?

Level 1
- *Maintain or Expand number of ALDs to increase customer focus and provide more control points: 5 or 6 (+ SNS)?*

Level 2
- *Consolidate capabilities into a fewer number of divisions ~10*

R&D Groups
- *Assign the ~250 groups to the appropriate division and then look for some consolidation at the group level to expand the average size of the groups*

We are still struggling to understand what are our major cost drivers

- Normalized for budgets, PNNL stack is $27 million less than ORNL's
- ORNL has 3800 staff in 4.4 million sq ft of space, PNNL has roughly same in 2 million sq ft
- We believe, but haven't been able to quantify that ORNL's surplus space adds significant costs
- High cost of ORNL divisions at Y-12
- 350 people charged >60% of their time to org burden in FY00

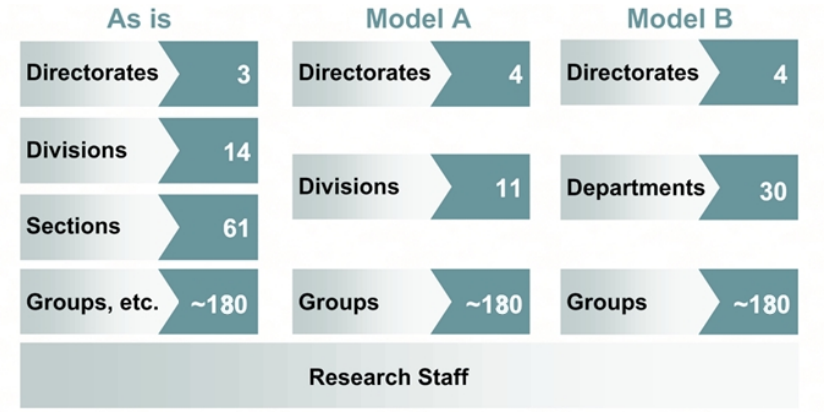


Figure 3. Proposed organizational models.

4.1 Review of Model A

Model A was designed to reduce the number of divisions by realigning capabilities, creating a mix of small single-program divisions and larger multiprogram divisions. Under Model A, divisions would remain the primary operating units and capability integrators. Sections would be eliminated, with tasks previously handled at the section level moving either up to the division level or down to the group level. Groups would be consolidated where appropriate, with an average of about 13 staff members per group and 13 groups per division. Each directorate would have three or four divisions plus programs.

4.1.1 Advantages

- Model A would largely retain the current structure of divisions, with which the DOE customer was generally comfortable.
- It would maintain coherence and alignment of S&T capabilities with DOE.
- It would require only modest cultural change but provide substantial cost savings.
- It would provide a straightforward way of removing the section head layer of management, since the infrastructure would be in place at the division level.
- It would support the combining of groups to create a smaller number of groups of larger size.
- It would allow the shifting of administrative burden from section heads to the division level without major effort.
- It would preserve divisions that were succeeding at interdisciplinary work.
- It would support control of unit costs by maintaining a relatively small number of “division-like” organizations.
- It would facilitate interactions among related competencies.
- It would support the management of ES&H, finance, and human resources services at the level where they are charged.
- It would allow for the efficient sharing of support services across groups within a division.

4.1.2 Disadvantages

- The span of control might be too large, since the model would require the distribution of 170 to 230 groups across 11 divisions. (A proposed solution was to add associate division directors to the largest divisions.)
- Use of this model would increase the administrative load on group leaders, who are generally direct chargers. (It was noted that this was probably true for both models.)
- The model might be perceived as not providing substantial change.

4.2 Review of Model B

Under Model B, about 30 departments would comprise a single level of line management between the ALD level and the group level, replacing divisions and sections. Many operational and administrative functions would move to the ALD level, and directorates would become the primary operating units and capability integrators. Departments would be responsible for capability development, operations, and staff development. Tasks previously handled at the section level would move either up to the department level or down to the group level. Groups would have an average of roughly 7.5 staff members, and each department would comprise an average of 7.5 groups. Directorates would have about 10 departments, plus programs.

4.2.2 Advantages

- Model B would provide a balanced span of control, both upward and downward.
- Costs should be reduced and communications should improve.
- Level 2 management would be focused on capability stewardship.
- The model would look familiar from the bottom up.
- It would increase coherence in Level 2 by providing a more specific focus on capability areas.
- It should reduce stovepiping if control of organization burden were shifted to Level 1.
- It would respond to the R&D staff's "hunger" for more than minimal change, as expressed in focus groups and the QWL survey.
- It would provide for allocation of resources specifically to support staff development.

4.2.3 Disadvantages

- Model B could threaten some sponsor relationships by leaving control and accountability trajectories unclear.
- It would break up some divisional units that were working well.
- It could make coordination of capability areas more difficult, at least on the line management side.
- Span of control issues upward would be an issue in the Energy and Engineering Sciences Directorate because of its size.
- Model B would require more cultural change.
- Discipline would be required to keep the 30 departments from expanding indirect cost functions toward the size of conventional division staffs.

4.3 Results of Model Analysis

The analysis revealed that Model A most effectively addressed the concerns that the task force was chartered to address:

- It would retain the desired customer focus at Level 1.
- It would provide strategic alignment of capabilities at Level 2 (through a mix of small and large divisions).
- It would achieve a relatively uniform structure across the Laboratory.
- It would remove a layer of line management while creating appropriate spans of control (average <12).
- It would clarify staff development responsibilities.
- It would achieve approximately $4 million in cost savings.

5. Recommendations and Decision

The Organizational Review Task Force recommended the implementation of Model A, supported by the following actions:

- a Laboratory-wide review of business rules to ensure uniform application and to eliminate unneeded requirements,
- the creation of organization burden review committees at the directorate level (with Laboratory-wide representation),
- the appointment of staff associate directors for larger divisions (with a recommended maximum of 1 FTE per large division), and
- the development of a means for sharing some support staff among divisions (recognizing that, while some support staff can be eliminated at the division level, specialized services are best provided at the division level).

This recommendation was endorsed by the Leadership Team and announced at a Senior Staff Meeting on August 16, 2001. Dr. Madia presented a preliminary organization chart showing the new Level 1 and Level 2 organizations, noting that details of the implementation would be worked out in the coming weeks. He emphasized that the status quo would not be a factor in the distribution of groups and programs or in the leadership of the R&D divisions, noting that he had encouraged ALDs to “think as broadly as possible” about these positions. Decisions about changes in the structure of the Laboratory’s support organizations were to be made following related decisions about the makeup of the R&D organizations.

Dr. Madia called for resolution of these issues by September 19, 2001, to be followed by the distribution of a memo detailing the results. He stressed the need for all staff members to read this memo, understand how they fit into the new organization, and provide “loud feedback.”

6. Implementation

The new organizational structure was announced on September 5, 2001, in an e-mail message from Bill Madia (see Appendix B). Updated organization charts at the directorate level were made available at the same time (see Appendix C).

Key features of the new structure are as follows:

- The section head level of management was eliminated, as were 62 positions at that level in the R&D divisions. Most management responsibilities formerly performed by section heads were transferred to division directors. Staff development will receive more attention from group leaders and senior scientific staff. Roles and responsibilities for the various positions in the management structure will be further clarified as alignment of capabilities is refined.
- A new Computing and Computational Sciences Directorate, headed by Thomas Zacharia, was established to house the Computer Science and Mathematics Division (CSMD), the Center for Computational Sciences (CCS), and two reorganized divisions: Computational Sciences and Engineering (CSED), comprising portions of the former CPED, and Networking and Computing Technologies, comprising portions of the former Computing, Information, and Networking Division (CIND) from B&IS. Creative Media (publishing, graphics, and reproduction) and Knowledge Management (including library services) were transferred from CIND to the Communications and Community Outreach organization. Records management was transferred from CIND to the Environment, Safety, Health, and Quality organization. Brian Worley was named acting director of CSED. Permanent directors of CSED, CSMD, and CCS were to be sought through an open search.
- The Nuclear Science and Technology Division (NSTD) was created to incorporate the nuclear capabilities previously distributed among CTD, ETD, RPSD, and CPED. Joe Herndon was named acting division director, with an open search to be conducted for a permanent director.
- The Engineering Science and Technology Division was created to consolidate engineering and measurement capabilities from ETD, I&C, RPSD, and Energy Division. Ted Fox was named acting division director, with an open search to be conducted for a permanent director.
- The Chemical Sciences Division, headed by Michelle Buchanan, encompasses the former CASD and the fundamental chemistry capabilities from CTD.
- Energy and environmental analysis research from the former Energy Division are incorporated into ESD.
- Only minor changes are planned for the Fusion Energy, Physics, Solid State, Metals and Ceramics, Life Sciences, and Research Reactors divisions, and for the SNS Accelerator Systems, Experimental Facilities, and Conventional Facilities divisions. Searches for the directors of Life Sciences and SNS Experimental Facilities divisions will continue as previously announced.
- Selected research groups and individual programs were moved to align them more effectively with similar resources in the Laboratory. Further changes were to be made by new division and directorate management teams, with detailed organization charts to be issued by September 14, 2001, to minimize uncertainty. ALDs and support directors were to hold staff meetings to describe these changes in more detail and discuss the Laboratory's plans and directions.

Dr. Madia's message also announced the institution of a structured process for reviewing and approving all indirect budgets (particularly division organization burden, program office costs, and other service centers) and the establishment of an Indirect Budget

Review Committee to ensure a uniform and consistent treatment of indirect costs across the Lab. These management changes were designed to play a major contributing role in achieving the $8 million planned reduction of indirect costs for FY 2002.

The reintroduction of a formal program management career ladder was also announced in recognition of the importance of program management to ORNL's growth, strategy development, and customer relations. Careers in this ladder will start at the principal investigator level and allow advancement to Level 1 management positions.

7. Summary

The goal of reorganization was to better align ORNL's capabilities with anticipated business opportunities, eliminate a layer of management, and reduce the cost of doing business through improved efficiency. Attaining this goal required some difficult decisions. It was recognized, for example, that

- realigning capabilities would create disruptions for R&D staff;
- removing a layer of management would mean the loss of several jobs, change reporting relationships, and increase the administrative load on the remaining levels; and
- restructuring divisions had the potential to diminish a sense of connection to past accomplishments.

The Organizational Review Task Force weighed the costs and benefits of these and other choices in its deliberations and reviewed them with the Leadership Team in presenting its recommendations.

The task force also worked to keep employees informed about organizational changes, providing both formal and informal channels for communication. Employee input was solicited throughout the process. All comments posted to the Web site or e-mailed to members of the task force or the Leadership Team were reviewed. Information about task force activities and reorganization decisions was released as quickly as possible via e-mail messages, the Organizational Review Web site, *ORNL Today,* and staff meetings.

In his September 5, 2001, announcement of the new organizational structure, Dr. Madia noted "new and expanding opportunities for ORNL to participate in the future research needs of DOE and other customers." The success of this effort will ultimately be judged on its effect on the Laboratory's ability to compete more effectively in taking advantage of these opportunities.

Appendix A
Organizational Review Task Force Membership

Co-Chairs
Lee Riedinger
Jeff Smith

Associate Laboratory Directors
Gil Gilliland
Frank Harris
Jim Roberto

Division Directors
Michelle Buchanan, Chemical and Analytical Sciences Division
Mike Kuliasha, Computational Physics and Engineering Division
Reinhold Mann, Life Sciences Division
Becky Verastegui, Computing, Information, and Networking Division

Senior Scientists
Bem Culiat, Life Sciences Division
Tom Wilbanks, Energy Division

Section Heads
Bob Jubin, Chemical Technology Division
Ben Larson, Solid State Division
Brian Worley, Computer Science and Mathematics Division

Program Directors
Marilyn Brown, Energy Efficiency
Harvey Gray, National Security
Linda Horton, Basic Energy Sciences (Metals and Ceramics Division)

Human Resources
Darryl Boykins, Human Resources

Resource People
Dennis Newby, Finances
Bob Van Hook, Consultant

Appendix B
Text of Organizational Announcement from Bill Madia, September 5, 2001

Last June I established the Organizational Review Task Force to address three specific issues related to the Lab's organizational structure. The Task Force was asked to examine how we might better align the Lab's capabilities with anticipated business opportunities, eliminate a full layer of management, and reduce the cost of doing business at ORNL through improved efficiency. Today I am pleased to announce the results of this effort and present the organizational structure that will become effective October 1.

There are new and expanding opportunities for ORNL to participate in the future research needs of DOE and other customers. Significant growth potential exists for our work in the fundamental sciences, energy technologies--including nuclear, and other applied missions. In order to best capitalize on these opportunities, we must realign the Laboratory's capabilities in ways that will enable us to compete more effectively. Hence, we are announcing a fundamental change in the Laboratory's division structure and a realignment of programs among the new divisions. Technically, the number of research divisions, including three in the Spallation Neutron Source Project, will be reduced from 19 to 16. The magnitude of the change, however, is far greater than the elimination of the current Energy, Instrumentation and Controls, and Robotics and Process Systems divisions. Additional important changes will occur in the management structure and in the strategic alignment of Laboratory capabilities. The major changes include:

- A new directorate will be established for Computing and Computational Sciences to continue the rapid growth we have experienced in high performance computing and computational science. The new directorate will be headed by Thomas Zacharia and will house the Computational Sciences and Engineering (CSED), Computer Science and Mathematics (CSMD), and Networking and Computing Technologies divisions, as well as the Center for Computational Sciences (CCS). Brian Worley will be the acting director of CSED, which grows out of the current Computational Physics and Engineering Division. Open searches will be initiated for permanent directors of CSED, CSMD, and CCS.
- Most of our nuclear research capabilities will be housed in a newly created Nuclear Science and Technology Division (NSTD). NSTD will incorporate the nuclear capabilities previously contained in the Chemical Technology, Engineering Technology, Robotics and Process Systems, and Computational Physics and Engineering divisions. Joe Herndon will serve as acting division director as we conduct an open search for a permanent director.
- A newly formed Engineering Science and Technology Division will consolidate our engineering and measurement capabilities from the former Engineering Technology, Instrumentation and Controls, Robotics and Process Systems, and Energy divisions. Ted Fox will serve as acting director as we conduct a search for a permanent director to lead this new division.

- ORNL's Chemical and Analytical Sciences Division will add fundamental chemistry capabilities from the former Chemical Technology Division to form a newly constituted Chemical Sciences Division headed by Michelle Buchanan.
- The Environmental Sciences Division will add Energy and Environmental Analysis research from the former Energy Division.
- Only minor changes are planned for the Fusion Energy, Physics, Solid State, Metals and Ceramics, Life Sciences, and Research Reactors divisions, and for the SNS Accelerator Systems, Experimental Facilities, and Conventional Facilities divisions. Searches for the directors of Life Sciences and Experimental Facilities divisions will continue as previously announced.
- In addition to the reorganization of divisions, selected research groups and individual programs have been moved to align them more effectively with similar resources in the Laboratory. Over the next few weeks the new division and directorate management teams will be making additional changes to fine-tune this announcement. I have asked that all division directors issue a detailed organization chart to their staff by the end of next week in order to minimize uncertainty. In addition, our Associate Laboratory Directors and support directors will be holding staff meetings to describe these changes in more detail and discuss our future plans and directions.
- Finally, the reorganization of the research divisions has made it necessary to implement various changes in the support organizations. For a complete set of new organization charts, please go to http://home.ornl.gov/ornlhome/org_charts/ornl_org.pdf

By far the most dramatic change in ORNL's management structure will be the elimination of the section head level of management and the associated 62 positions that currently exist in the research divisions. Most management responsibilities being performed by section heads will be transferred to division directors, while the important role of staff development will be a sharpened focus for group leaders and senior scientific staff. As we realign capabilities we will also clarify the roles and responsibilities for the various positions in our management structure.

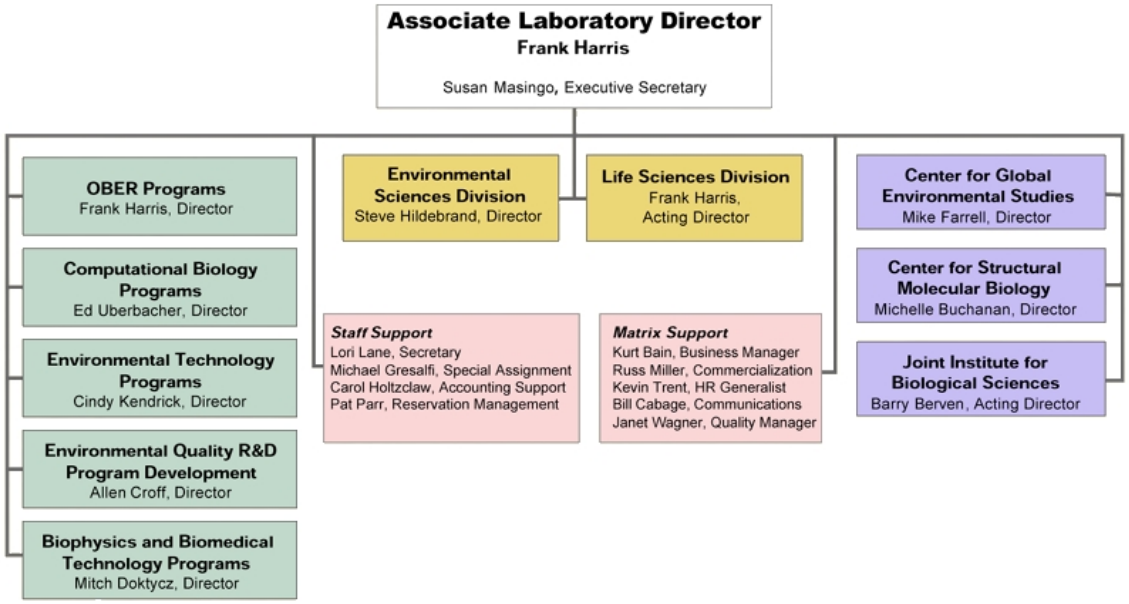
The effort to reduce costs by removing a layer of management will be augmented by other changes in our business operations. We will institute a structured process for reviewing and approving all indirect budgets, particularly division organization burden, program office costs, and other service centers. An Indirect Budget Review Committee will be established to ensure that we maintain a far more uniform and consistent treatment of indirect costs across the Lab. These management changes will play a major contributing role in the $8 million planned reduction of indirect costs for FY 2002.

Finally, we will be reintroducing a formal program management career ladder. This ladder recognizes the importance of program management to ORNL's growth, strategy development, and customer relations. Careers in this ladder will start with principal investigators but allow advancement to Level I, as is the case with Thom Mason, Associate Laboratory Director for the SNS Project.

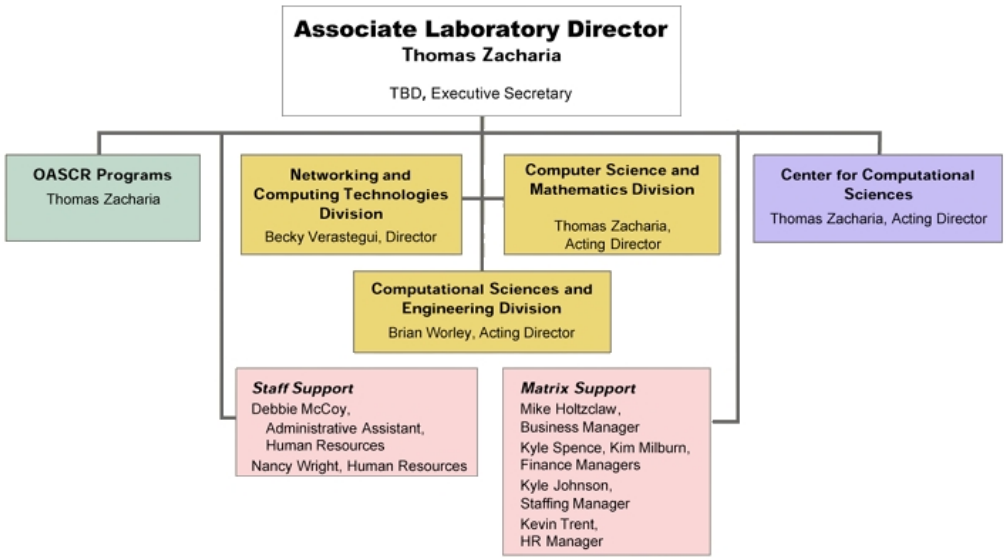
I'd like to thank the members of the Organizational Review Task Force for their hard work and dedication to this important assignment. The organizational changes we are about to implement are consistent with the goals we set for ourselves back in June. The result represents another area in which we are moving rapidly from vision to implementation. I am excited about the potential these changes offer for the future of Oak Ridge National Laboratory. Thank you for your continued support.

Appendix C
Organization Charts for Research Directorates, Effective October 1, 2001

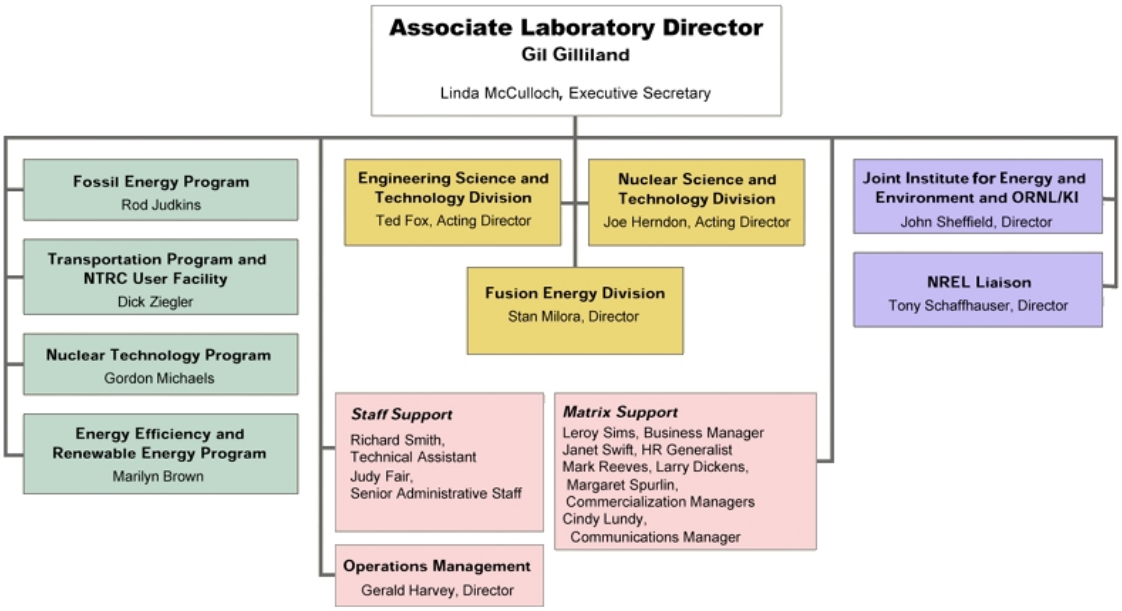
Biological and Environmental Sciences Directorate



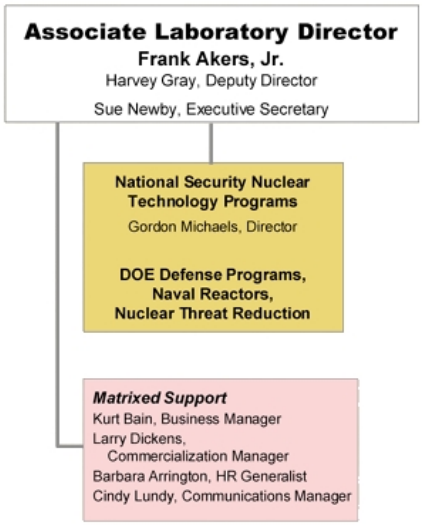
Computing and Computational Sciences Directorate



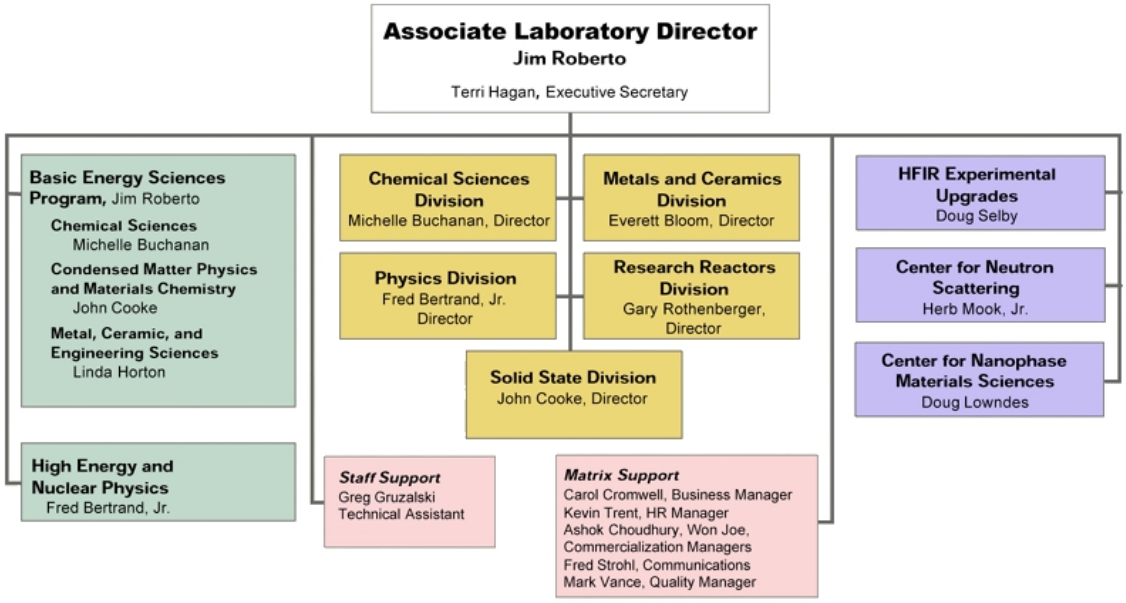
Energy and Engineering Sciences Directorate



National Security Directorate



Physical Sciences Directorate



Spallation Neutron Source Directorate