

# Task Force on the Future of Science Programs at the Department of Energy

Working Session  
January 22, 2003

# Summary Statement of Work

This Task Force will articulate the critical role of basic science conducted or sponsored by the Department of Energy, recommend policy to ensure that DOE science will be excellent and at the cutting edge in the 21<sup>st</sup> Century, and recommend policy and practice to ensure that the mission and operations of the Department of Energy are served and enhanced by excellent contemporary science.

# Summary Statement of Work Redux

This Task Force will **articulate the critical role** of basic science conducted or sponsored by the Department of Energy, recommend policy to ensure that DOE **science will be excellent** and at the cutting edge in the 21<sup>st</sup> Century, and recommend policy and practice to ensure that the **mission and operations of the Department of Energy are served and enhanced** by excellent contemporary science.

# Nature of Final Report

- Brief -- Perhaps 25 pages
- High Level
- Key Bullet Points for the Secretary
- Rationale for Basic S&E Research for/by DOE
  - Absolute Importance
  - Economic Importance
  - Connection to DOE Mission
  - Role Among Federal Agencies

# Final Report, Cont'd

- Necessary Conditions for Great Science
- Infrastructure
  - For conducting research
  - For moving results to mission activities
- Frontier Activities DOE Must Pursue
- Workforce / Education / Opportunity

# Organizing Principles from First Meeting

- U.S. Leadership in Science and Engineering
  - Why is it important?
  - Competition / Threats
  - International Partitioning of Research

# Organizing Principles, Cont'd

- Security
  - Energy Security
  - National Security
  - Environmental Security
  - Economic Security

# Organizing Principles, Cont'd

- Koonin Framework
  - What promising areas of research should be pursued?
  - Which of these are appropriate for DOE?
  - Which are specific to DOE?



# TF Tasks for January 22, 2003

- Translate Statement of Work / Discussions into a Work Plan
- Define Subgroups of Task Force
- Establish Time Line
- Outline Future Meetings
- Determine Information Needed by TF and Subgroups

# Possible DOE Tasks

- “Straw Man” Outline of Final Report
- Map Core Research Activities vs Technology Programs
  - As determined by provider
  - As determined by user

# Topical Matters

- Advanced Scientific Computation / Simulation
- Genome Research
- Homeland Security / DHS
- Environment / Global Change / CO<sub>2</sub> / Economics
- Nuclear Energy / Technology / Waste / Political-Economics
- Energy Technologies / Fuel Cells / Solar / Fusion
- Nanoscale Science and Engineering
- Physical Science and Engineering in Federal Portfolio / Budget

# DOE Research in Context

- DOE / Private Sector Roles
- DOE in Galaxy of Federal Agencies
- DOE Frontier Science and Engineering Research Interface with Technology, Mission and Demonstration Projects

# Possible Subgroups

- Energy Security
- National Security
- Environmental Security
- Economic Security

# Alternate Subgroups

- Energy / Environment
  - Key Bullet Points
  - Achieving Excellence
  - Infrastructure
  - Frontier Research Topics
  - Relating to Mission / Technologies
- National Security
  - Key Bullet Points
  - Achieving Excellence
  - Infrastructure
  - Frontier Research Topics
  - Relating to Mission / Technologies
- World Sci. Leadership
  - Key Bullet Points
  - Achieving Excellence
  - Infrastructure
  - Frontier Research Topics
  - Relating to Mission / Technologies
- Economic Security
  - Key Bullet Points
  - Achieving Excellence
  - Infrastructure
  - Frontier Research Topics
  - Relating to Mission / Technologies

# Task Force Meetings

- March 13

- Topics
- Milestones

- May 15

- Topics
- Milestones

- June 25

- Topics
- Milestones

- July 24

- Topics
- Milestones

# Working Groups

- Articulate DOE Science Role in Serving National Needs
  - Define National Needs
  - Key Missions
  - Customers: Internal / External
  - Suppliers: Internal / External
  - Competitors / Partners
- Catalog DOE Strengths / Weaknesses
  - Integration Science <---> Application
  - Stewardship
  - “Greatest Hits of DOE”
- Frontiers / Opportunities / Obligations
- Sustaining the Enterprise
  - Conditions for Great Science
  - Conditions for Great Service
  - People, Facilities and Organization
  - Investment Strategy



# Working Groups

- Articulate DOE Science Role in Serving National Needs
  - Wince-Smith, Irani, Baldeschweiler, Papermaster
- Catalog DOE Strengths / Weaknesses
  - Duderstadt, Lederman
- Frontiers / Opportunities / Obligations
  - Koonin, Birgeneau
- Sustaining the Enterprise
  - Martin, Berkeley, Greenwood

# Follow Up

- Convert 1-22 work to documents and distribute
- Circulate recent testimony / speeches of Sec. Abraham
- Information needed for business process map
- What else do the groups need?

# Overarching Tasks

- Identify and Prioritize Recommendations
- Craft and Prioritize Messages
  - Format
  - Media
- Outline Report
  - Follow working group format: Yes / No?

# S&W or SWOT

- Strengths
- Weaknesses
- (Opportunities...and threats?)

# DOE Strengths

- Traditions of very high quality scientific research, leading to obligations of continued stewardship for key areas of science such as high energy physics.
- Capacity to launch and manage scientific research projects on a very large scale (beyond NIH and NSF).
- National laboratories as an extraordinary resource
- Ability to create and support large scale research infrastructure of importance to national research effort (not just DOE).
- Broad geographic distribution and political footprint.

# DOE Weaknesses

- Weak link between basic research programs and DOE missions.
- Organizational structure
  - Decouples SC from mission offices
  - Inability of mission offices to conduct (sustain) basic research activities key to their mission
- Relatively weak ability to support “small science”), at least compared to NSF, NIH, and DARPA
- Not adapting rapidly enough to new research paradigms (e.g., STCs, ERCs)

## DOE Weaknesses (cont)

- Difficulty in handling competition between intramural research (the labs) and extramural research (the campuses)
- Rarely the interagency leader
- Appear to be research areas critical to DOE mission not adequately covered (e.g., nuclear energy, liquid fossil fuels)
- Confusion over DOE mission and rationale for SC (difficult birth and childhood of DOE)
- Reputation of DOE in Washington (excessively stove-piped, nonresponsive, arrogant, politically inept)
- Lack of merit review in Labs and sometimes inappropriate use of LDRD funds

## DOE Weaknesses (still more)

- Worry about DOE demographics (aging workforce, lack of diversity)
- DOE lacks a national constituency (NIH has Christopher Reeves; DOE has Ken Lay)
- Political independence of labs
- Some hangover of old AEC culture (still more mortgage payments due to the physicists for winning WWII)



# Opportunities

- Mapping the mission to the President's priorities.
- Department of “Energy Independence”?
- Security, security, security

# Threats

- Politics in Agenda Setting
- Subversion of Scientific Integrity
- Threat of inappropriate reorganizing, e.g. Dept. of Science