

Earth Sciences in the FY 2005 Budget

*Emily M. Lehr and Gayle M. Levy,
American Geological Institute*

HIGHLIGHTS

- **Department of Energy (DOE):** Natural gas and petroleum research accounts are slated for major cuts of about 50 percent in the President's request. Geoscience research within the Basic Energy Sciences account would remain flat.
- **U.S. Geological Survey (USGS):** The President has requested a 2.5 percent cut for the agency. Similar to the President's FY 2004 request, the minerals program is poised to take a major cut. Likewise, mapping and some water programs aren't likely to fare well in the coming year.
- **National Science Foundation (NSF):** The Geoscience Directorate is funded at a 1.8 percent increase over FY 2004. The Major Research Equipment and Facilities Construction (MREFC) account includes \$50.8 million for the third installment of the EarthScope initiative.
- **National Aeronautics and Space Administration (NASA):** The Earth Science Enterprise has requested a 7 percent cut. The request includes funds to use data from NASA Earth Observatories to answer critical questions to aid policy and economic decision-makers.

INTRODUCTION

The earth sciences cover a broad range of the R&D spectrum, running the gamut from fundamental research into the internal processes and deep history of the Earth to highly applied, interdisciplinary investigations that address environmental contamination, natural hazards, and sustainable resource development. Although this chapter focuses on earth science programs in four key departments and agencies, earth

science activities can be found in 16 other departments and agencies spanning nearly 300 separate programs.

Taken as a whole, the president's budget favors fundamental earth science research programs over more applied R&D. The success of the EarthScope initiative at NSF—the first-ever Major Research Equipment and Facilities Construction project for the earth sciences—contrasts with stagnant or decreasing support in the President's request for applied programs with the hardest hit being those related to oil and natural gas in the Department of Energy.

Table 1: Budget request for principal agencies and programs supporting earth-science R&D (budget authority in millions of dollars).

| Agency / Program | FY 2003 Enacted | FY 2004 Enacted | FY 2005 Request | % Change FY 04-05 |
|---|--------------------|--------------------|--------------------|----------------------|
| Department of Energy | | | | |
| <i>Basic Energy Sciences</i> | | | | |
| --Geosciences Research | 20.3 | 20.5 | 20.3 | -1 |
| <i>Fossil Energy R&D</i> | | | | |
| --Natural Gas Research | 47 | 43 | 26 | -39.5 |
| --Petroleum Research | 42 | 35 | 15 | -57 |
| <i>Solar & Renewable Energy</i> | | | | |
| --Geothermal | 30 | 25.5 | 25.8 | -1.2 |
| <i>Yucca Mountain Site Characterization</i> | | | | |
| --Core Science | 3 | -- | -- | -- |
| Department of the Interior | | | | |
| <i>U.S. Geological Survey*</i> | 919 | 944 | 920 | -2.5 |
| --Geologic Division* | 233 | 234 | 220.8 | -5.6 |
| --Water Resources Div.* | 207 | 216 | 202.7 | -6.4 |
| NASA | | | | |
| <i>Earth Science Enterprise</i> | 1,708 | 1,613 | 1,485 | -7.9 |
| National Science Foundation | | | | |
| <i>Geosciences Directorate</i> | 685 | 715 | 728.5 | +1.8 |
| <i>Major Research Equip. EarthScope</i> | 30 | 43.2 | 50.8 | +17.6 |

Source: Agency budget materials, Office of Management and Budget.

* - Includes non-R&D components.

As was the case last year, increased need for science in support of homeland security has not translated into increased support for relevant earth science programs. Although the U.S. Geological Survey's (USGS) water-quality monitoring, geospatial information, and hazard-related

EARTH SCIENCES IN THE FY 2005 BUDGET

capabilities are in heavy demand at the new Department of Homeland Security (DHS), there are virtually no increases associated with this theme in the USGS request or for other earth science programs.

DEPARTMENT OF ENERGY (DOE)

Fossil Energy R&D: A majority of the earth science research funded through the Office of Fossil Energy is related to petroleum and natural gas exploration and production (E&P). Petroleum, natural gas, and gas hydrates research programs are hard hit by this year's request, as they were in the President's FY 2004 request. Some, but not all, of the cuts requested last year were restored in the final appropriations. Funding for oil and natural gas R&D combined now make up only 6 percent of the total Fossil Energy R&D budget, most of which funds coal-related technologies. That percentage has continued to drop with each new request. Natural gas E&P requested \$17.5 million, a decrease of nearly 22 percent from last year's funding level. Funding for gas hydrates would decrease by 36 percent from FY 2004 under the budget request to total \$6 million. The petroleum E&P account would receive a 68 percent cut, leaving the program at \$3 million. Although most of the coal-related research is concerned with power plant efficiency, there is \$49 million for carbon sequestration research, close to 20 percent higher than the FY 2004 appropriations.

Basic Energy Sciences: To align budget accounts with the Basic Energy Sciences (BES) working structure, DOE has placed earth science research within the combined Chemical Science, Geosciences, and Energy Biosciences Research program. This program provides peer-reviewed grants to universities and DOE national laboratories for fundamental earth science research in geochemistry, hydrology, rock mechanics, and geophysical imaging—areas with broad application to multiple DOE mission areas including oil and gas exploration and development, geothermal energy, and environmental remediation. The FY 2005 request for this program is \$228 million.

Geothermal: The geothermal research program within the Solar and Renewable Energy account funds earth-science research in materials, geofluids, geochemistry, geophysics, rock properties, reservoir modeling, and seismic mapping. Like many accounts within the Office of Energy Efficiency and Renewable Energy, geothermal research was not given much of an increase to make way for increase hydrogen research in

response to the president's hydrogen economy initiative. In total, the geothermal account has requested \$26 million, a 1 percent increase from last year's allocation.

Yucca Mountain Site Characterization: Last year's decision by the President and Congress to accept the Yucca Mountain site as the nation's permanent underground repository site for high-level nuclear waste means that the project has moved into its second phase. After more than 20 years and \$4 billion in site characterization, funding for Yucca Mountain will now be focused primarily on activities to support the submission of a license application to the U.S. Nuclear Regulatory Commission. Due to this new focus, the budget request no longer includes the Core Science account, although some applied research, particularly in hydrology, continues. Overall, the Yucca Mountain nuclear waste repository project requested \$880 million.

U.S. GEOLOGICAL SURVEY (USGS)

Looking at the USGS as a whole, this year's request is much more favorable to the agency than last year's request but still represents a decrease from the final FY 2004 appropriations. The total request is \$920 million, a decrease of more than 2 percent from last year's level. This year the USGS budget focuses on water availability, invasive species, and natural hazards. One area that received a major cut is a \$2.7 million decrease for fire research, which examines the impact of fire on biological systems.

Geologic programs would receive a total of \$221 million, a 6 percent decrease from FY 2004. The biggest hit goes to the Mineral Resources Program, which would receive a \$6.5 million cut. As with other programs, such cuts are in addition to the budgetary erosion due to increases in uncontrollable costs. The proposed cuts would reduce or eliminate some important federal government research and reporting on mineral potential, production, consumption and environmental impacts. In addition, a nearly \$3 million reduction is proposed for mapping, remote sensing, and geographic investigations, which may hinder the development of the National Map.

Overall, water programs would receive \$202.7 million, a 6 percent decrease from last year's allocation. The National Water-Quality Assessment program requested \$62.5 million, which is down almost \$1

EARTH SCIENCES IN THE FY 2005 BUDGET

million from last year's funding level. The Toxic Substances Hydrology program, would receive \$12.6 million, a decrease of 15 percent from FY 2004.

NATIONAL SCIENCE FOUNDATION (NSF)

Funding for the Geoscience Directorate (GEO) would receive a small boost from the FY 2004 appropriation, with a budget request of \$728.5 million. The majority of the solid earth science research within GEO is funded through the Earth Science Division (EAR) that has requested \$155.6 million.

The EarthScope initiative—comprised of the U.S. Seismic Array (USArray), the San Andreas Fault Observatory at Depth (SAFOD), and the Plate Boundary Observatory (PBO)—is again included in the NSF's Major Research Equipment and Facilities Construction (MREFC) account, having received \$43.2 million in funding for FY 2004. This year's request is for \$50.8 million. This third installment of a proposed five-year \$187 million project would not provide funds for a fourth component of EarthScope.

NATIONAL AERONAUTICS & SPACE ADMINISTRATION (NASA)

NASA's Earth Science Enterprise (ESE) works to develop a scientific understanding of the Earth and its response to natural and human-induced changes. The requested \$1.5 billion for ESE is a 7 percent decrease from the FY 2004 allocation. Within this request, \$1.4 billion is for Earth System Science, which includes \$560 million for scientific research, analysis, modeling, and use of data from NASA Earth observatories that contribute to answering critical scientific questions on the Earth system to aid policy and economic decision-makers.