### SUMMARY OF ESTIMATES BY APPROPRIATIONS

#### BUDGET AUTHORITY IN THOUSANDS OF DOLLARS

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ENERGY SUPPLY, RESEARCH AND DEVELOPMENT
ACTIVITIES

(Including Transfer of Funds)

For expenses of the Department of Energy activities including the purchase, construction and acquisition of plant and capital equipment and other expenses incidental thereto necessary for energy supply, research and development activities, and other activities in carrying out the purposes of the Department of Energy Organization Act (Public Law 95-91), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction, or expansion; purchase of passenger motor vehicles (not to exceed [18] 21 for replacement only), [$1,347,048,000,] $1,909,710,000, to remain available until expended; [in addition $684,158,000 shall be derived by transfer from Uranium Supply and Enrichment Activities provided in prior years and shall be available until expended; and of which $684,158,000 which shall be available only for the Center for New Industrial Materials; the Center for New Industrial Materials; the Center for Nuclear Imaging Research; the Energy Research Complex; Saint Christopher's Hospital for Children - Energy Demonstration Project; Center for Excellence in Education - Energy Utilization Performance Project; the Institute of Nuclear Medicine; the Advanced Science Center; the Center for Science and Engineering; and funds provided for byproducts utilization activities shall be available only for the following regional projects: Florida Department of Agriculture and Consumer Services; Hawaii Department of Planning and Economic Development; Iowa State University; Oklahoma, Red-Ark Development Authority; Washington, Port of Pasco; State of Alaska.] (Energy and Water Development Appropriations Act, 1987 as included in Public Laws 99-500 and 99-591, section 101(e),) and in addition, as authorities by section 201 of Public Law 95-238 and notwithstanding 31 U.S.C. 3302, revenues received as user fees for use of the Liquified Gaseous Fuels Spill Test Facility in Fiscal Year 1988 shall be retained and used to provide toxic and flammable spill test facilities and activities.

Explanation of Change

Deletes Language contained in Public Laws 99-500 and 99-591 which had specific application to fiscal year 1987.

Proposed Language provides fees from non-Federal users of the Liquified Gaseous Fuels Spill Test Facility in Nevada to be received into the account as reimbursable expenses to be retained and used to operate, manage and maintain the facility.
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<th>FY 1987 Estimate</th>
<th>FY 1988 Request</th>
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University scientists have been hampered in recent years in their ability to conduct state-of-the-art scientific research by increasingly obsolete or inadequate scientific research instrumentation. Advanced research requires advanced scientific instrumentation. The "state-of-the-art" of scientific research instrumentation has progressed so rapidly in the last five years (along with the purchase price of new instruments) that major research instruments are obsolete in three to five years. Such instruments are no longer used solely by one scientist but rather are shared by many scientists often from different disciplines and academic departments. For example, a 500 MZ Nuclear Magnetic Resonance Spectrometer at Purdue University serves 270 researchers, including DOE sponsored researchers, in an around-the-clock operation. The lack of access to advanced scientific instrumentation also has affected the preparation and training received by graduate students. Since the vast majority of university graduates are employed by industry, this in turn requires industrial scientists to spend an inordinate amount of time in training new staff in the use of advanced research instrumentation, thereby affecting industrial research productivity.

During the past decade there have been a variety of Federal and private studies on the instrumentation problem in universities. In a 1984 study by the National Science Foundation (NSF) it was estimated that the need for new instrumentation for universities ranges from one to four billion dollars, an amount far in excess of that which can be financed by the universities themselves. In 1984 Federal support for university instrumentation totaled $608 million. The importance of the university research instrumentation problem has been recognized by the Office of Science and Technology Policy (OSTP). As a result OSTP established a coordinated program involving all the major agencies which provide research support to universities, aimed at improving the quality of research instrumentation in universities. In addition to DOE, the principal agencies involved in this program are NSF, DOD and NIH, with each agency responsible for providing the instruments required related to their mission requirements. This effort is coordinated by an interagency committee on university research instrumentation chaired by the NSF Deputy Director.

The primary objective of the DOE University Research Instrumentation program (URI) is to strengthen the capabilities of university scientists to conduct advanced research on energy problems and processes. A secondary
objective is to provide graduate students with first-hand experience in the use of sophisticated research instru-
mentation. The URI program is complementary to the Department's energy research and technology programs. In
general, DOE university research grants and contracts provide support only for research operating costs (salaries,
computer time, etc.) with funding for new instrumentation limited on average to those smaller instruments costing
$30,000 or less. In contrast, the URI program assists universities in purchasing instruments which cost in excess
of $100,000, which will be required by a number of faculty researchers, and which because of their size, cost and
use by a single investigator could be justified on an individual research award.

The program is a competitive one, involving substantial cost-sharing from the institution, with awards based on
the merit and accomplishments of current DOE-supported research projects and the degree to which the new equipment
will enable the researchers to substantially advance the understanding of energy-related phenomena. A total of 40
awards have been made in the past two years, ranging from $98,000 to $466,000, with the average award at $223,000.

In past years the URI program has given special attention to the need for advanced scientific equipment for
research on metallurgy, ceramics, solid state materials, catalysis, fluid mechanics, heat transfer, fermentation,
plant growth, atmospheric pollutants, combustion and nuclear waste storage. The research areas were selected
after discussions with the DOE research program directors. In FY 1986 the program encouraged the submission of
proposals involving "innovative" instrumentation (equipment generally not available at U.S. universities). Special emphasis will again be placed on "innovative" instrumentation needs for advanced topics in energy research in FY 1987 and in FY 1988. A recent survey estimated that the overall short term need for advanced scientific instrumentation for university energy research was approximately $150 million. Of this amount, about $15 to $20
million was specified for "innovative" equipment.
DEPARTMENT OF ENERGY  
FY 1988 CONGRESSIONAL BUDGET REQUEST  
ENERGY SUPPLY RESEARCH AND DEVELOPMENT  
(dollars in thousands)  

LEAD TABLE  

University Research Instrumentation  

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<tbody>
<tr>
<td>University Research</td>
<td>$6,176</td>
<td>$5,000</td>
<td>$5,000</td>
<td>$5,000</td>
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<tr>
<td>Instrumentation</td>
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<tr>
<td>Total</td>
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<td>a/ b/ 5,000</td>
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<tr>
<td>Operating Expenses</td>
<td>(6,176)</td>
<td>(5,000)</td>
<td>(5,000)</td>
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<tr>
<td>Total Program</td>
<td>($6,176)</td>
<td>($5,000)</td>
<td>($5,000)</td>
<td>($5,000)</td>
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a/ Total has been reduced by $78,000 which has been transferred to SBIR program.
b/ Total has been reduced by $246,000 in accordance with P.L. 99-177, the Balanced Budget and Emergency Deficit Control Act of 1985 (Gramm/Rudman/Hollings).
SUMMARY OF CHANGES

University Research Instrumentation

FY 1987 Appropriation Enacted................................................................. $ 5,000

Program increase and decreases:

- Instrumentation awards remain the same as FY 1987...................................... 0

FY 1988 Congressional Budget Request....................................................... $ 5,000
I. Preface:

The program will concentrate on providing instrumentation support for university research groups which have already demonstrated expertise in one of a small number of specified high priority energy-related topics which are of special concern to the Department's research programs.

II. A. Summary Table

<table>
<thead>
<tr>
<th>Program Activity</th>
<th>FY 1986</th>
<th>FY 1987</th>
<th>FY 1988</th>
<th>% Change</th>
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<td>University Research Instrumentation</td>
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III. Activity Descriptions

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<th>Program Activity</th>
<th>FY 1986</th>
<th>FY 1987</th>
<th>FY 1988</th>
<th>Planned topics are:</th>
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<tbody>
<tr>
<td>University Research Instrumentation</td>
<td>In FY 1986, 30 awards were granted to 26 universities. ($6,176)</td>
<td>It is anticipated that 15 to 18 competitively selected awards will be granted. ($5,000)</td>
<td>It is anticipated that 15 to 18 competitively selected awards will be granted. ($5,000)</td>
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<td>Award topics are:</td>
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<td>o Advanced Materials Characterization, Synthesis, and Processing Science</td>
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<td>o Health and Environmental Effects of Energy Development and Use</td>
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<td>o Engineering Sciences</td>
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<td>o Catalysis (Heterogeneous and Homogeneous), Photochemistry and Photocatalysis</td>
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<td>Planned areas for selected topics are:</td>
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<td>o Geochemistry</td>
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</tbody>
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Total University Research Instrumentation: $6,176 $5,000 $5,000