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Title

OVERVIEW OF THE APPLIED BATTERY AND ELECTROCHEMICAL RESEARCH PROGRAM

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RESEARCH PROGRAM

Frank McLarnon

June 1981

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OVERVIEW
OF THE
APPLIED BATTERY AND ELECTROCHEMICAL
RESEARCH PROGRAM
MANAGED BY THE
LAWRENCE BERKELEY LABORATORY

JUNE 2-4, 1981

OVERVIEW OF THE APPLIED BATTERY AND ELECTROCHEMICAL RESEARCH PROGRAM

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Berkeley, California 94720

The Lawrence Berkeley Laboratory (LBL) has lead mission responsibility for the Applied Battery and Electrochemical Research Program. The purpose of this program is to provide the applied research base which supports all of DOE's Electrochemical Systems Missions, and the general objective is to help provide batteries and electrochemical systems that can satisfy economic, performance and schedule requirements. The specific goal is to identify the most promising electrochemical technologies and transfer them to industry and/or another DOE program for further development and scale-up.

General problem areas addressed by the program include the identification of new electrochemical couples for advanced batteries, the determination of technical feasibility of the new couples, improvements in components of batteries under development by other Electrochemical Systems projects funded by DOE, and the establishment of engineering principles applicable to batteries and electrochemical processes. Major emphasis is given to applied research which will lead to superior technical performance and lower-life cycle costs.

LBL placed or renewed 30 subcontracts in Fiscal Year 1981 and conducted a vigorous in-house research program. On-going projects are listed on the following sheets, and those marked with an asterisk will be reviewed at this conference.

Acknowledgement:

This research is supported by the Assistant Secretary for Conservation and Renewable Energy, Office of Advanced Conservation Technologies, Electrochemical Research Division of the U. S. Department of Energy, under Contract W-7405-ENG-48.

APPLIED BATTERY AND ELECTROCHEMICAL
RESEARCH PROGRAM

SUPPORTS

DOE ELECTROCHEMICAL SYSTEMS MISSIONS

ON

- ★ ELECTRIC VEHICLES
- ★ SOLAR ELECTRICITY
- ★ DISPERSED ELECTRIC UTILITY LOAD LEVELING
- ★ ENERGY AND RESOURCE CONSERVATION

U.S. DEPARTMENT OF ENERGY
ASSISTANT SECRETARY FOR CONSERVATION AND RENEWABLE ENERGY
OFFICE OF ADVANCED CONSERVATION TECHNOLOGIES
DIVISION OF ELECTROCHEMICAL SYSTEMS RESEARCH



MANAGEMENT
RESPONSIBILITY

LAWRENCE BERKELEY LABORATORY
ENERGY AND ENVIRONMENT DIVISION
APPLIED BATTERY AND ELECTROCHEMICAL RESEARCH PROGRAM



CONDUCT
RESEARCH

30 SUBCONTRACTORS
9 IN-HOUSE PROJECTS

PROGRAM SCOPE

- EXPLORATION OF NEW ELECTROCHEMICAL COUPLES FOR ADVANCED BATTERIES
- INVESTIGATION OF NOVEL ELECTRODES, ELECTROLYTES AND SEPARATORS FOR NEAR-TERM AND ADVANCED BATTERIES
- ELUCIDATION OF PHENOMENA GOVERNING PERFORMANCE, CYCLE LIFE AND COSTS OF BATTERIES AND ELECTROCHEMICAL SYSTEMS
- IMPROVEMENT OF ENGINEERING DESIGN AND SCALE-UP CRITERIA
- ALLEVIATION OF MATERIALS PROBLEMS IN BATTERIES AND ELECTROCHEMICAL SYSTEMS
- STUDY OF NEW TECHNIQUES FOR FABRICATION OF BATTERY COMPONENTS AND MATERIALS
- SUPPORTING RESEARCH FOR IMPROVED ELECTROLYTIC TECHNOLOGY

RESEARCH AREAS OF THE APPLIED BATTERY AND ELECTROCHEMICAL RESEARCH PROGRAM

- I. EXPLORATORY BATTERY R & D
 - A. NEW ELECTROCHEMICAL CELLS
 - CELL RESEARCH
 - NEW CELL EXPLORATION
 - B. ELECTRODE STUDIES

- II. ENGINEERING-SCIENCE RESEARCH
 - A. ELECTRODE MORPHOLOGICAL STUDIES
 - B. PHENOMENOLOGICAL STUDIES
 - C. PHYSIOCHEMICAL METHODS FOR ELECTROCHEMICAL RESEARCH
 - D. MODELING OF ELECTROCHEMICAL CELLS AND BATTERY SYSTEMS

- III. MATERIALS RESEARCH
 - A. SOLID AND POLYMERIC ELECTROLYTES
 - B. LIQUID ELECTROLYTES
 - C. STABILITY OF PASSIVE CELL COMPONENTS

PROGRAM OBJECTIVES

- IDENTIFY, EVALUATE AND INITIATE DEVELOPMENT OF NEW ELECTROCHEMICAL COUPLES WITH THE POTENTIAL TO MEET OR EXCEED THE ADVANCED SYSTEM PERFORMANCE GOALS OF ONE OR MORE OF THE ECS MISSIONS
- PROVIDE AND ESTABLISH SCIENTIFIC AND ENGINEERING PRINCIPLES APPLICABLE TO BATTERIES AND ELECTROCHEMICAL PROCESSES
- IDENTIFY, CHARACTERIZE, AND IMPROVE THE MATERIALS AND COMPONENTS FOR USE IN BATTERIES AND ELECTROCHEMICAL PROCESSES

PROGRAM STRATEGY

CONDUCT THE REQUIRED APPLIED RESEARCH WHICH WILL LEAD TO
SUPERIOR BATTERY AND ELECTROCHEMICAL SYSTEM TECHNICAL
PERFORMANCE AND LOWER LIFE-CYCLE COSTS

TASK I : EXPLORATORY BATTERY R & D

TASK II : ENGINEERING-SCIENCE RESEARCH

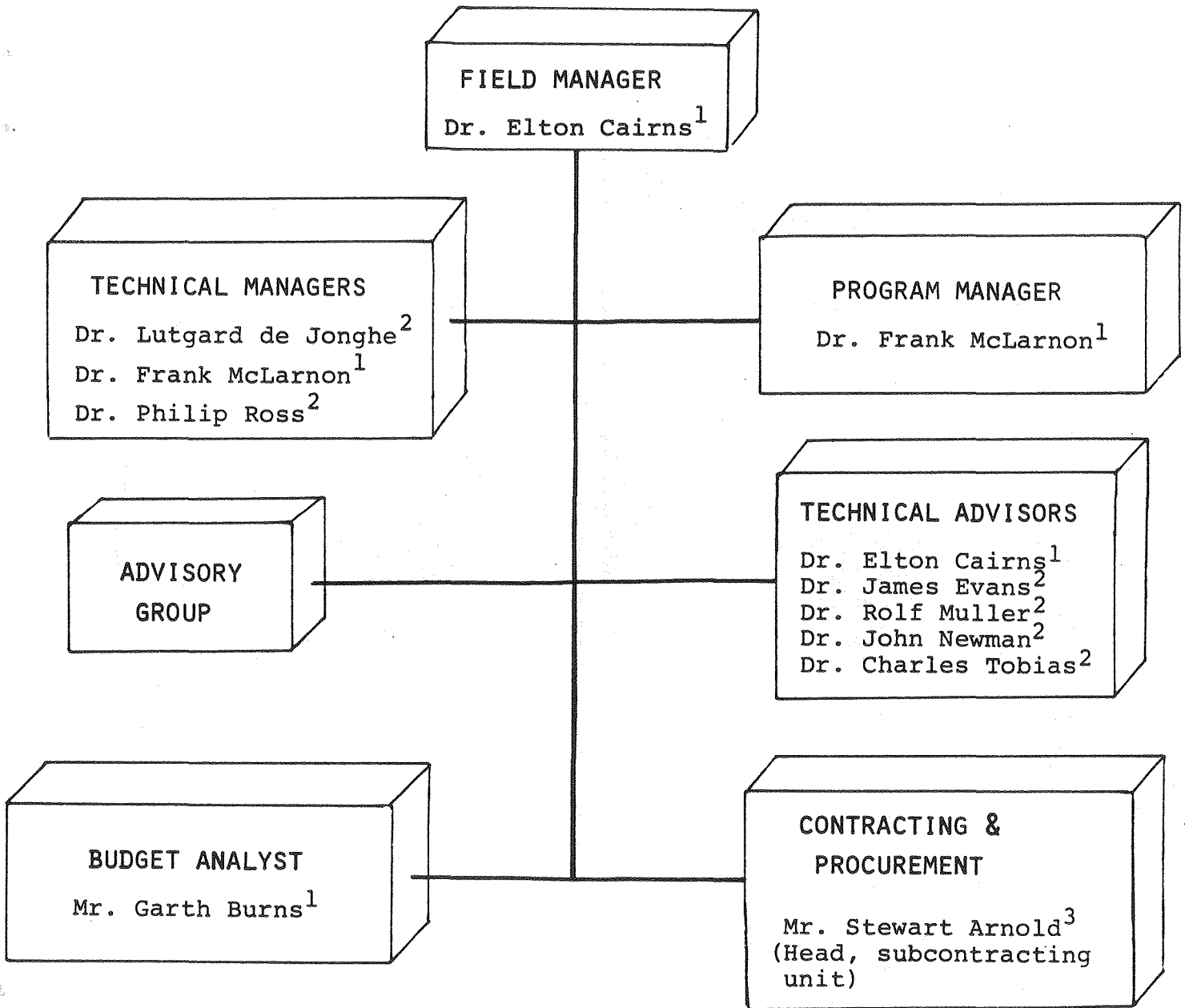
TASK III : MATERIALS RESEARCH

TASK IV : PROGRAM MANAGEMENT

PROGRAM GOAL

IDENTIFY ELECTROCHEMICAL TECHNOLOGIES HAVING
THE GREATEST PROMISE TO SATISFY
ECONOMIC, PERFORMANCE, AND SCHEDULE REQUIREMENTS
OF THE ECS MISSIONS AND TRANSFER THEM TO
INDUSTRY AND/OR ANOTHER DOE PROGRAM FOR
FURTHER DEVELOPMENT AND SCALE-UP

PROGRAM ORGANIZATION CHART

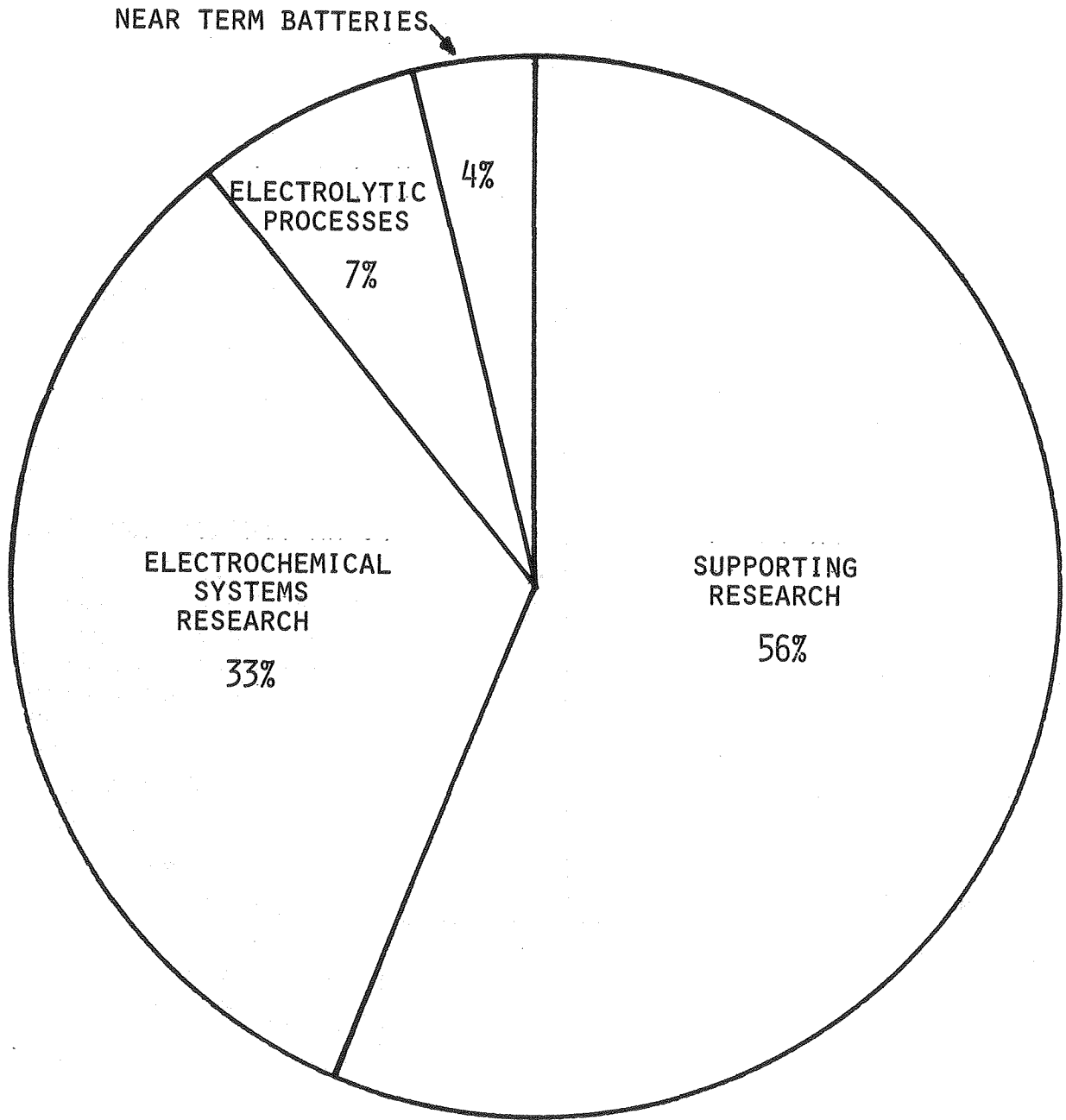


¹Energy & Environment Division,
Dr. Elton Cairns, Division Head

²Materials & Molecular Research Division,
Dr. Alan Searcy, Division Head

³Purchasing Department, Administration Division,
Mr. George L. Pappas, Division Head.

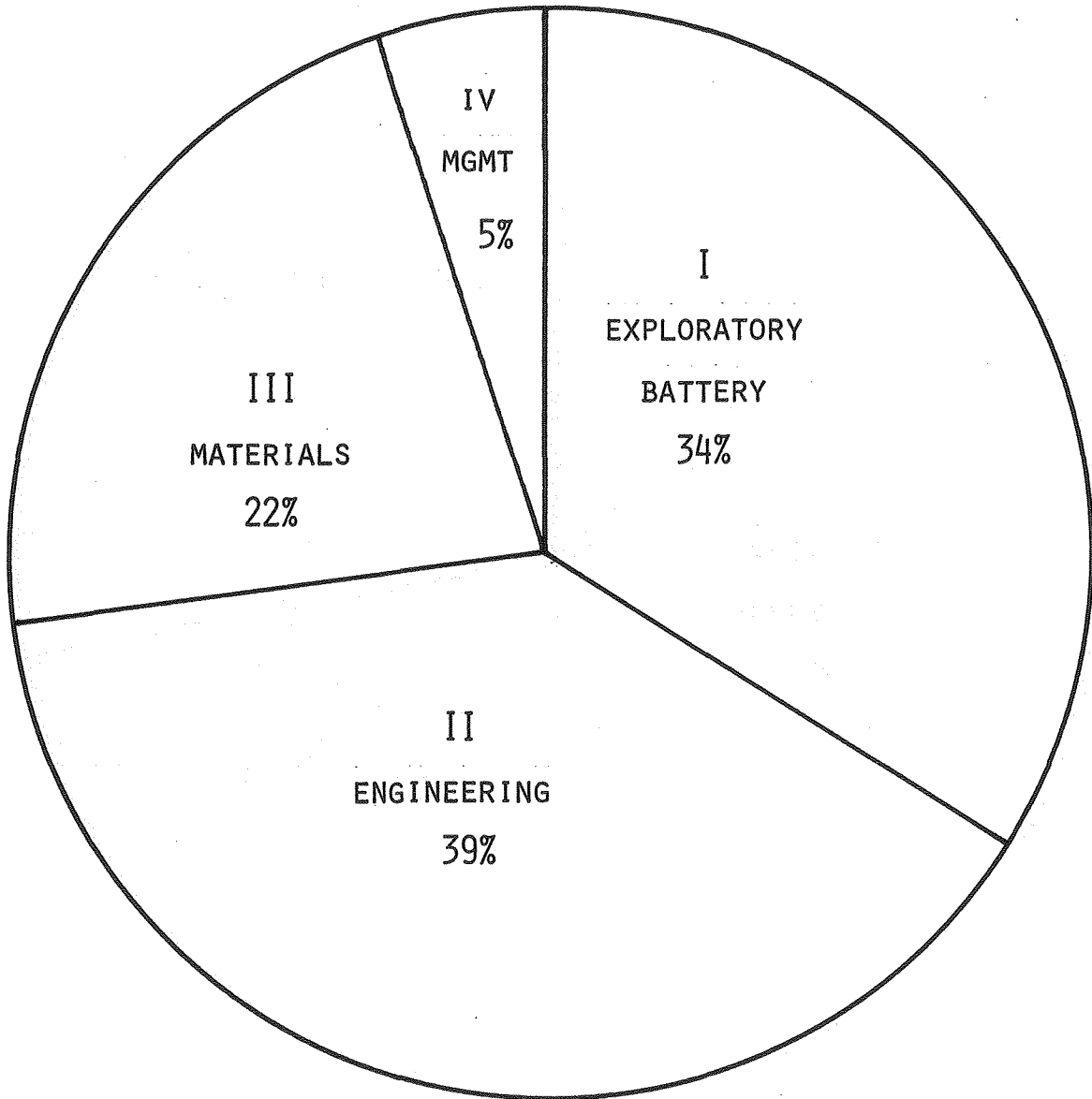
PROGRAM FUNDING
FY 1981



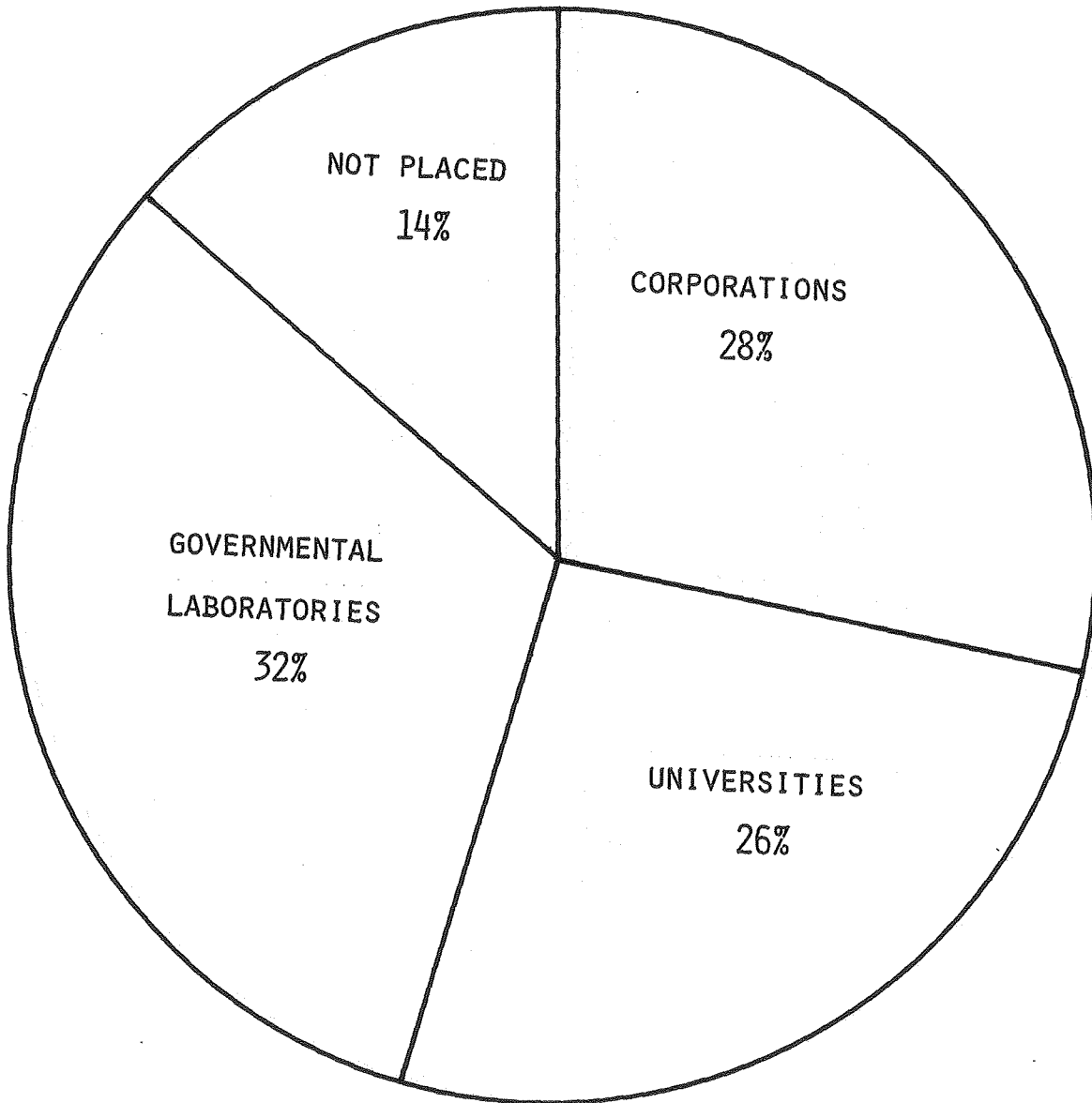
TOTAL BUDGET = \$3890K

XBL 815-9932

DIVISION OF FUNDING
BY TASK
FY 1981



DIVISION OF RESEARCH FUNDING
BY
PERFORMING ORGANIZATION
FY 1981



DIVISION OF RESEARCH FUNDING
BY SUPPORTED TECHNOLOGY
FY 1981

