DOE/ER-0277

Geosciences Projects FY 1985 Listing

Published: May 1986

U.S. Department of Energy
Office of Energy Research
Office of Program Analysis

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Washington, DC 20545

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INTRODUCTION

The Department of Energy (DOE) funded approximately 140 million dollars of geoscience and related activities in FY 1985. The DOE funds and the commensurate program management responsibilities resided in 11 DOE program offices, each of which has its own mission and responsibilities. A Geosciences Working Group was formed from representatives of these offices. The group meets periodically and provides an informal mechanism to identify and report on the Department's geoscience and related activities.

This report, which updates the previous working group publication issued in February 1982, contains three independent sections. These include:

A) Summary Outline of DOE Geoscience and Related Studies, and

B) Crosscut of DOE Geoscience and Geoscience Related Studies.

The FY 1985 funding levels for geoscience and related activities in each of the 11 programs within DOE are presented on pages 8 to 105. The 11 programs fall under six DOE organizations: Energy Research; Conservation and Renewable Energy; Fossil Energy; Defense Programs; Environmental, Safety, and Health; and Civilian Radioactive Waste. The first part of this report is separated into six sections that correspond to these six organizations and contains programmatic descriptions and funding information.

From time to time, there is a particular need for special interprogrammatic coordination within certain topical areas. Section B of the report is intended to fill this need for a topical categorization of the Department's geoscience and related activities. These topical areas in: 1) Solid Earth Geosciences, 2) Atmospheric Geosciences, 3) Ocean Geosciences, 4) Space and Solar/Terrestrial Geosciences, and 5) Hydrological Geosciences are presented on pages 107 to 176 of this report.

OFFICE OF ENERGY RESEARCH

The Office of Energy Research is responsible for four major outlay programs: Health and Environmental Research, Basic Energy Sciences, High Energy and Nuclear Physics, and Magnetic Fusion Energy. The Director of the Office of Energy Research also advises the Secretary on the Department's overall energy research and development programs, university-based education and training activities, and monitors the well being and management of the multi-program laboratories under the jurisdiction of the Department.

The Office of Energy Research conducts geoscience and related activities in the following offices and divisions:

Office of Basic Energy Sciences: Division of Engineering and Geosciences, Division of Materials Sciences, Division of Carbon Dioxide Research and Division of Chemical Sciences.

Office of Health and Environmental Research: Division of Ecological Research.

Office of Basic Energy Sciences:

The Office of Basic Energy Sciences (BES) supports long-range basic energy-related research and is charged with providing the fundamental scientific foundation for the Nation's future energy options. The organization of BES is primarily discipline-oriented. Research is sponsored in selected areas of the traditional scientific disciplines--the physical and biological sciences, engineering and geosciences. The individual research projects supported by the sub-programs of BES are selected on the basis of scientific merit, possible relevance to meeting the BES long-range research goals, and contribution toward a balanced responsive research program.

The Geosciences Research Program, supported by the Division of Engineering and Geosciences, includes participants from Department of Energy laboratories, industry, universities, and other Governmental agencies.

The objectives of the Geoscience program are to develop a quantitative and predictive understanding of geological, geophysical and geochemical structures and processes in solid earth and solar-terrestrial relationships. This understanding is needed to assure an effective knowledge base for energy resource recognition, evaluation and utilization in an environmentally acceptable manner. Principle areas of interest include:

1) Geology, Geophysics and Earth Dynamics--large-scale earth movements; evolution of geologic structures; properties of earth materials, rock flow, fracture and failure.

2) Geochemistry--thermochemical properties of geologic materials; static rock-water interactions; organic geochemistry; geochemical migration.

3) Energy Resource Recognition, Evaluation and Utilization--resource definition and utilization; reservoir dynamics and modeling; magma energy resources; Continental Scientific Drilling Program.

4) Hydrologic and Marine Sciences.

5) Solar-Terrestrial/Atmospheric Interactions--magnetosphere physics and chemistry; upper atmosphere chemistry and physics; solar radiation.

A listing for the Geoscience program supported projects is presented on pages 7 to 19 of this report.

Detailed worldwide measurements indicate that the amount of carbon dioxide (CO_2) in the earth's atmosphere is gradually increasing. Scientific analysis suggests that such an increase could have substantial effects on climate and agriculture and other human endeavors. The goal of the Department of Energy's Carbon Dioxide Research Program managed by the Division of Carbon Dioxide Research is the identification of possible policy options for Governmental action in response to these changes. The achievement of this goal requires a significant increase in our scientific knowledge of the atmosphere, the effects that increasing atmospheric CO_2 and other trace gases will have on them.

Integrated geoscience research on the CO_2 issue includes observation of atmospheric CO_2, fluxes of CO_2 among major reservoirs of the earth (atmosphere, ocean, and land), and documentation of CO_2 of ice cores. The research should provide the technology base needed to consider innovative concepts and strategies by which people can modify and/or adapt to these potential changes. Assessments of risks and cost/benefit analyses can be conducted so that potential options for decision making can be based upon a truly comprehensive understanding of CO_2 induced changes. A listing of the CO_2 research program supported projects is presented on pages 20 to 24 of this report.

The Materials Sciences Division within BES supports basic research on materials properties and phenomena important to all energy systems. The aim is to provide the necessary basic materials knowledge required to advance the Nation's energy programs.

The objective of the Chemical Sciences Division is to expand the Nation's knowledge base in the chemical and related sciences in areas most likely to lead to new ideas and improved processes for developing and using domestic energy resources.

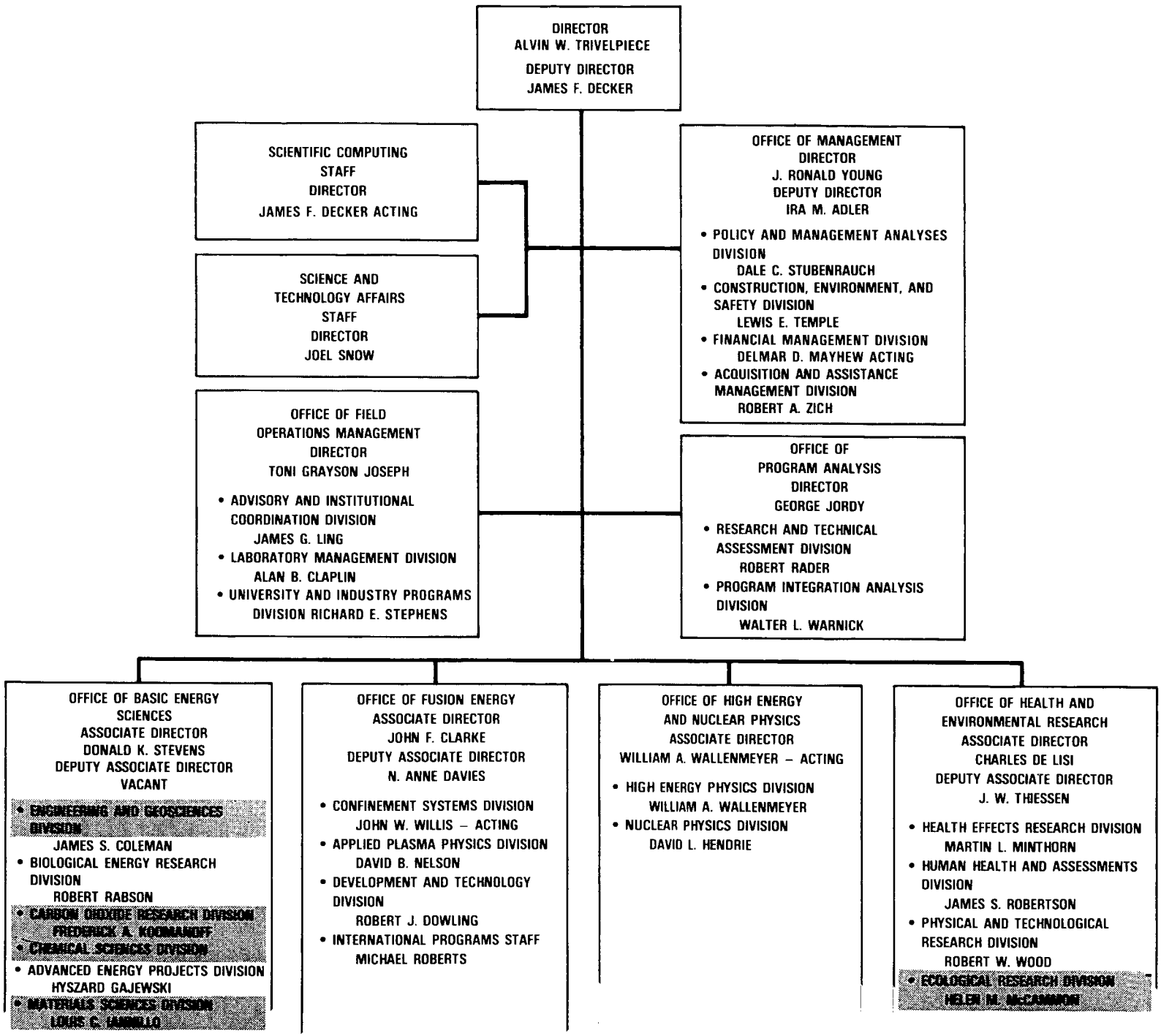
Some of the research projects supported by the Chemical Sciences and Materials Sciences Divisions are geoscience related and have a geoscience component to the research. These projects are listed on pages 25 to 29. The amount of the funds listed for each project reflects the pro rata part of the funding that is geoscience related.

Office of Health and Environmental Research (OHER):

OHER has supported geosciences since 1950. OHER's mission has been to provide a knowledge base in the basic sciences, and, particularly, long term environmental and ecological research in all energy technologies. In the past several years, geological and hydrological research had been directed to the transport and transformation of energy contaminants within ecological systems. OHER gives priority to research on intermediate to long term aspects of energy technologies on the environment; technical research that directly supports the requirements of environmental laws is conducted by other agencies. The objectives of geoscience research within OHER are development of scientific information aimed at anticipating and ameliorating the effects of energy technologies in natural environments, and understanding the environmental changes that result from energy development.

Geoscience research in the Ecological Research Division is aimed at developing a long term base of knowledge about the effects of energy technologies and future energy development. Research projects commonly involve the disciplines of geology, ecology, hydrology, marine sciences, chemistry, and biology. Geosciences research is rarely conducted in isolation from other disciplines. This interdisciplinary research approach means that geoscience funds are distributed within multidisciplinary research projects. These projects supported by the Ecological Research Division are presented on pages 30 to 37 of this report.

OFFICE OF ENERGY RESEARCH



BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Argonne National Laboratory	Trace Element Migration in the Earth's Crust.	M. Seitz, et. al.	120
	Migration of Heavy Element Chemical Species in Geologic Media.	F. Schrieiner, et. al.	120
	Thermochemistry of Geothermal Materials.	P.A.G. O'Hare, et. al.	120
Lawrence Berkeley Laboratory	Deep Electro-Magnetic Soundings in Thermal Regimes.	H.F. Morrison N.E. Goldstein	90
	Effect of Fracture Characteristics Upon Acoustic Wave Propagation in Boreholes.	M.S. King	40
	Center for Computational Seismology.	T.V. McEvilly E.L. Majer	70
	Non-Isothermal Reservoir Dynamics.	C.E. Tsang, et. al.	95
	Thermodynamics of High Temperature Brines.	K.S. Pitzer	100
	Properties of Silicate Liquids and Glasses.	I.S.E. Carmichael	130
	Chemical Transport in Natural Systems.	C.L. Carnahan J.S. Ramer	90
	Generation & Primary Migration of Petroleum and Its Precurser Compounds.	O. Weres	85
	Generation of Abiogenic Methane.	J.A. Apps	40

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BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Berkeley Laboratory (Continued)	Asteroid Impacts and Mass Extinctions.	L. Alvarez, et. al.	150
	Transport Properties of Rock-Fluid Systems at Elevated Temperatures and Pressures.	M.S. King, et. al.	75
	Aqueous Solution Data Base.	S.L. Phillips	70
	Fluid Flow in Fractured Rock Under Stress.	P.A. Witherspoon Y.W. Tsang	60
	Geophysical Measurements Facility.	T.V. McEvilly	70
	CSDP: Workshop on Geophysical Modeling for Long Valley.	T.V. McEvilly H.F. Morrison	15
	Hydrogeochemistry in Thermal Regimes.	H.A. Wollenberg A.F. White	100
	Geomechanical Laboratory Studies of SSSDP Core Samples.	M.S. King	15
	In-situ Fluid Sampling of the Salton Sea Scientific Drilling Program Well.	A.F. White	9
	Reflection Profiling at the Salton Sea Deep Hole Site.	E.L. Majer T.V. McEvilley	75
	Surface Studies Involving the Mineral Surface/Radionuclide Ion Solution Interface.	D.L. Perry	60

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory	Rock Mechanics: Thermal & Creep Behavior of Generic Repository Rocks.	H. Heard, et. al.	160
	Diffusion in Silicate Materials.	A.J. Piwinskii	95
	Electrical Conductivity and Temperature in the Upper Mantle.	A. Duba	85
	Attenuation and Dispersion in Partially Saturated Rocks.	Chin	110
	Surface Wave Method for Determining Earthquake Source Mechanisms with Applications to Regional Stress Field Studies.	Patton & Taylor	90
	Underground Imaging.	J. Lytle*, et. al.	285
	Thermal Stress Microfracturing of Granite.	H. Heard	70
	Thermodynamics, Kinetics, and Transport in Aqueous Electrolyte Solutions.	J. Lytle*/H. Heard	150
	Kinetic and Compositional Model of High-Pressure Kerogen Pyrolysis.	J. Lytle*/H. Heard	100
	Continental Drilling Program Information and Data Management Unit.	N. W. Howard	100
	Viscosity and Electrical Conductivity of Rock Melts: Continental Scientific Drilling Program.	A. J. Piwinskii	55

* Deceased

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory (Continued)	CSDP: Imperial Valley Information Base.	D. Emerson P. Kasameyer	40
	Salton Sea Scientific Drilling Program Science Management Activities.	A. Duba P. Kasameyer	65
	Seismic Studies of Possible Magma Injection and Magma Chambers in the Long Valley Region.	Mills, et. al.	150
	Constraints from Borehole Gravity on Geothermal System Models & Resource Definition in the Salton Sea Geothermal Field.	P. Kasameyer J.H. Hearst	19
	Physical & Chemical Laboratory Studies of Cores from the Salton Sea Scientific Drilling Project.	Daily & Linn	19
	Shallow Hole Drilling Investigations of Long Valley, Valles, and Salton Sea Thermal Regimes.	L.W. Younker	200
	Thermal and Petrologic Studies of Large Silicic Systems.	L.W. Younker P. Kasameyer	80
Los Alamos National Laboratory	Electrical Conductivity, Temperature, and Radiative Transport in the Earth.	T. Shankland	120
	Nonlinear Generation of Acoustic Beams.	T. Shankland	120
	Creep Deformation of Rock.	J. Blacic	120

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Coal Maturation: Occurrence, Form, and Distribution of Sulfur and Mineral Matter in Peat.	R. Raymond, et. al.	190
	Rock-Water Interactions and Element Migration in the Jemez Hydrothermal System.	R.W. Charles, et. al.	280
	Thermodynamic Properties of Aqueous Solutions at High Temperatures and Pressures.	P.A. Rogers C.E. Holley	110
	The Geochemistry of Ru and Tc and Geochemical Controls on the Redistribution of Multivalent Elements in the Lithosphere.	D.B. Curtis, et. al.	110
	Geologic, Geochemical, and Sr, Nd, and Pb Isotopic Studies on an Anomalous Late Cenozoic Basalt Province in the Southwestern Great Basin.	B.M. Crowe, et. al.	80
	Physiochemical Basis of the Na-K-Ca Geothermometer.	T.M. Benjamin, et. al.	60
	Trace Element Geochemistry of Volcanic Gases & Geothermal Systems.	B.M. Crowe D.B. Curtis	20
	Origin and Extent of the Toledo Caldera, Jemez Mountains, New Mexico.	G.H. Heiken F.E. Goff	60
	Search for Magma Beneath the Jemez Mountain Volcanic Field.	K.H. Olsen	150

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Shallow Hole Investigation of Long Valley, Valles, and Salton Sea Thermal Regimes.	F.E. Goff, et. al.	150
	Studies of the Polvadero Group, Jemez Mountains, NM.	S. Baldridge D. Vaniman	110
	Valles Caldera Information Base.	S. Goff N. Marashak	35
	CSDP Drilling Sample & Data Management System.	S. Goff	130
	In Situ Fluid Sampling of Salton Sea Scientific Drilling Project Well.	F.E. Goff	24
	Energy Transport in Space Plasma.	S.P. Gary W.C. Feldman	
	Electrodynamical Aspects of the Solar Wind-Magnetosphere Interaction.	E.W. Hones, Jr. J. Birn	
	Theory of Energetic Particle Acceleration and Precipitation in the Terrestrial Magnetosphere.	D.N. Baker	
	Calculations in Support of Modeling/ Modeling of Magnetosphere.	S.P. Gary D.N. Baker	20

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Oak Ridge National Laboratory	Geochemistry of Crustal Processes to High Temperatures and Pressures. These studies focus upon:		480
	(A) Silicate Melt Geochemistry	M. Naney	
	(B) Hydrothermal Geochemistry:		
	(1) Homogeneous Equilibria.	D. Wesolowski	
	(2) Heterogeneous Equilibria.	E. Drummond	
	(3) Kinetics.	E. Drummond D. Cole	
	(4) Modeling.	D. Cole, et. al.	
Pacific Northwest Laboratory	Remote Sensing: Geoscience Data Analysis and Integration.	A.P. Foote, et. al.	140
	Chemical Migration by Contact Metamorphism Between Pegmatite - Country Rock.	J.C. Laul	105
	DOE Insolation/Aeronomy Studies:		350
	(1) Insolation Studies.	J.J. Michalsky, et. al.	
	(2) Aeronomy Studies.	W.W. Kleckner, et. al.	
Sandia National Laboratories, Albuquerque	CSDP - High Temperature Geophysical Research Techniques.	H.C. Hardee, et. al.	300
	Magmatic Emplacement.	C.R. Carrigan	70
	CSDP Long Valley-Mono Craters Site Assessment.	J.B. Rundle J.C. Eichelberger	50
	Inyo Domes Research Drilling Program.	J.C. Eichelberger	141.5
	Geoscience Research Drilling Office.	R.K. Traeger	600

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories, Albuquerque, (Continued)	Long Valley-Mono Craters (CA) Information Base.	J.C. Eichelberger	20
	Crustal Strain.	J.B. Rundle	75
	Time-Dependent Deformation and Fracture of Brittle Rock.	L.S. Costin D.J. Holcomb	110
	Creep Response of NaCl at Low Stresses and Temperatures.	W.R. Wawersik	100
	Hydrothermal-Magma Systems.	W.C. Luth, et. al.	250
	Clay H_2O Interactions.	J.L. Krumhansl	70
Arizona State University	Drilling Investigation of a Young Magmatic Intrusion Beneath the Inyo Domes, Long Valley, California: Structural and Emplacement Studies.	J.H. Fink	22
*	Silicate, Aluminosilicate and Boro-silicate Melts: Thermochemical Studies by High Temperature Calorimetry.	A. Navrotsky	83
University of Arizona	Solar Variability Observation Through Changes in Solar Figure and Mean Diameter.	H.A. Hill	121.2
Brown University	Thermal Regimes of Major Volcanic Centers: Magnetotelluric Constraints on the Coupling of Deep-Seated Magma Genesis to High-Level Geothermal Reservoirs.	J.F. Hermance	166.3

* Now at Princeton University.

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
California Institute of Technology	In Situ Stress in Deep Boreholes.	T.J. Ahrens	160
	Infrared Spectroscopy and Hydrogen Isotope Geochemistry of Hydrous Silicate Glasses.	E. Stolper	50
University of California, Berkeley	Advective-Diffusive/Dispersive Transport of Chemically Reacting Species in Hydrothermal Systems.	H.C. Helgeson	120
	Isotopic Studies on Rare Gases in Terrestrial Samples and in Natural Nucleosynthesis.	J.H. Reynolds	232.6
	Long Valley Caldera: Monitoring Studies of Gas Composition and He, Ar, and Carbon Isotopes.	W. Rison H. Craig	40.6
University of California, Los Angeles	Adiabats and Gruneisien Parameter at High Temperatures and High Pressure.	R. Boehler M. Nicol	85
	Determination of Thermodynamic Functions of Minerals at High Temperature.	O.L. Anderson	74
University of California, Riverside	Sulfate-Oxide-Silicate Phase Equilibria and Associated Fluid Inclusion Properties in the Salton Sea Geothermal Systems.	E. McKibben	50
University of Southern California	Continental Scientific Drilling Program: The Seismology of Continental Thermal Regimes.	K. Aki	150

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Chicago	Depth to and Concentrations of Water in Large Bodies of Silicic Magma.	A.T. Anderson	46
Columbia University	Energetics of Silicate Melts from Thermal Diffusion Studies Seismo-tectonics of the Eastern Aleutian Arc and Associated Volcanic Systems.	D. Walker	78.5
	Seismo-tectonics of the Eastern Aleutian Arc and Associated Volcanic Systems.	K. Jacobs L. Sykes	360
	Fluid Transport Properties of Rock Fractures.	C.H. Scholz E.E. Engelder	150
DOSECC, Inc.	Workshop on Continental Scientific Drilling.	B. Raleigh	6
University of Hawaii at Manoa	Physical Characterization of Magma Samples.	M. Manghnani	200
Harvard University	Energetics & Thermochemical Properties of Rocks and Minerals.	J. Thompson, et. al.	115.1
University of Maryland	Salton Sea Geothermal System Using Be Isotope and Trace Element Geochemistry.	N. Vallette-Silver	42.6
Massachussetts Institute of Technology	Microcracks and Energy.	G. Simmons	80
Michigan State University	The Effects of Pressure, Volatiles, and Thermal History on Chemical Heterogeneity in Magma Systems.	T.A. Vogel	31.3

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Michigan Technological Institute	Geothermal Alteration of Sediments in the Salton Sea Scientific Drill Hole.	S.D. McDowell	50
National Academy of Sciences	Studies in Geophysics.	T.M. Usselman	32
	Committee on Seismology.	J.W. Berg, Jr.	10
	U.S. Geodynamics Committee.	P.J. Hart	59
	Continental Scientific Drilling Committee.	R.S. Andrews	65
	Board on Earth Sciences.	J.W. Berg, Jr.	10
	Geophysics Film Commmittee.	B. Valentino	20
City University of New York, Brooklyn College	Deep Burial Diagenesis in Carbonates.	G.M. Friedman	95.1
State University of New York, Albany	Thermal Evolution of Sedimentary Basins.	T.M. Harrison	118
University of North Carolina	Activity-Composition Relations in Silicate Melts.	A. Glazner	38.2
University of Oklahoma	Source Material and Mechanisms of Generation & Migration of Oils in Anadarko Basin, Oklahoma.	P. Philp	83.7
Pennsylvania State University	The Geochemistry of Coal Origins in Relation to Coal Structure.	P.H. Given, et. al.	123

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Rice University	Structural Evolution of the Central Brooks Range, Alaska.	H.C. Ave Lallemont	124
South Dakota School of Mines and Technology	Thermally Induced Chemical Migration: A Natural Analog Approach.	J.J. Papike	100
	SSSDP Cores: Metamorphic Reaction Progress as a Function of Chemical & Thermal Environment.	J.J. Papike	50
Stanford University	Porosity with Fluids: Origin and Effects on Physical Properties of Crustal Rocks.	A.M. Nur	172
	Structure and Emplacement of the Inyo Domes Intrusion, Long Valley, California.	D.D. Pollard	39
Texas A&M University	Deformation of Granitic Rocks at Elevated Temperatures and Pressures.	M. Friedman	100.2
University of Texas, Arlington	Volcanological Investigation of the Banco Bonito Eruption and Subsurface Geology at the Ring Fracture Zone, Valles Caldera, New Mexico.	S. Self	43
University of Tulsa	Stability of Natural Gas in the Deep Subsurface.	C. Barker	80
University of Wisconsin	Thermal Stress Microfracturing of Granite.	H.F. Wang	52.3
Woodward-Clyde Associates	Earthquake Analyses for Structural Definition & Material Characteristics of the Mono Craters and Long Valley Magma Systems.	L.J. Burdick D.M. Cole	40

BASIC ENERGY SCIENCES--GEOSCIENCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Yale University	Opening Mode Crack Growth in Rock.	R.B. Gordon	
Woods Hole Oceanographic Institution	Organic Geochemistry of Outer Continental Margin and Deep Ocean Sediments.	J.W. Farrington J.K. Whelan	223

BASIC ENERGY SCIENCES--CARBON DIOXIDE PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Oak Ridge National Laboratory	Soil Carbon in the Global Carbon Cycle.	Post, Mann, & Pastor	215
University of Arizona	Accurate Determination of C-13/C-12 in CO_2 of Past Atmospheres.	A. Long	84
Atmospheric & Environmental Research, Inc.	Humidity/Cloud-Radiation Feedback & Possible Climatic Perturbations Due to Fossil Fuel Utilization.	W-C. Wang	138
	A Research Program on Natural and Antropogenic Climate Change.	W-C. Wang	100
National Center for Atmospheric Research	Enhanced Research Program on the Long-Range Climatic Effects of Increasing Atmospheric CO_2.	W.M. Washington	260
Brown University	Model Validation Research: Comparison of Simulated and Observed Climate Patterns for the past 18,000 Years.	T. Webb, III	459
University of Colorado	Lake Ice Occurrence as a Possible Detector of Atmospheric Carbon Dioxide Effects of Climate.	R.G. Barry	35
	Analysis of Southern Hemishpere CO_2 Data in Relation to Variations in Atmospheric Circulation and Sea Ice Conditions.	R.G. Barry	24
Cornell University	Merging the Tropical Biosphere Model and Carbon Inventory Estimates with Land Use Change Estimates.	C.A.S. Hall	33

BASIC ENERGY SCIENCES--CARBON DIOXIDE PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Duke University	Land Use and Vegetation Changes in South and Southeast Asia, 1700-1980 AD.	J.F. Richards	240
University of East Anglia	Validation of General Circulation Model Control Runs.	T.M.L. Wigleg	20
Universities of Illinois and Puerto Rico	The Role of Tropical Forests in the Global Carbon Cycle.	S. Brown A. Lugo	88
Lamont-Doherty Geological Observatory	Study of Carbon Dioxide Source/Sink Distributions with a 3-D Model.	I.Y-S. Fung	150
	Recent Climate Change in North America and CO_2: Search in Stratified Daily Data.	G. Kukla	133
	Variations in Arctic Cloud Cover in Summer.	G. Kukla	25
Lawrence Berkeley Laboratory	The Role of Carbonaceous Aerosol in Climate Modification.	H.J. Rosen	250
Lawrence Livermore National Laboratory	Cloud/Radiation Interactions and Climate.	F.M. Luther	225
	CO_2 Effects Research.	M.C. Maccracken	870
	Trace Gas Interactions in the Global Atmosphere.	D.J. Wuebbles	250
Marine Biological Laboratory	Mathematical Models for Use in Defining the Role of the Terrestrial Biota in the Global Carbon Cycle.	R.A. Houghton	274
	Remote Sensing of Deforestation in the Amazon Basis.	G.M. Woodwell	257

BASIC ENERGY SCIENCES--CARBON DIOXIDE PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Marshall Space Flight Center	Study of a CO_2 Observational Platform System (CO-OPS).	C.H. Guttman	200
University of Massachusetts	Studies of Climatic Variability During the Period of Instrumental Records.	Bradley, Kelly, Jones, Diaz	150
National Bureau of Standards	High Accuracy Standards and Reference Methodology for CO_2 in Air.	E.E. Hughes	200
National Center for Atmospheric Research	Enhanced Research Program on the Long Range Effects of Increasing Atmospheric CO_2.	W.M. Washington	260
New York University	Geophysical Models of the Fossil Fuel CO_2 Problem.	M.I. Hoffert	160
Oak Ridge Associated Universities	Uncertainties in Future CO_2 Emissions.	J. Edmonds	100
	Estimate of CO_2 Emissions from Fossil Fuel.	R.M. Rotty	150
Oak Ridge National Laboratory	Sensitivity Analysis of the Impact of Carbon Dioxide Accumulation on Climate.	D.G. Cacuci	100
	Carbon Cycle Program Management.	C.C. Coutant	21
	The Global Carbon Cycles and Climate.	Emanuel, Peng, Deangelis	385
Oregon Graduate Center	Atmospheric Methane: Research Program for a Study in China.	R.A. Rasmussen	264
Oregon State University	Research on the Dynamics of the Climate.	W.L. Gates	225

BASIC ENERGY SCIENCES--CARBON DIOXIDE PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Oregon State University (Continued)	On the Increase of Total Carbon Dioxide in the World Oceans.	C-T. Chen	101
	Model Intercomparison.	W.L. Gates	100
Pacific Northwest Laboratory	Atmospheric CO_2 Abundance--An Archival Study of Spectroscopic Data.	G.M. Stokes	
University of Southern Florida	The Role of Aragonite in the Marine Carbon Cycle.	R.H. Byrne	82
State University of New York at Stony Brook	Research Project on CO_2-Induced Climate Change.	R.D. Cess S. Hameed	308
University of Washington	Geochemical Determination of Biospheric CO_2 Fluxes to the Atmosphere.	M. Stuiver	32
Lamont-Doherty Geological Observatory	Ocean Tracer Modeling: Data Evaluation and Comparison of Preliminary Models.	W.S. Broecker	120
	Assessment of CO_2 Sink/Source in the Oceanic Areas: Seasonal and Geographic Variability.	T. Takahashi	194
University of Miami	Indian Ocean Radiocarbon.	H.G. Ostlund	49
University of New Hampshire	Ocean Models in the Global Carbon Cycle.	B. Moore, III	106
Princeton University	Models of Nutrient and Carbon Cycles in the Oceans.	J.L. Sarmiento	155

BASIC ENERGY SCIENCES--CARBON DIOXIDE PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Scripps Institution of Oceanography	Development of a 3-D Model of the Natural Carbon Cycle in the Ocean and its Perturbation by Anthropogenic Carbon Dioxide.	R.B. Cacastow	149

BASIC ENERGY SCIENCES--CHEMICAL SCIENCES DIVISION

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Ames Laboratory	Analytical Spectroscopy. New techniques for measurement of elements in geological samples.	V.A. Fassel	35
Brookhaven National Laboratory	Analytical Techniques with Synchrotron Radiation and Ion Beams. Microprobe techniques for characterization of solids, particularly of geological origin.	K.W. Jones	110
Oak Ridge National Laboratory	Mass Spectrometric R&D for Inorganic Analyses. Mass spectrometric techniques for elementral and isotopic analyses.	R.L. Walker	52
Pacific Northwest Laboratory	Analytical Atomic Absorption Spectrometry Research. New techniques for measurement of elements in geological and environmental samples.	D.L. Styris	108
University of Georgia	Fundamental Studies of Separation Processes. Fractionation of fossil materials by chromatography.	L.B. Rogers	32
University of Maryland	Study of Highly Selective Sorptive Effects with Applications to Paraffins and Petroporphyrin Separations. Separation and identification of porphyrin components of fossil materials.	D.H. Freeman	35
University of Virginia	The Glow Discharge as an Atomization and Ionization Device. New techniques for direct analysis of solids such as minerals.	W.W. Harrison	16

BASIC ENERGY SCIENCES--CHEMICAL SCIENCES DIVISION

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Wyoming	Solid Surface Luminescence Analysis. Luminescence Techniques for Analysis of Fossil Hydrocarbons.	R.J. Hurtubise	45
University of California, Irvine	Research in Chemical Kinetics/Atmospheric Chemistry.	F.S. Rowland	95
Pacific Northwest Laboratory	Laser-Based Analytical Techniques. Laser Spectroscopic Techniques for Isotopic Measurements on Noble Gases in Deep Aquifers and Ocean Waters.	T.J. Whitaker	91
Lawrence Berkeley Laboratory	Critical Behavior of Ionic Systems. Thermodynamics of high pressure brines related to geologic methane reservoirs.	K. Pitzer	138
	High-Pressure Phase Equilibria in Hydrocarbon-Water (Brine) Systems. Thermodynamics of high pressure brines related to geologic methane reservoirs.	J.M. Prausnitz	75
Los Alamos National Laboratory	Actinide Chemistry in Near-Neutral Solutions. Actinide chemistry under conditions found in groundwaters.	T.W. Newton	27
Oak Ridge National Laboratory	Basic Aqueous Chemistry in Near-Neutral Solutions. Actinide chemistry under conditions found in groundwaters.	T.W. Newton	27
Florida State University	Research in Actinide Chemistry. Solution chemistry, including interactions with ligands found in groundwaters.	G.R. Choppin	2

BASIC ENERGY SCIENCES--CHEMICAL SCIENCES DIVISION

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Stanford University	Fundamental Studies of Flow and Instabilities in Porous Media. Transport of Viscous Fluids Through Porous Media Related to Secondary Oil Recovery.	G.M. Homsy	25
Lawrence Berkeley Laboratory	Photochemistry of Materials in the Stratosphere.	H. Johnson	250

BASIC ENERGY SCIENCES--MATERIALS SCIENCES DIVISION

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Boeing Aerospace	X-ray Spectroscopic Investigation Metamictization and Annealing in Crystalline Materials.	R.B. Greegor F.W. Lytle*	10
Carnegie Institute	Static Megabar Pressures. High temperature high pressure studies using diamond anvil cell.	P.M. Bell H.K. Mao	**
Research Institute of Colorado	Molecular Solids at High Pressure and Temperature. Equation of state and lattice dynamics	R.D. Etters	70
Los Alamos National Laboratory	The Effect of Self-Irradiation on Stability of Ceramic Nuclear Waste.	F. Clinard, et. al.	10
	Materials Under Extreme Conditions. High temperature high pressure studies using diamond anvil cell.	R.L. Mills, et. al.	240
Massachusetts Institute of Technology	Irradiation Damage Microstructures in Nuclear Ceramics with Applications in Fusion Energy Technology and Nuclear Waste Disposal.	L.W. Hobbs	10
University of New Mexico	Radiation Effects and Annealing Kinetics in Crystalline Complex Nb-Ta-Ti Oxides, Phosphates, and Silicates.	R.C. Ewing	20

* Deceased
** No Cost Extension

BASIC ENERGY SCIENCES--MATERIALS SCIENCES DIVISION

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
State University of New York, Stony Brook	Participating Research Facilities at the National Synchrotron Light Source.	J. Bigeleisen	80
Oak Ridge National Laboratory	Preparation and Characterization of Research Materials/Growth of Single Crystal Research Specimens.	L.A. Boatner, et. al.	350

OFFICE OF HEALTH AND ENVIRONMENTAL RESEARCH (OHER)--ECOLOGICAL RESEARCH DIVISION[1]

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Hydrologic Transport in Southwestern Ecosystems.	E. Springer	300
Oak Ridge National Laboratory	Hydrologic Transport of Trace Elements in Contrasting Watersheds.	R. Luxmoore	275
	Biogeochemical Transport Processes and Modeling.	C. Francis G. Yeh	475
	Experiments Using Natural Dissolved Organic Matter in the Subsurface.	J. McCarthy	150
Pacific Northwest Laboratory	Aqueous/Nonaqueous Fluid Dynamics in Groundwater.	W. Nelson, C. Simmons Streile	150
Massachusetts Institute of Technology	Groundwater Transport of Colloidal Micro-particles and Organic Macromolecules.	P. Gschwend	75
Clarkson University, Notre Dame	Multisolute Subsurface Transport Modeling.	T. Theis	80[2]
Princeton University	Hydrophysical Transport of Nonaqueous Organic of the Southeastern Continental Shelf.	G. Pinder	80[2]
Pennsylvania State University	Energy-Based Runoff and Erosion Potential Analysis with High Resolution Digital Remote Sensing Techniques.	R. Eyton	114[2]
	Hydrologic-Ecologic Research Experiments on Watersheds in Alaska, Nevada-Arizona and Pennsylvania.	G. Petersen	200[3]

OFFICE OF HEALTH AND ENVIRONMENTAL RESEARCH (OHER)--ECOLOGICAL RESEARCH DIVISION[1]

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Arizona	International Congress-Hydrology of Low Permeability Rocks.	G. Simpson	15
Purdue University	Simulation of Water-Organic Chemical-Clay Systems Using Supercomputers.	J. Cushman	178[2,4]

(1) Hydrologic research is conducted predominantly within the Ecological Research Division's Subsurface Transport Program, to include transport of contaminants in surface water and groundwater. National Laboratory-University collaborative projects are common. Projects listed are focussed on hydrologic transport including predictive modeling. Related research in hydrogeochemistry (which may include a microbiological component) is not listed.

(2) Multiyear university grants with estimated annual contribution.

(3) Consolidated project title and budget estimate are shown. Includes several remote sensing experiments as a part of multidisciplinary research in watersheds. Remote sensing conducted as part of ecological research using new or advanced technologies, with attention to hydrologic-ecologic interactions using National Laboratory-University consortia or multi-university associations.

(4) Representative of hydrogeochemical research with a component applicable to hydrologic transport.

OHER--ECOLOGICAL RESEARCH DIVISION--BIOLOGICAL AND ENVIRONMENTAL RESEARCH ATMOSPHERIC SCIENCE

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Argonne National Laboratory	Network Monitoring of Acidic Dry Deposition.	M.S. Wesely	96
	Atmospheric Bound Layer Transport and Dispersion Studies.	M.S. Wesely	179
	Nonlinearity of Acid Precipitation Processes.	M.S. Wesely	560
Atmospheric Turbulence Diffusion Laboratory	Atmospheric Turbulence and Diffusion.	B.B. Hicks	661
Brookhaven National Laboratory	Atmospheric Aerosol Microphysics.	W.H. Marlow	136
	Atmospheric Chemistry and Physics of Organic Pollutants.	J. Gaffney	275
	Aerosol Chemistry and Dynamics.	I.N. Tang	160
	Atmospheric Tracer and Instrumentation Developments.	R.N. Dietz	160
	Nonlinearity.	P. Michael	2,580
	Temporary Assignment for Acidic Deposition Program.	G. Hendry	205
E.I. DuPont De Nemours and Company, Inc.	Air Transport of Contaminants.	A.H. Weber	194
Lawrence Berkeley Laboratory	Aerosol Chemistry by ESCA Technology.	T. Novakov	360

OHER--ECOLOGICAL RESEARCH DIVISION--BIOLOGICAL AND ENVIRONMENTAL RESEARCH ATMOSPHERIC SCIENCE

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory	Support Complex Terrain Studies.	P.H. Gudiksen	391
	Ascot Management.	M.H. Dickerson	149
	Regional Atmospheric Modeling.	P.M. Gresho	116
	Atmospheric Studies Complex Terrain.	M. Dickerson	342
Los Alamos National Laboratory	Project Airstream Measurement.	E. Mroz	90
	Terrain Influence Meteorology.	S. Barr	500
Oak Ridge National Laboratory	Atmosphere - Canopy Interactions.	S.E. Lindberg	115
	Ion Chemistry and Atmospheric Cluster Phenomena.	W.R. Garrett	399
Pacific Northwest Laboratory	Coupling/Decoupling of Synoptic and Valley Circulations.	C. Whiteman	100
	Dry Deposition and Resuspension.	G.A. Sehmel	160
	Atmospheric Boundary Layer Studies.	T.W. Horst	165
	Atmospheric Diffusion in Complex Terrain.	M.M. Orgill	140
	Nonlinearity/Acid Precipitation Processes.	W. Slinn	1,820
	MAP3S Network.	M. Dana	28
University of California	Photochemical and Thermal Reactions of Combustion Related Particular Organic Matter.	R. Atkinson	85

OHER--ECOLOGICAL RESEARCH DIVISION--BIOLOGICAL AND ENVIRONMENTAL RESEARCH ATMOSPHERIC SCIENCE

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Colorado State University	General Circulation Variability Medium to Long-Range Forecasting and Energy-Industry Related Applications.	E. Reiter	60
U.S. Department of Commerce	Atmospheric Transport and Dispersion of Pollutants and Related Meteorological Studies.	J. Heffter	259
University of Delaware	Chemistry of Atmospheric Precipitation at Lewes.	T. Church	30
Ford Motor Company	Studies of Optimal Techniques for OHR and HO_2 Measurements in Ambient Air.	C. Wang	48
University of Illinois	Resolution of Source Contributions to Environmental Samples.	P. Hopke	30
	Atmospheric Pollution Scavenging.	R.G. Semonin	260
Institute of Ecosystem Studies	MAP3S Ithaca Site.	G.E. Likens	33
University of Maryland	Objective Prediction of Monthly Mean Surface Temperatures.	F. Baer	37
	Megameter-Scale Atmospheric Transport and Dispersion.	F. Baer	20
Miami University	MAP3S Precipitation Station.	J.C. Klink	10
University of Michigan	Estimation of Potential and Probable Source Regions for Acid Precipitation.	P. Samson	4

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
New York University	Interaction of Radiation with Matter.	M. Pope	350
State University of New York	Maintenance of a Rural Precipitation Chemistry Center at Whiteface Mountain.	J. Kadlecek	1
	Rural Precipitation Chemistry Center at Whiteface Mountain.	J. Kadlecek	18
Pennsylvania State University	Dynamics, Energetics and Structure of Microclusters.	A.W. Castleman	90
	Precipitation Chemistry Network - MAP3S Program.	R. De Pena	34
University of Rochester	Infrared Excitation of Clusters and Ions of Atmospheric Interest.	J.S. Muenter	40
SRI International	Homogeneous and Heterogeneous Chemistry of Atmospheric Species.	D.M. Golden	68
University of Virginia	MAP3S Program.	J.N. Galloway	34

OHER--ECOLOGICAL RESEARCH DIVISION--OCEAN SCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of California, Los Angeles	Distribution and Fate of Biogenic and Petroleum-Derived Substances in Marine Sediments.	I. Kaplan	95
	Program of Mineralization and Cycling in Marine Systems: Organic Geochemistry and Particulates and Sediments.	I. Kaplan	91
Columbia University	Transport and Transfer Rate in Waters of the Continental Shelf.	P.E. Biscaye	1,092
University of Georgia	Production and Turnover of Suspended Organic Detritus in the Coastal Water of the Southeastern Continental Shelf.	L.R. Pomeroy	100
Lawrence Livermore National Laboratory	Environmental Behavior of Radionuclides in the Marine Environment.	V.E. Noshkin	360
Oregon State University	The Role of Zooplankton and Micronektron in the Cycling and Remineralization of Chemical Materials in the Southern California Bight.	L.F. Small C.A. Huh	87
Scripps Institution of Oceanography	Sources and Composition of Organic Materials in Waters and Sediments of the Southern California Coastal Zone.	P.M. Williams	122
	The Flux and Recycling of Reactive Substances in the Surface Sediments of the Deep Basins Off Southern California.	R.A. Jahnke	53
	Trace Metal Geochemistry of South Atlantic Bight.	H.L. Windom	132

OHER--ECOLOGICAL RESEARCH DIVISION--OCEAN SCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Woods Hole Oceanographic Institute	The Oceanic Geochemistry of Natural and Artificial Radionuclides.	E.R. Sholkovitz	100
	Distribution of Some Chemical Elements Between the Dissolved and Particulate Phases in the Ocean.	D.W. Spencer M. Bacon	154
Argonne National Laboratory	Behavior of Transuranic Elements in Natural Waters.	D.M. Nelson W.R. Penrose	422
Columbia University	Plutonium, Cesium, and Uranium Seri Radionuclides in the Hudson River Estuary and Other Environments.	H.J. Simpson	60
Yale University	Fate of Nuclides in Natural Water Systems.	K.K. Turekian	83

OFFICE OF RENEWABLE ENERGY TECHNOLOGIES

The Department of Energy's renewable energy programs include a number of technology areas of potential importance to the Nation's energy production, storage, and distribution network. Geothermal technology converts heat stored in geologic formations into useful energy. Four types of geothermal resources--hydrothermal, geopressured, hot dry rock, and magma--are combined with several conversion technologies to produce useful energy as heat or electricity.

The Department's Geothermal Energy Program plays a major role in building a technology base to enable the private sector to develop economically the various forms of geothermal resources. Through this effort, the geothermal program provides an array of technology options that expand and strengthen the energy supply mix from which industry can draw in developing products and processes for commercial applications.

The purpose of the Department's geothermal program is to support the development and utilization of the Nation's geothermal resources as an economical, reliable, operationally safe, and environmentally acceptable energy source. This is accomplished through development of new technologies that will promote more efficient and economical use of hydrothermal, geopressured, hot dry rock and magma resources. The program is carried out by the DOE National Laboratories, Federal and State Governmental Agencies, universities, and private contractors. Principal areas of interest include:

1) Geopressured Resources,

2) Hot-Dry Rock,

3) Reservoir Technology and Stimulation,

4) Brine Injection Technology,

5) Caldera Reservoir Investigations,

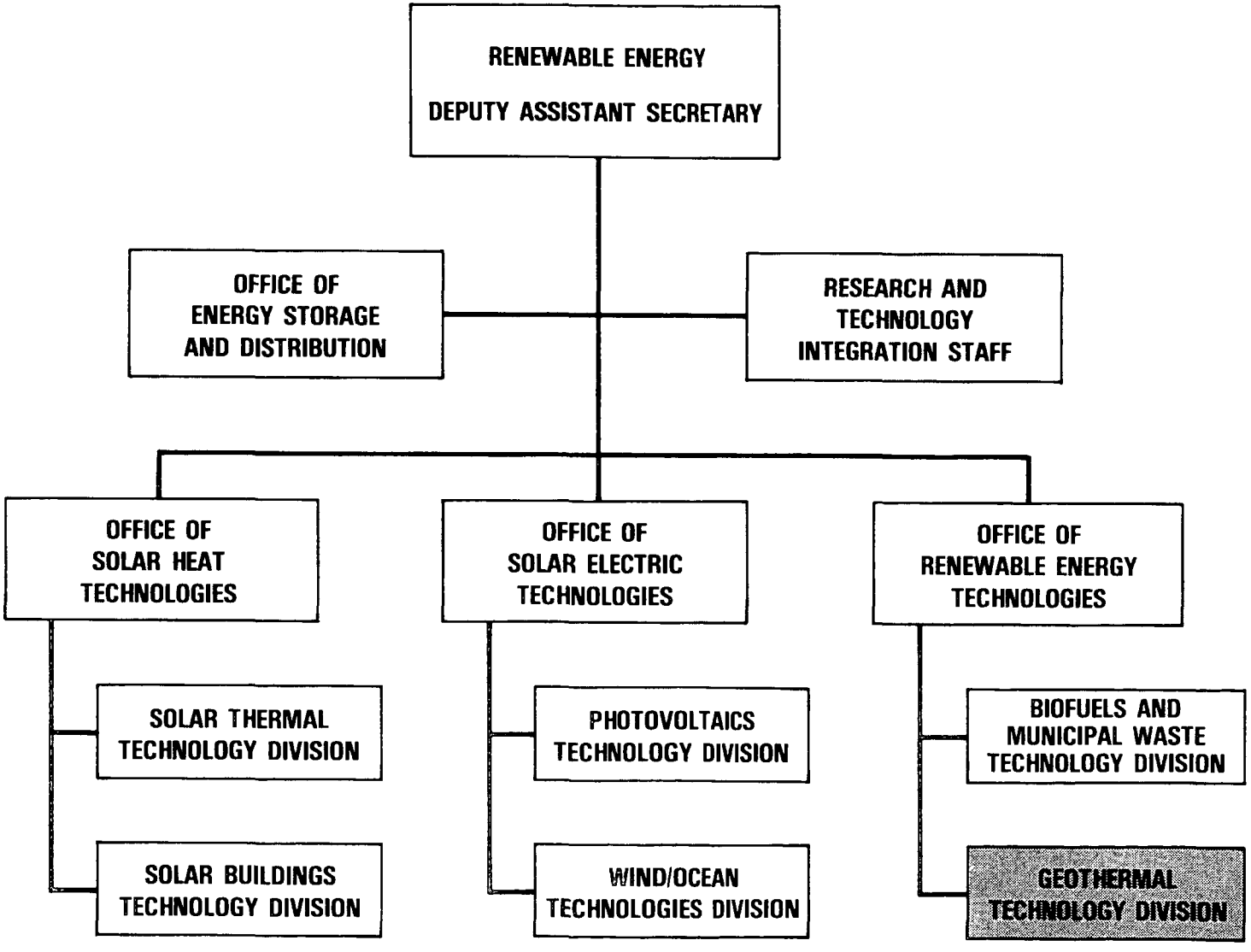
6) Hard Rock Penetration Research,

7) Magma Energy Extraction, and

8) Salton Sea Scientific Drilling.

The individual projects which support these sub-elements are listed on the following pages.

OFFICE OF THE DEPUTY ASSISTANT SECRETARY FOR RENEWABLE ENERGY



GEOPRESSURED RESOURCES PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Texas, Austin	Geopressured Reservoir System Investigation. Research in logging, aquifer simulation, liquid hydrocarbon solubility, and subsidence.	M. Dorfman	875
Texas Southern University	Scale Formation in Geopressured Wells. Evaluation of the saturation index of calcite based on production rate, and testing of inhibitor effects.	C. McDonald	40
University of Southwestern Louisiana	Hydrocarbons Associated with Geothermal Brines. Chemical analysis of brines and cryo-condensates, and measurement of the solubility of aromatic hydrocarbons and their distribution between oil and brine.	D. Keely J. Meriweather	124
Lawrence Berkeley Laboratory	Analysis of Liquid Hydrocarbons Associated with Geopressured Gas. Interpretation of multiple phase equilibria under geopressured reservoir conditions.	O. Weres	50
Louisiana State University	Microseismic monitoring, subsidence measurement, and water and air quality monitoring.	C. Groat	464
Technadril-Fenix and Scisson	Long-Term Production and Injection Test of Gladys McCall Well. Flow testing for reservoir analysis.		870
National Geodetic Survey	First Order Leveling Survey in Southern Louisiana. Measurement of elevation change to detect natural subsidance.	W. Kaula	154

HOT DRY ROCK PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Workover of Well EE-2 and Redrilling of Well EE-3. Drilling operations to regain the volume of fractured rock produced during previous year.		6,300
	Wellbore Diagnostic Logging. Downhole surveys with temperature, gamma, spinner, caliper, and televiewer instruments.		1,100
	Downhole Instrument and Equipment Development. Development of borehole acoustic televiewer and a set of downhole explosive tools.		2,000
	Reservoir Microseismic Analysis		630
	Reservoir Size Assessment Technique. Development of testing techniques to determine the effective energy production and longevity of fractured hot dry rock reservoirs.		46
	Hot Dry Rock System Flow Tests. Evaluation of fractured reservoir through three flow tests and data analysis.		107
	Reservoir Thermal and Fluid-Dynamic Modeling and Analysis.		925
	Reservoir Geochemical Processes. Conduct studies to detect downhole deposition of silica scale.		346

RESERVOIR STIMULATION PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories, Albuquerque	Permeability Enhancement. Development of a high-energy, sustained pressure pulse for the formation of multiple fractures in geothermal reservoir rocks.	J. Dunn	650

BRINE INJECTION TECHNOLOGY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Berkeley Laboratory	Heat Extraction Efficiency. Prediction of the impact on the efficiency of heat extraction from the placement of injection wells relative to production wells.	K. Pruess M. Lippmann	60
	Field Case Studies. Collection of actual test data from the operation of geothermal injection wells for development and validation of numerical models.	M. Lippmann S. Benson	50
	Migration of Injected Fluids. Development of mathematical methods for predicting and analyzing the flow of fluids, chemical species, and heat resulting from injection.	K. Pruess G. Bodvarsson	100
	Fluid Compositional Effects on Injection. Development of a description of thermophysical properties of fluid mixtures for incorporation into computer codes modeling transport processes in geothermal reservoirs.	K. Pruess S. Benson	95
Idaho National Engineering Laboratory	Interpretation of Physical Measurements to Predict Effects of Injection. Development of interpretation methods to relate well measurements to the thermal and chemical effects of injection.	J. Miller T. Clemo	162
	Fundamental Transport Processes of Injected Brine. Validation of numerical models and analytical methods to evaluate fluid flow through fractured and porous rocks.	L. Hull T. Clemo	170

BRINE INJECTION TECHNOLOGY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
	Field Testing of Tracers and Instrumentation. Injection tests to gather data for validation of models.	S. Steiger L. Hull	90
Lawrence Livermore National Laboratory	Seismic Monitoring of Fluid Injection at Casa Diablo, Long Valley, California.	P. Kasameyer	100
University of Utah	Development of Electrical Techniques to Locate the Fluid Front in Injection Systems.	S. Ward	100
University of California at San Diego	Thermodynamic Model for Prediction of Deposition. Development of an ion interaction model to predict formation of scale.	J. Weare	93
University of Utah Research Institute	Tracer Analysis of Injected Fluid Flow and Development of New Tracers.	J. Moore	200
Stanford University	Analysis of Tracer Returns to Determine Fluid Flow Path.	R. Horne J. Gudmundsson	200

RESERVOIR TECHNOLOGY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Smithsonian Institution	Expansion of Volcano Bibliography to Include Geothermal Areas.	T. Simpkin	10
Lawrence Berkeley Laboratory	Characterization and Mapping of Reservoir Parameters, Processes, and Spatial Dimensions. Development of numerical models to simulate the physical parameters in a reservoir.	K. Pruess G. Bodvarsson	100
	Monitoring and Prediction of Reservoir Changes During Production Lifetime. Validation and testing of numerical reservoir models.	G. Bodvarsson K. Pruess	100
	Field Case Studies. Measurement and analysis of reservoir response to production and development of field models.	S. Benson M. Lippmann	100
	Fault and Fracture Mapping. Development of geophysical techniques to locate and map faults and fractures.	N. Goldstein E. Majer	250
University of Utah Research Institute	Development of Geologic Models of Fractured Geothermal Reservoirs. Integration of Structural and Flow Path Models.	D. Nielson	60
	Geochemical Studies of Drill Chip Samples from Geothermal Areas. Analysis of liquid and gas phases in inclusions.	J. Moore	70
	Fracture Detection Using Borehole Electrical Geophysical Techniques. Mathematical modeling and field testing.	S. Ward	70

RESERVOIR TECHNOLOGY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Utah Research Institute (Continued)	Geophysical Survey of Ascension Island. Analysis of dipole-dipole resistivity survey on a volcanic island.	D. Nielson	50
University of Arizona	Radiometric Dating of Very Young Volcanic Rocks. Development and testing of new potassium-argon dating methods.	P. Damon	30
Southern Methodist University	Compilation of a Heat Flow, Thermal Gradient, and Thermal Conductivity Map of North America.	D. Backwell	40
Stanford University	Steam Adsorption on Reservoir Fractures. Measurement of Steam Reservers held as Adsorbed Water.	F. Miller H. Ramey	30
	Heat Extraction from Fractured Hydrothermal System. Application of linear heat-sweep model to Cerro Prieto and Los Azufres Fields.	P. Kruger	40
	Reservoir Determination from Well Test Analysis. Determination of reservoir size with the effect of compressibility in two-phase systems, from pressure-transient analysis of double-porosity systems, and from analysis of well-test anisotropy.	H. Ramey W. Brigham	200
	Application of Reservoir Analysis Techniques to Field Data. Development of a lumped-parameter model to predict depletion, and analysis of flashing flow in fractures.	R. Horne S. Sageev	100

RESERVOIR TECHNOLOGY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Geological Survey	Geochemical Monitoring for Interpretation of the Effects of Production on Geothermal Reservoirs. Observation of the geochemical aspects of geothermal reservoir depletion.	A. Truesdell	30

CALDERA RESERVOIR INVESTIGATIONS PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Idaho Operations Office	Deep Thermal Gradient Research in Young Volcanic Areas. Cost-shared with geothermal companies. Coring, logging, and measurements in thermal gradient holes.	S. Preswich	
	GEO Operator Corporation		500*
	Thermal Power Company		250*
	Blue Lake Geothermal Company		250*
University of Utah Research Institute	Cascades Thermal Gradient Measurement Technical Assistance. Analysis of geophysical logs, cores, and drill records for development of a geologic model.	P. Wright	160
University of Utah Research Institute	Cascades Thermal Gradient Hole Permeability Research. Fluid permeability analysis of cores.	D. Nielson	40
U.S. Geological Survey	Holographic Analysis of Medicine Lake Caldera Through Pseudo-Teleseismic Experiment.	H. M. Iyre	100
	Electrical Technique Evaluation in Newberry Caldera, Oregon.	A. Zody	50
Oregon State Department of Geology and Mineral Industries	Geologic Analysis of Deep Geothermal Reservoirs in the Cascades. Subsurface measurements of thermal gradients, and relationship of gradients to geologic structure.	G. Priest	160

* Estimated.

HARD ROCK PENETRATION RESEARCH PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Bureau of Mines	Support for the National Committee for Rock Mechanics.		10
Sandia National Laboratories Albuquerque	Analysis of Drill String Dynamics and Tests of Single-point Cutters. Laboratory, numerical, and field tests of rock cutting under controlled conditions.	J. Kelsey B. Caskey	835
	Stabilization of Boreholes. Control of lost-circulation, mud properties development, testing of foam polymers.	R. Givler G. Loeppke	675
	Development of Radar Fracture Mapping Tool. Sensor for the detection of fractures outside the borehole.	C. Carson T. Chang	467

MAGMA ENERGY EXTRACTION PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories Albuquerque (Continued)	Geophysical Surveys for Site Selection. Vertical seismic profiles, reflection and refraction surveys, and passive event analysis to locate magma bodies.	J. Dunn	265
	Magma Geochemistry and Metal Compatibility with Melt. Laboratory experiments of metal stability and fluid properties in rhyolite melts with various volatile compositions.	T. Gerlach	448

SALTON SEA SCIENTIFIC DRILLING PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Bechtel National, Inc.	Drilling Scientific Well in Salton Sea Geothermal Field. Incremental funding for drilling, coring, collecting fluid samples, and making scientific measurements.	C. Harper	450
Sandia National Laboratories Albuquerque	Develop, Test, and Operate Mechanical Tools to Measure Fluid Flow Rate, Pressure, and Temperature. Instrument development for measurements on a nonconducting cable at temperatures up to 400 C.	R. Traeger C. Carson	147
	Develop, Test, and Operate a Thermally Shielded Power Source. Power source development for the use of downhole fluid sampler on a nonconducting cable at temperatures up to 400 C.	J. Kelsey C. Carson	90
Los Alamos National Laboratory	Develop Downhole Fluid Sampler to Operate in Hostile Brine Environment and Collect Fluids at Formation Temperature and Pressure Conditions.	F. Goff B. Dennis	60

STATE COOPERATIVE RESERVOIR ANALYSIS PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Wyoming Geological Survey	Thermal Regime of the Jackson Hole Area. Development of numerical model for heat flow and hydrology of the system.	H. Heasler	18
Alaska State Division of Geological and Geophysical Surveys	Geological Studies of Mt. Spurr. Collection and analysis of recent volcanic rocks from Mt. Spurr.	C. Nye	40
University of Alaska Geophysical Institute	Geothermal Energy Investigation of Mt. Spurr. Conduct geophysical and geochemical surveys of Mt. Spurr.	D. Turner E. Westcott	120
New Mexico Energy Institute	Partial Funding for Exploration Well at New Mexico State University.	L. Icerman	20
Utah State Geological and Mineral Survey	Geothermal Investigation of Washington County Geophysical Measurements and Hydrologic Studies in Existing Wells.	D. Mabey A. Smith	40
University of Utah	Coordination and Support of State Cooperative Geothermal Reservoir Analysis. Development of methods for data collection and interpretation and chemical analysis of fluid.	D. Foley	80
University of Hawaii	Geothermal Fluid Characterization for Silica Recovery. Determination of possible processes to recover a marketable form of silica from geothermal fluids.	B. Chen	40
University of North Dakota	Thermal Gradient Measurement in South Dakota. Measurement of thermal gradient and thermal conductivity for the calculation of heat flow in deep wells of South Dakota.	W. Gosnold	47

STATE COOPERATIVE RESERVOIR ANALYSIS PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Nevada	Geothermal Enhancement of Mineral Processing. Develop methods to use low-temperature geothermal fluids for enhanced mineral processing and mine-dump leaching.	D. Trexler	110
Idaho State Department of Water Resources	Geothermal Reservoir Analysis of Twin Falls County. Fluid pressure measurements in production and injection wells.	L. Street	60

FOSSIL ENERGY

OFFICE OF THE ASSISTANT SECRETARY FOR FOSSIL ENERGY

The Assistant Secretary for Fossil Energy is responsible for major research and development programs which address the three major forms of fossil energy; i.e., coal, petroleum, and gas. The objective of these research programs is to expand the knowledge base with which industry can bring efficient, economically competitive, and environmentally acceptable new fossil energy resources and technology options into the marketplace.

Within Fossil Energy, geosciences and related research activities mainly are supported by the Office of Oil, Gas and Shale Technology.

Major program areas supported by the Office of Oil, Gas, and Shale Technology include: Unconventional Gas Recovery, Oil Shale, Enhanced Oil Recovery, Underground Coal Gasification, and Advanced Process Technology.

The Unconventional Gas Recovery Program (UGR) participants include Department of Energy laboratories, industry, universities, and other Governmental agencies. The objectives of the program are to increase the economic attractiveness of these resources to the private sector through improved geologic analysis of the resources and the characteristics of gas in place, and to develop the knowledge base of recovery through geoscience/geotechnical tests in areas of potential. These efforts emphasize the establishment of a gas supply knowledge base that will help to answer questions about the availability and cost of future gas supplies. Current activities include expanding the technical data base through basic research, modeling and diagnostics, and highly instrumented field tests. Resources studied under the UGR Program include eastern Devonian shales, western tight gas sands, gas hydrates, coalbed methane, and gases from deep sources. Projects supported by this program are presented in this report on pages 66 to 69.

The Oil Shale Program objective is to develop a reliable predictive capability for the efficient, economic, and environmentally acceptable conversion of oil shale to useful liquid products through a thorough understanding of the chemical and physical phenomena involved in the conversion process. Accordingly, a technology base is being developed for the private sector's use in the design and development of product and by-product recovery processes that have reduced cost and enhanced environmental acceptability, including proof-of-concept activities of new breakthrough ideas or hypotheses. In addition, an environmental data base relative to all facets of pollutant generation and the cost effective mitigation are being developed. The highest priority research is the generation of data essential to the understanding of the conversion phenomena which will constitute the input to the private sector's decision making process leading to implementation of commercial processes. Projects which are supported by this program are listed on pages 63 to 65 of this report.

The Enhanced Oil Recovery Program supports generic technology base research and development activities which can improve the understanding and predictability of the enhanced oil recovery processes.

For the past 30 years, private industry has researched various enhanced oil recovery techniques with mixed results. Because of the complexities of the subsurface behavior of injected fluids and chemicals, none of the processes are well understood. While industrial research has concentrated on short-term, resource-specific targets, the Department's research program is oriented toward more fundamental, generic research in three subactivities: Heavy Oil, Light Oil, and Tar Sands.

The Heavy Oil Subactivity includes theoretical studies of multiphase fluid flow using steam with foam for mobility control; research focusing on computer simulation of steam with additives; and studies of fuel formation (coke) kinetics during in situ combustion thermal extraction operations.

The Light Oil Subactivity includes fundamental research into chemical and physical properties of surfactants and the oil displacement and mobility mechanisms; research focusing on CO_2 displacement mechanisms, mobility control, viscous fingering and mobilization of trapped oil by CO_2 and loan flooding/diverting concepts; studies of geological parameters impacting recovery; and rock-fluid interaction studies including chemical adsorption and desorption, relative permeability, wettability effects, ion-exchange characteristics, surface chemistry, and chemical potential of sedimentary rocks.

The Tar Sands Subactivity includes assessment through laboratory reactor tests of the importance of physical and chemical characteristics of tar sands and parameters of various thermal in situ processes in effecting oil recovery; fundamental studies on extraction and upgrading kinetics and environmental mitigation; and studies (with Canada) of remote tracking techniques (geophysical) of in situ thermal fronts. Projects supporting the Enhanced Oil Recovery Program that are geoscience related are listed on page 61 of this report.

The Advanced Process Technology Program identifies and develops crosscutting advanced extraction, processing, and environmental concepts and technologies related to oil, gas, tar sand bitumen, and shale oil. Principal areas of interest include:

1) Novel or innovative extraction technology concepts;

2) Fundamental petroleum (natural and synthetic) chemistry research;

3) Extraction and characterization instrumentation and advanced environmental research; and

4) Fundamental Artic ice research for oil and gas development.

These program supported geoscience related projects are listed on page 60 of this report.

The Underground Coal Gasification Program is the remaining Fossil Energy Program which includes geoscience related projects. The major program objectives include:

1) Development of environmentally acceptable in situ technologies for converting coals which are unattractive to mine into clean liquid or gaseous fuels.

2) Demonstrate the viability of producing medium BTU gas from low-rank coals utilizing steam/oxygen to provide a suitable feedstock for surface upgrading and/or combustion.

3) Test the viability of underground gasification of low to moderate swelling, bituminous coals.

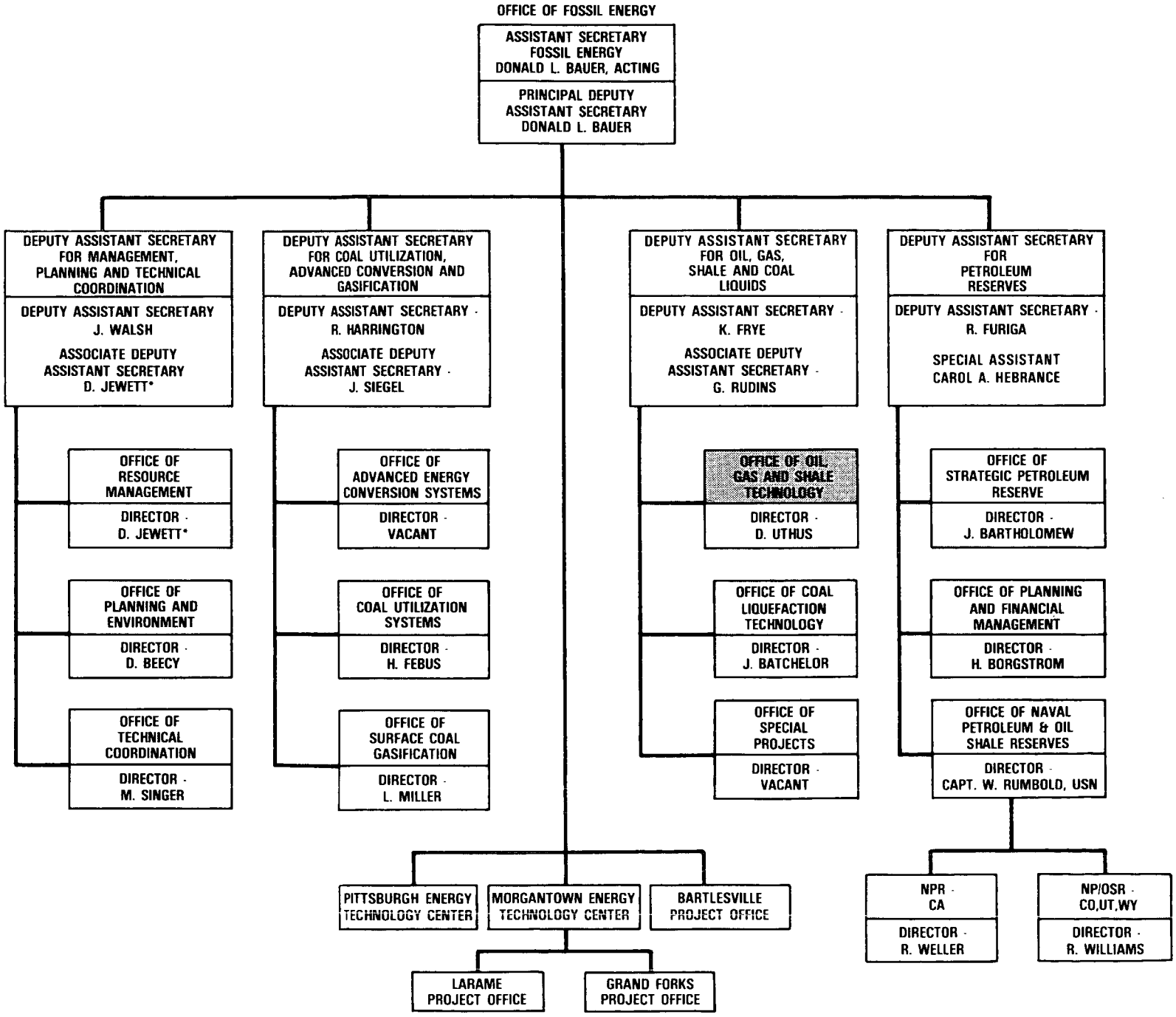
4) Increase the data base to support private sector development of economically viable in situ conversion processes.

5) Work actively with industry to ensure maximum technology transfer.

6) Actively seek opportunities to leverage project funds for process development activities through cooperative projects with industry and foreign research and development groups studying underground coal gasification.

The geosciences related projects supporting this program are listed on page 62.

OFFICE OF FOSSIL ENERGY



*DUAL POSITION

APPROVED OCTOBER 13, 1982 - REVISED MARCH 1, 1986

ADVANCED PROCESS TECHNOLOGY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Western Research Institute	Identify and Quantify the Environmental Contaminate at the Hanna and HOE Creek Underground Coal Gasification Field Sites.	J. Covell	100
Lawrence Livermore National Laboratory	Develop High Frequency Electromagnetic (HFEM) Instrumentation and Tomographic Techniques to Provide Detailed Propagation and Attenuation Parametric Reconstruction of the Reservoir Cross-Section.	E.F. Laine	150
Sandia National Laboratories Albuquerque	Obtain Controlled Source Audio Magneto-telluric (CSAMT) Measurements and Analyze for Defining Reservoir Parameter, Thermal Front Mapping and Fluid Measurement Properties.	C.M. Hart	400
	Develop a Remote Instrumentation System (Seafloor Earthquake Measurement System-Sems) to Gather and Analyze Soil Stability Data for Eventual Input into Design of Structure.	D. Ingi	195

ENHANCED OIL RECOVERY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
National Institute for Petroleum and Energy Research	Develop More Accurate Prediction Methodology of Spatial Variations (Heterogenities) in Reservoir Residual Oil Satuation, Permeabilities, Porosities and Other Critical Parameters Effecting EOR Operational Efficiency.	B. Sharma	1,620
University of Texas, Austin	Characterization of the Permeabilities Eolian (Wind Deposition) Stratification Types and Their Boundaries, Direction and Other Aspects as Precursors of EOR Efficiency to Improve Numeric Reservoir Simulations.	L. Lake	100
Stanford University	Evaluation of Reservoir Heterogeneties as They Effect CO_2 Flooding Efficiency in Sweep and Displacement.	F. Orr	205
Waterway Experimental Station	Evaluate Acoustic Emissions and Alternation in Rock Strata Upon Thermal Change as Detectors for the Thermal Front in Steam In Situ Tar Sand Extraction, Using Both U.S. and Canadian Test Resources.	J. Warriner	200

UNDERGROUND COAL GASIFICATION PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Western Research Institute	Post Burn Evaluation of Field Test Sites for Identification of Temperature Dependent Mineralogical Changes; Also Development of a Geological Data Base for Use in the Prevention of Groundwater Contamination.	J. Covell	500
University of Arizona	Numerical Modeling of Groundwater Flow and Water Quality at Underground Coal Gasification Sites Model.	D. Contractor	52

OIL SHALE PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Wyoming	Physical Properties of Oil Shale: Determine the "Static-Fracture Toughness" and Related Physical Property Measurements on Different Grades of Oil Shales.	K. Chong	40
Los Alamos National Laboratory (LANL)	LANL will support Sandia National Laboratories/Albuquerque in Developing a Predictive Capability (Modeling) Relating Shale Bed Preparation (Rock Fragmentation) and Process Efficiency for In Situ Retorting.	S.R. Skaggs	750
Sandia National Laboratories Albuquerque	Based on Rock Fragmentation Research Needs, the Research is Divided into Three Task Areas: 1) Laboratory & Modeling Efforts Aimed at Understanding the Retort Process in a Multi-Dimensional Situation; 2) Analytical Model Development to Predict Particle Size and Void Distribution as a Function of Blast Design; and 3) Field Experiments Conducted Initially to Generate Data for Developing the Long Term Motion Models and Later Conducted to Verify the Model Predictions.	P. Hommert	900
U.S. Army Corps of Engineers (Vicksburg)	This Research Addresses Combustion Front Migration in the Retorted Shale, Particle Breakdown, and Collapse Susceptibility of a Retorted Shale Pile. The scope of work will include the necessary sample collection, laboratory analyses, and data interpretation	J.S. Huie	45*

* FY 1984 Funds

	PRINCIPAL	FY 1985 FUNDING

INSTITUTION	TITLE/PROJECT DESCRIPTION	INVESTIGATOR	(IN THOUSANDS)
U.S. Army Corps of Engineers (Vicksburg) (Continued)	to perform the following tasks: 1) estimate the combustion front migration velocity through loose retorted shale; 2) estimated the effects of combustion and prolonged heating on individual particle size; 3) estimate the collapse susceptibility of loose retorted shale during and after combustion.		
Terra Tek, Inc.	Reference Shale Samples and Data Bank: Collect, Analyze, and Make Available to Oil Shale Researchers Samples of Western and Eastern Oil Shales for Research Purposes.	D.D. Bona	121
University of Wyoming	This Research Will Test the Use of Radio Frequency (RF) Waves for Retorting Shale and the Possibility of Using this Energy Source to Enhance Permeability in the Linking Process for In Situ Retorting. Small-scale bench models will measure dielectric constants, permeabilities, gas pressures, oil yield, and porosities and incorporate the results into data already obtained from large field tests.	R. Inguva	200
Western Research Institute	Analyze Core for Trace Element Distribution and Oil Yield From the Parachute Creek Member of the Green River Formation, Colorado--Colorado Corehole 1.	P. Sullivan G.F. Dana	50

OIL SHALE PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Army Corps of Engineers (Vicksburg)	Develop Conceptual Research Designs and Design Parameters for Physically Modeling Retorted Shale Interactions in the Disposal Site; Hydrology, Hydrogeology, and Climatic and Geologic Regimes.	W.E. Strohm, Jr.	98
Inst. Mining and Mineral Research, Univ. of Louisville	Through Laboratory Studies, to Provide Data on Leachate Formation Mechanisms and Also Data on Disposal Strategies Through Field Leaching Studies.	T. Robl	150

UNCONVENTIONAL GAS RECOVERY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Tulsa	Methodology for Measurement of Natural Gas Composition and Stability in Deep Subsurface Sediments.	C. Barker	100
Global Geochemistry Corp.	Development of Methodology for Detecting the Existence of Deep Subducted Organic Gas and Segregating It From Gases of Suspected Organic Origin.	I.R. Kaplan	85
Colorado School of Mines	Measurement of Hydrate Pressure/Temperature Conditions In Situ to Model the Kinetic Rate of Hydrate Dissociation.	E.D. Sloan	96
U.S. Geologic Survey	Evaluation of the Hydrocarbon Potential of the Organic-Rich Shales in the Eastern United States.	J. Roen	105
	Evaluation of Geochemical/Geologic Factors Controlling the Generation/ Accumulation of Methane in Gas Hydrates.	K. Kvenvolden	40
	Evaluation of the Potential for Deep Hydrocarbon Generation as a Result of the Sediment Subduction Plate Accretion and Other Tectonically Related Processes.	K. Kvenvolden	150
Columbia University	Development of Thermal History Models To Understand How Hydrocarbons May Be Generated From Deep Source Rocks.	G. Bond	83
Northwestern University	Investigation of Plate Tectonic Structure in Lesser Antilles (Barbados) Accretionary Prism and Hydrocarbon Occurrence.	R.C. Speed	50

UNCONVENTIONAL GAS RECOVERY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Morgantown Energy Technology Center	Evaluation of Lineaments/Structure and Producing Gas Wells in Areas of Variable Tectonic Influence in the Devonian Shales.	J. Mercer	100
	Assessment of Geologic Factors Affecting Production in Coalbeds (Warrior Basin).	J. Mercer	50
	Determination of the Physiochemical Properties of Naturally Occurring Gas Hydrate.	W. Lawson	150
Columbia University	Verification of the Relationship Between In Situ Stress and Regional Geologic Structures.	T. Engelder	300
U.S. Geologic Survey	Geologic Investigations of Western Tight Gas Sands (Stratigraphy, Sedimentology, Seismology, Petrography, and Thermal Maturtion) to Characterize Piceance, Greater Green River, and Uinta Basins.	C. Spencer	313
	Evaluation of the Interrelationships of Lithology, Stratigraphy, Permafrost to the Formation and Distribution of Gas Hydrates Within North Slope of Alaska	K. Kvenvolden	110
New Mexico Institute of Mining and Technology	Evaluation of Relationships of Pore Structure in Tight Sands to Flow Characteristics; Obtain Accurate Measurements of Tight Sands Matrix and Fracture Parameters in Core Analysis	N. R. Morrow	74

UNCONVENTIONAL GAS RECOVERY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Geoexplorers International, Inc.	Evaluation of the Relationships of Geologic Age, Temperature Changes Over Time and Physical and Chemical Composition To the Stability and Formational Characteristics of Gas Hydrates in 25 Offshore Sites.	J. Krason	231
University of Arizona	Evaluation of Potential Source Rocks Which May Have Been Deeply Emplaced by Plate Tectonic Processes in North Central Alaska and Adjacent Areas of Canada.	P. J. Coney	0
Texas A&M University	Study of Sediment Subduction Process Through the Use of Accepted Plate Tectonic Principles and the Application of New Subduction Theory. These studies concentrate on marine geological environments.	T. W. Hilde	110
Science Applications, Inc.	Investigation of the Role of Natural Fractures and In Situ Stress on Gas Production from the Naturally Fractured Shale.	T. Blanton	300
Lawrence Livermore National Laboratory	Evaluation of Hydraulic Fracturing Effectiveness in Jointed and Heterogeneous Rocks Subjected to In Situ Stress	F. Heuze	200
U.S. Steel Corporation	Assessment of the Variables Which Affect Hydraulic Fracture Development in Coalbeds. This will permit the prediction of the effect of In Situ Stress Upon Hydraulically Induced Fractures and the Assessment of Fracture Containment.	C. Boyer II	140

UNCONVENTIONAL GAS RECOVERY PROGRAM

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Texas A&M University	Evaluation of Seismic Records Relative to Suspected and Confirmed Gas Hydrate Deposits in the Gulf of Mexico; Determination of the Geologic and Chemical Implications Pertaining to Gas Hydrate Formations.	J. Brooks	100
U.S. Geologic Survey	Electronmagnetic Energy Surveys to Detect Sedimentary Rock Units Associated with Subduction Zones and Their Relationship to the Earth's Mantle.	D. Stanley	149
Lawrence Livermore National Laboratory	Assessment of Diagnostic Tools to Measure In Situ Stress and Natural Fracture System Intensity.	F. Heuze	100
	Cross Well Topography to Detect Lenticular Sands Deposits and Open Natural Fractures.	J. Albright	150
CER Corporation	Correlation of Core/Log Results to Uncertainties Associated with Locating Productive Intervals in Tight Sand Formations.	R. Peterson	150
National Bureau of Standards	Determination of the Thermal and Mechanical Properties of Synthetic and Natural Samples of Gas Hydrates.	J. Callahan	100
University of Washington	Determination of the Thermomechanical Properties of Gas Hydrates Under Various Stress Conditions.	R. Corlett	30

DEFENSE PROGRAMS

OFFICE OF THE ASSISTANT SECRETARY FOR DEFENSE PROGRAMS

The Assistant Secretary for Defense Programs directs the Nation's nuclear weapons research, development, testing, production, and stockpile surveillance program. In addition, the Assistant Secretary is responsible for a safeguards and security program related to facilities and for the accountability and physical protection of special nuclear materials. Further responsibilities include management of inertial fusion development, nuclear materials production for defense purposes, classification and declassification of Restricted Data, and analysis and coordination of certain international activities related to nuclear technology and materials.

The geoscience research funded by Defense Programs is not energy-related in a strict sense. Instead, its content is determined by various defense related requirements consistent with its mission. Most of the work is conducted by the Department of Energy's three nuclear weapon laboratories: Los Alamos National Laboratory; Lawrence Livermore National Laboratory; and Sandia National Laboratories/Albuquerque. Principal areas of interest include:

1) Studies relating to the radioactive containment and geological effects of underground nuclear test explosions;

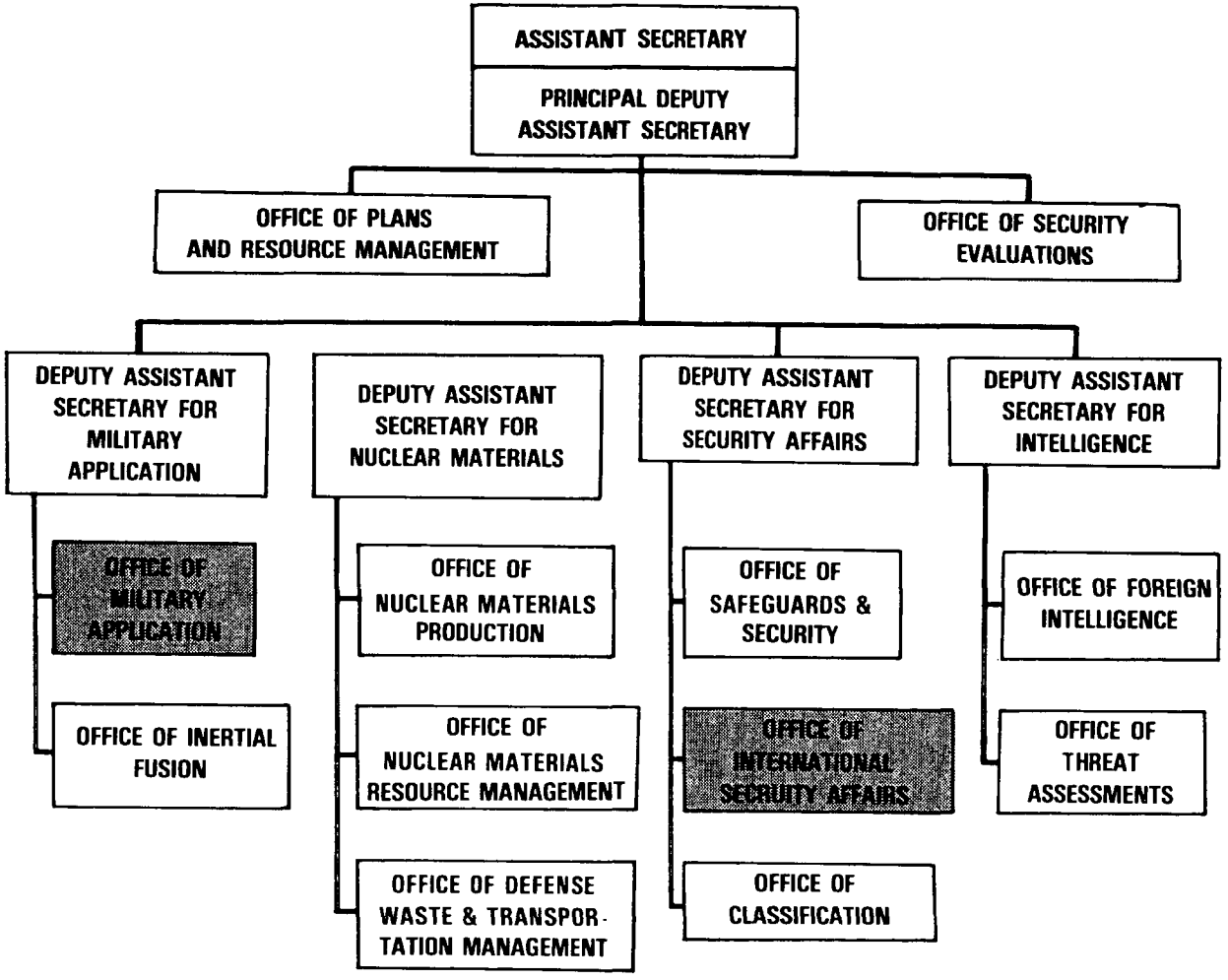
2) The seismology of nuclear test and test treaty verification issues;

3) Certain aspects of nuclear weapon targeting associated with interactions with the ground; and

4) Local and global atmospheric effects of nuclear explosions.

Specific geoscience related projects are listed on the following pages.

DEFENSE PROGRAMS ORGANIZATION



INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Radionuclide Migration.	J.L. Thompson	325
	Infrasonde Research.	J.P. Mutchlecner	500
	Nuclear Explosive Cratering.	T.F. Adams	200
	Nuclear Explosive Containment Simulation Model.	E.S. Gaffney	150
	SHALE Computer Code Development for Containment Purposes.	T.F. Adams	550
	Radionuclide Migration.	L.D. Ramspott	240
	Methods for Measuring Rock Properties.	J.R. Hearst	200
	Stress-Wave Effects and Containment Phenomenology.	L. Thigpen	650
	Seismic Methods of Locating Buried Interfaces.	N. Burkhard	245
	Geological Factors in Hard-Target Destruction.	D. Burton	550
	Seismic Array and Signal Processing.	D. Harris	665
	Explosive Detection and Location Capabilities of Local Arrays.	K. Nakanishi	675
	Regional Seismic Network Discrimination Capabilities.	S. Taylor	720

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Ground Coupling and Potential Test Ban Evasion Scenarios.	J. Scheimer	440
	Seismic Monitoring and Test Treaty Verification Analysis.		
	Site Selection Criteria for Seismic Stations.	D. Harris	140
	Southern Hemisphere Nuclear Explosive Monitoring.	R. Budwine	300
	Deep Seismic Sounding.	J. Zucca	250
	Laboratory Verification of Geochemical Code Predictions.	K. Knauss	200
	In Situ Measurements of Hot, Pressurized Boreholes.	P. Kasameyer	150
	Geological Effects of Large Meteorite Impacts.	J.B. Knox	56
	Ionospheric Monitoring.	J.H. Wolcott	1,000
	Nuclear Winter Studies.	R.C. Malone	400
	Low-Altitude Nuclear Weapons Atmospheric Phenomenology.	R.W. Whitaker	300
	Intermediate and High-Altitude Nuclear Weapons Atmospheric Phenomenology.	D.S. Sappenfield	200

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Atmospheric Microwave Propagation.	R.A. Roussel-Dupre	300
	Atmospheric Electromagnetic Pulse Production Studies.	T.C. Murphy	300
	Ionosonde Explosion Detection Research.	S. Warshaw	450
	Global Effects of Nuclear War.	M. MacCracken	2,000
	Nuclear Winter Dialogue.	J.B. Knox	210
	Climate Simulation Modeling.	M. MacCracken	250
	Nuclear Accident, Atmospheric Effects Modeling.	M.H. Dickerson	150
	Charged Particle and Radiation Effects on Satellites.	D.N. Baker	250
	Space Aerosols.	I.B. Strong	50
Lawrence Livermore National Laboratory	Modeling of Fluid-Flow Through Porous Rocks.	T. Buscheck	150

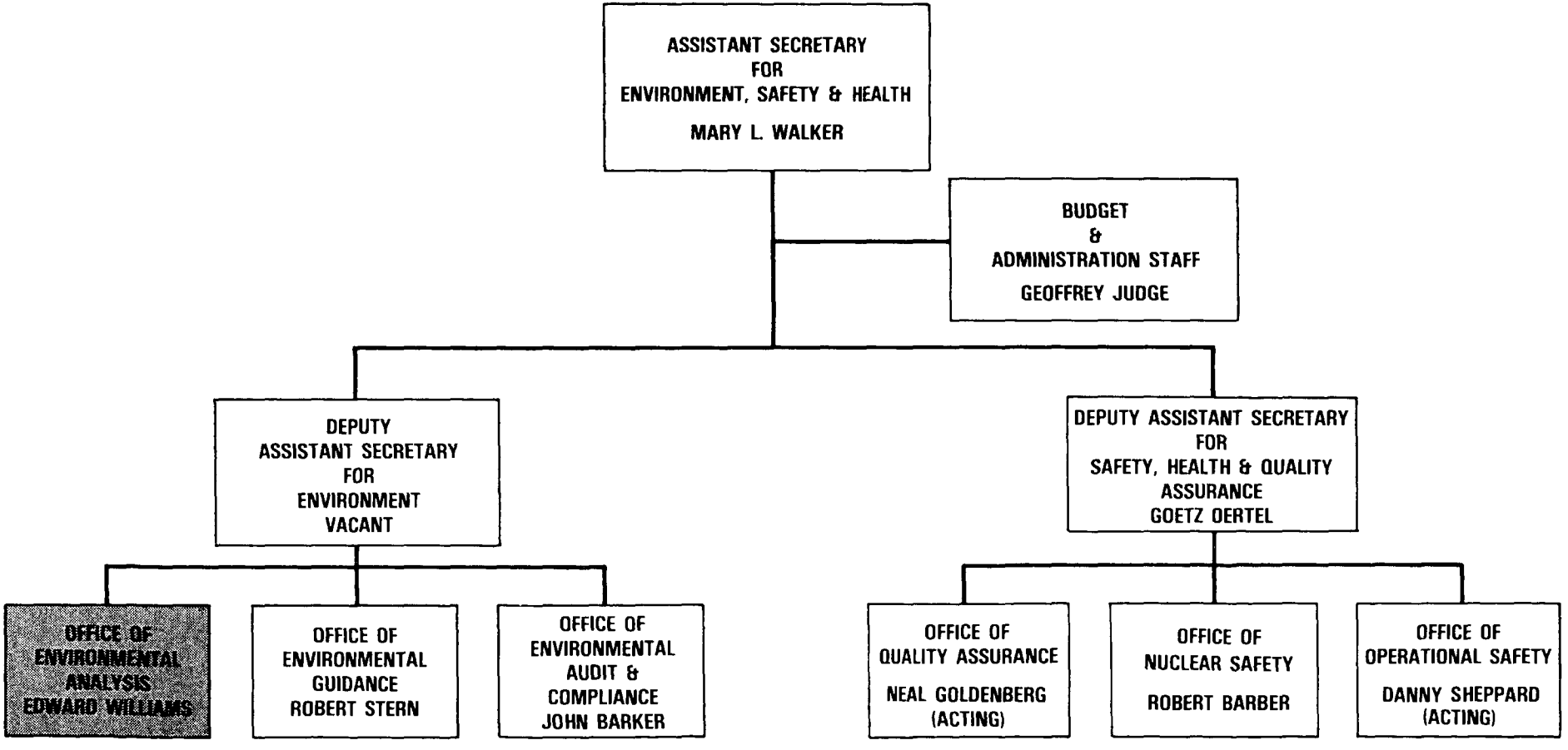
ENVIRONMENTAL, SAFETY AND HEALTH

OFFICE OF THE ASSISTANT SECRETARY FOR ENVIRONMENT, SAFETY AND HEALTH

The Assistant Secretary for Environment, Safety and Health, through the Office of Environmental Analysis, maintains an assessment capability for considering geoscience issues in environmental policy analyses associated with the Nation's energy industries. These studies would include global climatic impacts associated with energy production and use, resource demands for emerging industries and land use impacts caused by the energy extraction industries. One technical study is contracted during this year; several policy analyses concerning acidification, global warming and reclamation concerns will be carried out by the Office's analytic staff.

These studies support technical information and policy issue discussions that are used by the Department of Energy and its staffs for interagency and international discussions and papers that evaluate the relative utility of available policy options and determine priority needs for further research and assessment activities. In these interagency activities, the Office's assessments assure that a balanced perspective is applied that includes consideration of Administration policy goals as included in the National Energy Policy Plan and the physical impact issues that are detailed in the assessment. This single project supported by the Office of Environment, Safety and Health is shown on the following page.

OFFICE OF THE ASSISTANT SECRETARY FOR ENVIRONMENT, SAFETY & HEALTH



OFFICE OF ENVIRONMENT, SAFETY AND HEALTH

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Oak Ridge National Laboratory	Global Effects of World-Wide Emissions on the Atmosphere. To clarify a broad range of atmospheric perturbation issues which arise from human and natural processes--past, present, future--and which are or may become significant magnitude to impact future priorities for resource development.	D. Moses	75

CIVILIAN RADIOACTIVE WASTE MANAGEMENT

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

The Department of Energy has the primary responsibility (under the Nuclear Waste Policy Act) to:

1) Perform research and development, and demonstrate the disposal of spent fuel and high-level waste;

2) Design, schedule, site, construct, and operate deep-mined geologic waste repositories.

A nuclear waste repository will resemble a relatively large mine with surface facilities that will cover over 400 acres. Vertical shafts will descend thousands of feet from the surface Here, in a stable rock formation, a network of horizontal tunnels will be constructed for employing the waste. The waste will be in solid form in thick walled cylindrical containers that will be placed in prepared holes.

Before the Department can apply to the Nuclear Regulatory Commission for a license to operate its first radioactive waste repository, it will be necessary to characterize the recommended site in considerable detail and with sufficient accuracy and precision to justify the issuance of a license to operate the repository.

Because of this need to characterize a repository site adequately (as well as to implement other provisions of the Act), the Department established an Office of Civilian Radioactive Waste Management. The Office does not conduct generic geologic research and development; rather, its studies are directed toward the characterization of the geotechnical and engineering suitability of the specific sites under consideration.

Principal areas of interest in FY 1985 included characterization studies associated with the following geologic formations: salt, basalt, tuff, crystalline, rock, and subseabed.

The Salt Repository Project (one of the geologic characterization projects) includes performance of site characterization and other studies to collect necessary data to demonstrate compliance with the Department of Energy siting guidelines, EPA standards, and NRC criteria; the design of a waste package suitable for a repository in salt; the design of a waste package suitable for construction and operation in salt; demonstration of the safety of the total repository system before and after closure through performance assessments and other studies.

A detailed listing of the individual projects which support the Salt Repository Project is on pages 84 to 87 of this report.

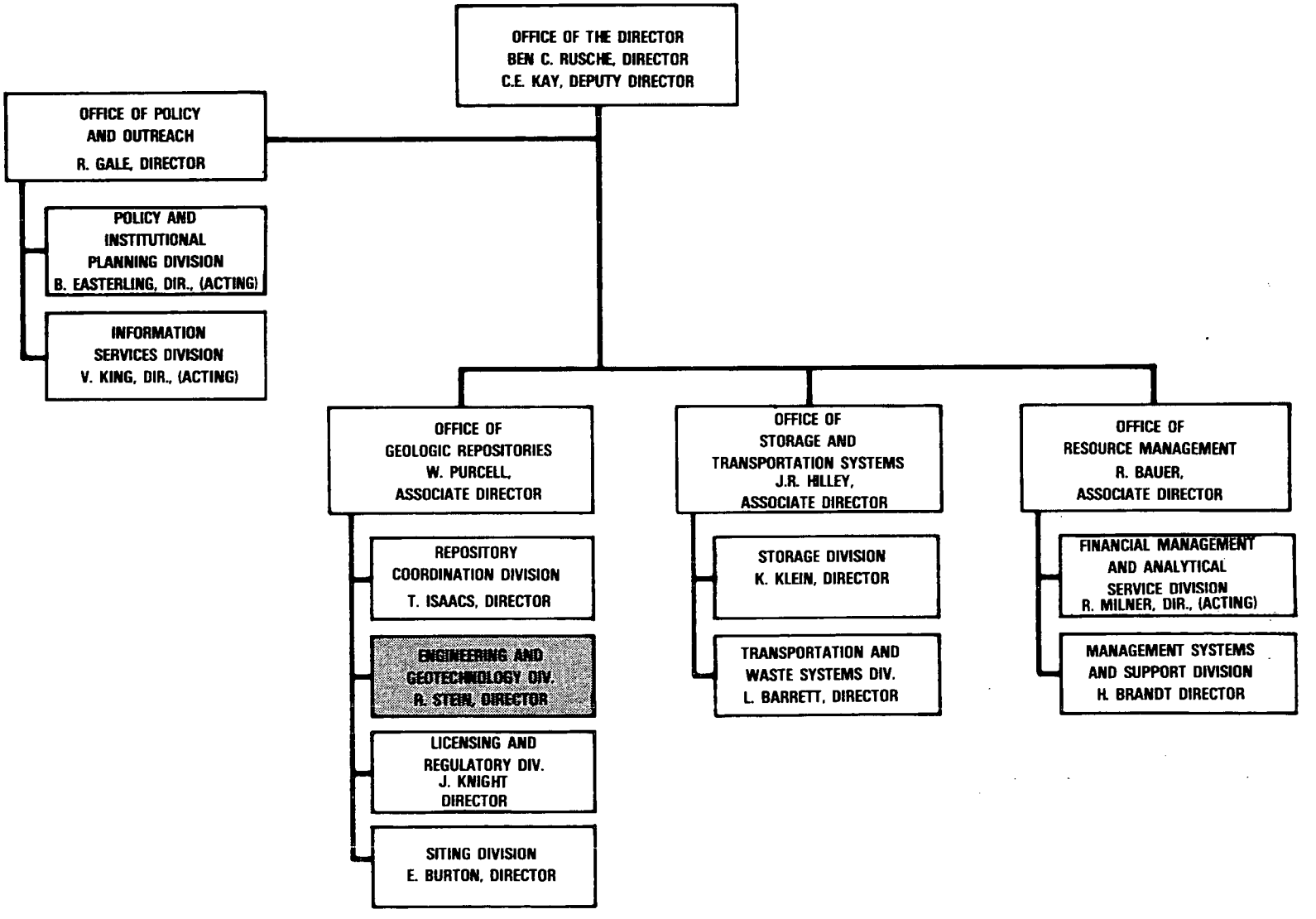
The Basalt Waste Isolation Project objectives are similar to those listed above except applied to basalt geologic formations. A project listing supporting this activity is on pages 88 and 89.

The Nevada Nuclear Waste Storage Investigations Project objectives are similar to those listed above except applied to tuff geologic formations. Projects supporting this activity are listed on pages 90 to 98.

The Crystalline Rock Project objectives are similar to those noted above except applied to crystalline rock geologic formations. A project listing for this activity is provided on pages 99 to 100.

The purpose of the Subseabed Project is to determine whether the properties of the subseabed are satisfactory for a radioactive-waste repository, and to develop the engineering and technology required for such a repository. Specific projects related to this activity are listed on pages 101 to 103.

OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT



OFFICE OF GEOLOGIC REPOSITORIES--SALT REPOSITORY PROJECT (SRP)

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Arizona State University	Stable Isotope and Fluid Inclusion Studies. Development and application of procedures and methodology for stable isotope and fluid inclusion in salt and related geologic materials for geochemical, hydrologic, and geologic characterization.	L.P. Knauth	98
BCD	Geochemistry Support. Consulting support for review, planning, and management of geochemistry activities	J.Means	0
Colorado School of Mines	RN Concentration in Permian Salt Brines. Calculational routine to determine how ground-water ages should be calculated from isotopic data.	D.Langmuir	49
Earth Technology Corporation	Geologic Project Manager--Southern Region. Geologic and hydrologic characterization of the southern region leading to the identification of potentially acceptable sites for a geologic repository.	K.L. Wilson	3,110
Georgia Institute of Technology	Stability and Thermal Decomposition of Repository Salt.	C. Weaver	60
Bendix Field Engineering Corporation	Geochemical and Petrological Analyses. Development and application of procedures and methodology for chemical and petrographic analyses of geologic and hydrologic materials.	C. Jones	1,053

OFFICE OF GEOLOGIC REPOSITORIES--SALT REPOSITORY PROJECT (SRP)

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory	Thermal Properties of Repository Rocks. Experimental measurement of thermal properties of repository rocks over range of pressures and temperatures simulating repository conditions.	D.E. Emerson	31
	Q3/6 Model Development. Development of of geochemistry computer code for brine systems at repository temperatures.	R. Wolerly	350
Louisiana State University (LSU)	LSU Core Storage Facility. Maintain Louisiana salt core at LSU facility.		43
Pacific Northwest Laboratory Office of Nuclear Waste Isolation (Battelle)	Site Evaluation. Manage and integrate site evaluation studies conducted by various contractors in the three salt basins under investigation by the Salt Repository Project.		2,429
RE/SPEC, Inc.	Soil Thermal Testing. Routine and specialized thermal testing of soil rock samples; development and procurement of thermophysical properties testing equipment.	G.D. Callahan	0
Seismic Acoustics Laboratory University of Houston	Physical Modeling of Seismic Reflection Surveys. Construction of three-dimensional physical models to represent geologic conditions at a candidate site; data collection, processing, and interpretation simulate industry practices to evaluate field techniques and resolution of geologic structures.	G.H.F. Gardner J.A. McDonald	0

OFFICE OF GEOLOGIC REPOSITORIES--SALT REPOSITORY PROJECT (SRP)

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Stone & Webster	Geologic Project Manager--Permian Basin Study. Geologic and hydrologic characterization of the Permian Basin leading to the identification of potentially acceptable sites for a geologic repository.	E.M. Washer	4,526
Texas Bureau of Economic Geology	Geologic Studies of West Texas Bedded Salt Deposits. Evaluate geologic and hydrologic environments of Palo Duro and Dalhart Basins of West Texas.	Bigler	2,852
University of California, Riverside	Near-Field Geologic Analog. Data collection from Salton Sea Geothermal Field for use in goechemistry model validation.	W. Elders	350
U.S. Geologic Survey	Geologic Exploration and Technology Development. Project liaison, review of programs, plans, model evaluation, Paradox Basin consultation and technical studies in Paradox and Palo Duro Basins.	A.M. LaSala, Jr.	299
Woodward-Clyde Consultants	Geologic Project Manager--Paradox Basin. Geologic and hydrologic characterization of the Paradox Basin leading to the identification of potentially acceptable sites for a geologic repository.	McLeary	2,210
Pacific Northwest Laboratory	Site Performance Assessment Support. Support for long-term site modeling, including effects of climate changes and other natural processes on ground-water system.	P. Eddy	250

OFFICE OF GEOLOGIC REPOSITORIES--SALT REPOSITORY PROJECT (SRP)

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
S. S. Papadopulos & Associates, Inc.	Hydrogeologic Testing Plans. Preparation of hydrogeologic testing plans for hydrologic characterization of the Permian Basin leading to the identification of potentially acceptable sites for a geologic repository.	S.S. Papadopulos	0

Rockwell Hanford Operations	Geologic Investigations. Conduct stratigraphic, petrographic, structural, tectonic, geomorphic, and economic geology investigations to determine the feasibility of siting a repository in the basalts underlying the Hanford Site, Washington.	S.M. Price	4,535
	Rock-Mechanics Investigations. Evaluate rock-mechanics properties of basalt to determine the feasibility of siting a repository at the Hanford Site, Washington.	D.J. Dodds	430
	Geochemical Investigations of Waste Package Environment. Establish the ambient physical and chemical environment expected for a nuclear waste repository constructed in the basalts underlying the Hanford Site, Washington. Evaluate the effect of emplacing waste in that environment. Investigations include characterization of the geochemical parameters of the system, including redox condition, evaluation of radionuclide reactivity in the system, and evaluation of effects of temperature, pressure, and radiation on the system.	P.F. Salter	700
	In Situ (Underground) Testing. Conduct planning for exploratory shaft facility to evaluate the site-specific geologic and hydrologic environment of basalts. Geologic, hydrologic, and rock-mechanics testing in facility will be used to assess the feasibility of constructing a repository in the basalts beneath the Hanford Site, Washington.	M.B. Arndt	1,130

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Rockwell Hanford Operations (Continued)	Drilling and Testing. Provide water-level monitoring structures, pumping wells, basalt cores and boreholes to support hydrologic, geologic, and rock-mechanic investigations. Collect water-level monitoring data, hydrologic test data, geologic core logging, geophysical logging, and drilling data to determine the feasibility of siting a repository in the basalts underlying the Hanford Site, Washington.	W.H. Price	6,530
	Hydrogeologic Investigations. Evaluate the ground-water flow system of the Hanford Site using physical hydrologic techniques to determine the feasibility of siting a repository in the basalts underlying the Hanford Site, Washington.	S.M. Baker	1,500
	Hydrochemical Investigations. Evaluate the ground-water flow system of the Hanford Site using hydrochemical techniques; characterize the radionuclide reactivity in the same flow system to determine the feasibility of siting a repository in the basalts underlying the Hanford Site, Washington.	S.M. Baker	1,240

OFFICE OF GEOLOGIC REPOSITORIES--THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Geological Survey Sandia National Laboratories, Albuquerque	Site Geology. To develop an understanding of the geologic framework and history of Yucca Mountain and to develop a geologic model that describes the structural and stratigraphic characteristics of the site.	R. Spengler J. Neal	699
U.S. Geological Survey	Topographic Analysis. To collect and analyze high-resolution topographic information from the site and to prepare topographic contour maps of the Yucca Mountain area.	S. Wu	120
	Gravity and Magnetics To interpret the distribution and configuration of subsurface stratigraphy and geologic structure of the Yucca Mountain site and to evaluate the stability of subsurface conditions.	H. Oliver	300
	Seismic Investigations. To characterize the subsurface geologic framework of the crust, upper mantle, and Paleozoic and Tertiary rocks in the vicinity of the site.	W. Mooney H. Ackerman	414
	Rock Properties. To evaluate rock properties that can be used to identify and distinguish the principal stratigraphic units at Yucca Mountain.	L. Anderson J. Rosenbaum D. Miller	414

OFFICE OF GEOLOGIC REPOSITORIES--THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Geological Survey (Continued)	Heat Flow. To provide reliable baseline temperature data at possible repository locations; to provide baseline thermal conductivity data for engineering studies; to determine heat-flux patterns at Yucca Mountain and on a regional basis; and to identify sites of vertical water circulation and lateral water movement.	J. Sass	125
	Tectonics. To understand Cenozoic tectonic dislocation of the pre-Cenozoic crust; to develop a tectonic model for analyzing changes resulting from climate and tectonic activity near Yucca Mountain; to identify erosional and depositional processes at the site; to locate Quaternary fault movement; to understand recurrent fault movement; and to compile geologic maps of site vicinity and area.	M. Carr	850
	Isotope Geology. To analyze the age and isotopic characteristics of rock units and calcite veins in the Yucca Mountain area.	J. Rosholt	175
	Seismicity and Strain. To assess the seismic hazard to the proposed Yucca Mountain repository; to monitor seismicity in the region and at the site; to prepare simple probabilistic ground motion maps; to conduct a site strain survey; and to measure in situ stress.	A. Rogers	718

OFFICE OF GEOLOGIC REPOSITORIES--THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Volcanism. To evaluate the hazards of future volcanism to a repository at Yucca Mountain; to calculate estimates of, and bounds on, the probability of igneous extrusion through the repository; and to estimate the distribution and concentration of radionuclides in materials extruded at the land surface.	B. M. Crowe	69
	Hydrothermal Geochemistry. To produce a conceptual model to explain the present distribution of minerals and water compositions in Yucca Mountain and to predict future mineralogy and water compositions.	C. J. Duffy A. Meijer	222
	Solubility Determination. To determine the solubilities and speciation of important waste elements (plutonium, americum, neptunium, uranium, thorium, zirconium, radium, and nickel) under conditions characteristic of the proposed repository along flow paths from the repository to the accessible environment.	J. F. Kerrisk	704
	Sorption and Precipitation. To determine sorption coefficients for elements of interest in order to predict radionuclide movement from the proposed repository at Yucca Mountain to the accessible environment.	K. W. Thomas	963

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Retardation Sensitivity Analysis. To construct a geophysical/geochemical description of Yucca Mountain, using the results of other project investigations, as a basis for determining the sensitivity of radionuclide transport along potential flow paths to chemical and physical retardation properties.	B. Travis G. DePoorter	834
	Alteration Mineralogy. To study the bulk rock and fracture alteration, including the alteration of primary glass to sorptive minerals, in order to understand the conditions, timing, and chemical transport phenomena that caused alteration at Yucca Mountain.	S. Schonn D. Vaniman	1,330
	Mineral Stability. To assess the impact of the proposed repository's thermal aureole on minerals that are important parts of the natural retardation system.	D. Bish, D. Vaniman	
	Mineralogy of Transport Pathways. To assess mineral abundances and chemistry for variability and continuity along transport pathways in three dimensions; to study transport pathways in the unsaturated zone near the waste disposal containers where transport may be particularly slow; to substantiate the continuity of well-characterized rock properties; and to establish a petrologic and mineralogic stratigraphy.	D. Vaniman	

OFFICE OF GEOLOGIC REPOSITORIES--THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory	Geochemical Modeling Code EQ3/6. To further develop the geochemical modeling code EQ3/6 for use in long-term predictions of radionuclide release from a repository.	T. Wolery	556
Sandia National Laboratories Albuquerque	Rock-Mass Analysis. To perform rock-mass thermomechanical analyses in order to develop and evaluate techniques for combining data from field tests that reflect rock-mass behavior and from laboratory tests that reflect the behavior both of fractures and the rock matrix.	S. J. Bauer	379
	Field Testing. To conduct field tests in G-Tunnel on the Nevada Test Site in welded tuffs that have stress states and thermal and mechanical properties similar to those of the welded tuffs in Yucca Mountain.	R. Zimmerman	941

OFFICE OF GEOLOGIC REPOSITORIES--THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories, Albuquerque (Continued)	Laboratory Properties. To develop, through laboratory measurements, a data base for the bulk, thermal, and mechanical properties of the tuffaceous rocks from Yucca Mountain for use in thermal and mechanical analyses of temperature fields, of stresses introduced by the presence of underground openings and heat-producing waste, and to estimate rock-mass properties.	F. B. Nimick	525
U.S. Geological Survey	Future Climates. To assess the Quaternary climate and hydrologic conditions in the Yucca Mountain area as a basis for predicting future conditions and to evaluate the effects of climatic changes on waste isolation.	L. Benson	597
Science Applications International Corporation Reynolds Electrical and Engineering Co.	Meteorological Monitoring. To continuously monitor meteorological conditions at Yucca Mountain in order to characterize climatic conditions.	E. McCann V. Gong	475
U.S. Geological Survey	Stream Flow. To predict flood and debris-flow hazards at Yucca Mountain.	P. Glancy	83

OFFICE OF GEOLOGIC REPOSITORIES--THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Geological Survey (Continued)	Ground-Water Flow Analysis. To identify ground-water flow paths at Yucca Mountain and to develop an understanding of flow in fractured rock.	R. Waddell	695
	Saturated-Zone Hydrology. To develop a three-dimensional model of flow beneath Yucca Mountain; to determine the distribution of hydraulic head beneath Yucca Mountain; and to compile parametric data for hydrologic characterization and the saturated zone.	J. Robison	459
	Unsaturated-Zone Hydrology. To determine the water influx to the unsaturated zone beneath Yucca Mountain; to determine the moisture content of the unsaturated zone; to compile parametric data for characterization of the unsaturated zone; and to develop a conceptual model of unsaturated-zone hydrology.	P. Montazer	1,284
	Future Ground-Water Conditions. To assess Quaternary hydrologic conditions in the Yucca Mountain region as a basis for predicting future conditions.	J. Downey	98
Los Alamos National Laboratory	Ground-Water Chemistry. To determine the composition of ground-water in and near Yucca Mountain; to model the groundwater composition along flow paths from the repository to the accessible environment before and after waste emplacement; to develop a model of Eh and pH buffering	A. Ogard	469

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	capacities of the tuff/water/air system; to estimate the effects of particulate transport for waste elements in the saturated zone of Yucca Mountain on total transport and retardation; and to demonstrate in a field test the overall retardation of waste elements in the saturated zone.		
	Natural Isotope Chemistry. To determine the distribution of naturally occurring radioactive materials at Yucca Mountain as part of the work to characterize the infiltration of precipitation, the velocity of water movement through the unsaturated zone, and the retardation of radionuclide transport.	A. Norris	63
	Dynamic Transport Process. To determine the rate of movement of radionuclides along the potential flow paths at Yucca Mountain to the accessible environment and to examine the effects of diffusion; absorption, dispersion, anion exclusion, sorption kinetics, and colloid movement in the flow geometrics and hydrologic conditions in the scenarios to be used in performance assessment of the proposed repository.	R. Rundberg	433

OFFICE OF GEOLOGIC REPOSITORIES--THE NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Applied Diffusion. To conduct field experiments to determine whether the results of laboratory-scale diffusion measurements can be extrapolated accurately to predict the rates of aqueous transport of such nonsorbing radioactive waste species as pertechnetate and iodine-129 under the conditions at Yucca Mountain.	A. Norris	221
Sandia National Laboratories Albuquerque	Water Migration Analysis. To determine the mechanisms of water movement when the proposed repository is under a thermal load from the emplaced waste and to determine water fluxes and pathways to be used in radionuclide-transport analyses.	E. A. Klavetter	429

OFFICE OF GEOLOGIC REPOSITORIES--THE CRYSTALLINE ROCK PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Atomic Energy of Canada Lawrence Livermore National Laboratory	Technical Cooperative Program. Planning and testing in the Underground research laboratory near Lac du Bonnet, Manitoba, Canada.	K. Dormuth J. Yow	600
Colorado School of Mines	Test Program. Development of the Heated Block Flat Jack Test as a potential in situ site-characterization test and studies of stress/deformation/fracture permeability relationships.	W. Hustrulid	200
Swedish Nuclear Fuel and Waste Management Company	Stripa Multinational Project. Participation in multinational in situ test project in the Stripa Mine, Sweden; tests include geohydrological, geochemical, and geophysical studies; studies of shaft, room, and borehold plugging; and studies of sealing techniques.		400
Lawrence Berkeley Laboratory/ Agapito Associates	Rock-Mechanics Computer Code Development. Modification and documentation of existing distinct element, finite-element codes and development of block theory and discontinuous deformation analysis techniques to provide analytical capability for field test simulations and data interpretation.	R. Goodman	0
Pacific Northwest Laboratory Office of Civilian Radioactive Depository	HYDROCOIN Flow Code BenchmarkIng Participation in International Effort at Benchmarking Mathematical Models and Computer Codes Used to Simulate Ground-Water Flow.	A. Brandstetter	99

OFFICE OF GEOLOGIC REPOSITORIES--THE CRYSTALLINE ROCK PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Pacific Northwest Laboratory Office of Civilian Radioactive Depository	Area Scoping Performance Analyses. Performance of scoping posclosure analyses and formulation of preliminary hydrogeologic conceptual models of ground-water flow and radionuclide transport for areas under study.	J. Doesburg	215
	Canadian Performance Assessment Cooperation. Evaluation of a ground-water flow computer code CEEST, using data from AECL research in Canada, and evaluation of two Canadian computer codes, SYVAC and MOTIF, as to their applicability to the U.S. Crystalline Repository Project.	A. Brandstetter	0
	Performance Assessment Strategy and Model Development. Identification and development of ground-water flow and radionuclide transport codes and the evaluation of initial geochemical and waste-package codes.	A. Brandstetter	205
Ohio State University	Fossil Natural Analog Study. Determination of radionuclide mass transport in a hydrothermal system in crystalline rock, evaluation of the parameters affecting transport under natural conditions, and evaluation of mineral migration characterizing by laboratory techniques.		60

OFFICE OF GEOLOGIC REPOSITORIES--THE SUBSEABED PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Oregon State University	Development and Verification of Complex Models for Site-Performance Predictions.	N. Pisias	114
Sandia National Laboratories, Albuqueruqe			954
Texas A&M University		W. Bryant	26
Oceano Instruments, Inc.	Development of Tools to Identify and Quantify Sediment Properties. Barrier assessment for isolated wastes within the deep-sea sediments.	A. Driscoll	18
University of Rhode Island		M. Leinen	72
Mound Laboratory	Studies of the Thermal Response of the Waste Package.	E. Johnson	60
Naval Oceanographic Research Development Activity		R. Bennett	150
Sandia National Laboratories, Albuquerque		L. Mondy	803
Scripps Institute of Oceanography		G. Shor	300
University of Rhode Island		A. Silva	105
University of Washington Applied Physics Laboratory		L. Olson	500
Sandia National Laboratories, Albuquerque	Studies of Waste-Package Interactions with the Clay Sediments.	R. Diegle	160
Sandia National Laboratories, Albuquerque	Studies of Interactions Between Near-Field Sediments and Radionuclides.	J. Krumhansl	
University of Minnesota		W. Seyfried	
Woods Hole Oceanographic Institute		F. Sayles	

OFFICE OF GEOLOGIC REPOSITORIES--THE SUBSEABED PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Argonne National Laboratory	Studies of Interactions Between Far-Field Sediments and Radionuclides.	F. Schreiner	125
Woods Hole Oceanographic Institute			
Sandia National Laboratories, Albuquerque		G. Sayles	92
			366
Arizona State University	Studies of Sediment Response to Intrusion of Waste Package.	W. Houston	48
Cornell University		P. Dawson	10
Sandia National Laboratories, Albuquerque		D. McTigue	322
University of Rhode Island	Engineering Emplacement of Waste Canisters into Deep-Sea Sediments.	A. Silva	40
	In Situ Assessment of Sediment Characteristics.	A. Driscoll	940
Sandia National Laboratories, Albuquerque	Development and Performance of Field Tests to Emplace Wastes in Deep-Water Sediments.	S. Burchett	600
	Environmental Studies To Assess Impacts of Subseabed Disposal.		
Harvard Unversity	Physical Oceanography of Deep-Sea Environments.	A. Robinson	40
Oregon State University		J. Dymond	248
Sandia National Laboratories, Albuquerque			485
State University of New York		J. Cochran	50
University of Rhode Island			202
University of Washington		S. Riser	15
Woods Hole Oceanographic Institute		H. Livingston	75

OFFICE OF GEOLOGIC REPOSITORIES--THE SUBSEABED PROJECT

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories, Albuquerque	Biological Oceanography of the Worlds Oceans.		125
Scientific Information Management, Inc.		D. Jackson	140
Scripps Institute of Oceanography		R. Hessler A. Yayanos	645
Oregon State University		K. Smith	125
Applied Physics Corporation	Environmental Modeling of Radionuclide Transfer from Wastes to Management.	J. Garner	108
Florida State University		G. Weatherly	20
Sandia National Laboratories, Albuquerque	Radiological and safety studies of the subseabed emplacement concept.	D. Deitrich	552
Technadyne Engineering Consultants		W. Simmons	255
G_2vanTsl, Inc.	Prediction of the Effectiveness of the Subseabed Disposal System.	G. Hertel	108
Massachusetts Institute of Technology		H. Marcus	22
Sandia National Laboratories, Albuquerque	Performance Assessments of the Total Systems Engineering.	A. Treadway	205
The Analytic Sciences Corporation		C. Koplik	300
Woods Hole Oceanographic Institute	Development of Provisional Siting Guidelines.	B. Tucholke	6
Lamont-Doherty Geologic Repository		D. Hayes	153

SECTION B

This section of the report organizes the individual project listings previously presented into topical research categories. These categories were established to fill the need for interprogrammatic coordination. They are as follows:

1. Solid Earth Geosciences
2. Atmospheric Geosciences
3. Ocean Geosciences
4. Space and Solar/Terrestrial Geosciences
5. Hydrological Geosciences

SECTION B

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Texas, Austin	Geopressured Reservoir System Investigation. Research in logging, aquifer simulation, liquid hydrocarbon solubility, and subsidence.	M. Dorfman	875
Texas Southern University	Scale Formation in Geopressured Wells. Evaluation of the saturation index of calcite based on production rate, and testing of inhibitor effects.	C. McDonald	40
University of Southwestern Louisiana	Hydrocarbons Associated with Geothermal Brines. Chemical analysis of brines and cryo-condensates, and measurement of the solubility of aromatic hydrocarbons and their distribution between oil and brine.	D. Keely J. Meriweather	124
Lawrence Berkeley Laboratory	Analysis of Liquid Hydrocarbons Associated with Geopressured Gas. Interpretation of multiple phase equilibria under geopressured reservoir conditions.	O. Weres	50
Los Alamos National Laboratory	Workover of Well EE-2 and Redrilling of Well EE-3. Drilling operations to regain the volume of fractured rock produced during previous year.		6,300
	Wellbore Diagnostic Logging. Downhole surveys with temperature, gamma, spinner, caliper, and televiewer instruments.		1,100
	Downhole Instrument and Equipment Development. Development of borehole acoustic televiewer and a set of downhole explosive tools.		2,000

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Reservoir Microseismic Analysis.		630
	Reservoir Size Assessment Technique. Development of testing techniques to determine the effective energy production and longevity of fractured hot dry rock reservoirs.		46
Sandia National Laboratories Albuquerque	Permeability Enhancement. Development of a high-energy, sustained pressure pulse for the formation of multiple fractures in geothermal reservoir rocks.	J. Dunn	650
Lawrence Berkeley Laboratory	Heat Extraction Efficiency. Prediction of the impact on the efficiency of heat extraction from the placement of injection wells relative to production wells.	K. Pruess M. Lippmann	60
	Field Case Studies. Collection of actual test data from the operation of geothermal injection wells for development and validation of numerical models.	M. Lippmann S. Benson	50
Idaho National Engineering Laboratory	Interpretation of Physical Measurements to Predict Effects of Injection. Development of interpretation methods to relate well measurements to the thermal and chemical effects of injection.	J. Miller T. Clemo	162
Lawrence Livermore National Laboratory	Seismic Monitoring of Fluid Injection at Casa Diablo, Long Valley, California.	P. Kasameyer	100

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Utah	Development of Electrical Techniques to Locate the Fluid Front in Injection Systems.	S. Ward	100
University of California at San Diego	Thermodynamic Model for Prediction of Deposition. Development of an ion interaction model to predict formation of scale.	J. Weare	93
Smithsonian Institution	Expansion of Volcano Bibliography to Include Geothermal Areas.	T. Simpkin	10
Lawrence Berkeley Laboratory	Characterization and Mapping of Reservoir Parameters, Processes, and Spatial Dimensions. Development of numerical models to simulate the physical parameters in a reservoir.	K. Pruess G. Bodvarsson	100
	Monitoring and Prediction of Reservoir Changes During Production Lifetime. Validation and testing of numerical reservoir models.	G. Bodvarsson K. Pruess	100
University of Utah Research Institute	Development of Geologic Models of Fractured Geothermal Reservoirs. Integration of Structural and Flow Path Models	D. Nielson	60
	Geochemical Studies of Drill Chip Samples from Geothermal Areas. Analysis of liquid and gas phases in inclusions.	J. Moore	70
	Fracture Detection Using Borehole Electrical Geophysical Techniques. Mathematical modeling and field testing.	S. Ward	70

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Utah Research Institute (Continued)	Geophysical Survey of Ascension Island. Analysis of dipole-dipole resistivity survey on a volcanic island.	D. Nielson	50
University of Arizona	Radiometric Dating of Very Young Volcanic Rocks. Development and testing of new potassium-argon dating methods.	P. Damon	30
Southern Methodist University	Compilation of a Heat Flow, Thermal Gradient, and Thermal Conductivity Map of North America.	D. Backwell	40
Stanford University	Steam Adsorption on Reservoir Fractures. Measurement of Steam Reservers held as Adsorbed Water.	F. Miller H. Ramey	30
	Heat Extraction from Fractured Hydrothermal System. Application of linear heat-sweep model to Cerro Prieto and Los Azufres Fields.	P. Kruger	40
Idaho Operations Office	Deep Thermal Gradient Research in Young Volcanic Areas. Cost-shared with geothermal companies. Coring, logging, and measurements in thermal gradient holes.	S. Preswich	
	GEO Operator Corporation		500
	Thermal Power Company		250
	Blue Lake Geothermal Company		250
University of Utah Research Institute	Cascades Thermal Gradient Measurement Technical Assistance. Analysis of geophysical logs, cores, and drill records for development of a geologic model.	P. Wright	160

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Utah Research Institute (Continued)	Cascades Thermal Gradient Hole Permeability Research. Fluid permeability analysis of cores.	D. Nielson	40
U.S. Geological Survey	Holographic Analysis of Medicine Lake Caldera Through Pseudo-Teleseismic Experiment.	H. M. Iyre	100
	Electrical Technique Evaluation in Newberry Caldera, Oregon.	A. Zody	50
Oregon State Department of Geology and Mineral Industries	Geologic Analysis of Deep Geothermal Reservoirs in the Cascades. Subsurface measurements of thermal gradients, and relationship of gradients to geologic structure.	G. Priest	160
U.S. Bureau of Mines	Support for the National Committee for Rock Mechanics.		10
Sandia National Laboratories Albuquerque	Analysis of Drill String Dynamics and Tests of Single-point Cutters. Laboratory, numerical, and field tests of rock cutting under controlled conditions.	J. Kelsey B. Caskey	835
	Stabilization of Boreholes. Control of lost-circulation, mud properties development, testing of foam polymers.	R. Givler G. Loeppke	675
	Development of Radar Fracture Mapping Tool. Sensor for the detection of fractures outside the borehole.	C. Carson T. Chang	467

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories Albuquerque (Continued)	Geophysical Surveys for Site Selection. Vertical seismic profiles, reflection and refraction surveys, and passive event analysis to locate magma bodies.	J. Dunn	265
	Magma Geochemistry and Metal Compatibility with Melt. Laboratory experiments of metal stability and fluid properties in rhyolite melts with various volatile compositions.	T. Gerlach	448
Bechtel National, Inc.	Drilling Scientific Well in Salton Sea Geothermal Field. Incremental funding for drilling, coring, collecting fluid samples, and making scientific measurements.	C. Harper	450
Sandia National Laboratories Albuquerque	Develop, Test, and Operate Mechanical Tools to Measure Fluid Flow Rate, Pressure, and Temperature. Instrument development for measurements on a nonconducting cable at temperatures up to 400 C.	R. Traeger C. Carson	147
	Develop, Test, and Operate a Thermally Shielded Power Source. Power source development for the use of downhole fluid sampler on a nonconducting cable at temperatures up to 400 C.	J. Kelsey C. Carson	90
Wyoming Geological Survey	Thermal Regime of the Jackson Hole Area. Development of numerical model for heat flow and hydrology of the system.	H. Heasler	18
Alaska State Division of Geological and Geophysical Surveys	Geological Studies of Mt. Spurr. Collection and analysis of recent volcanic rocks from Mt. Spurr.	C. Nye	40

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Alaska Geophysical Institute	Geothermal Energy Investigation of Mt. Spurr. Conduct geophysical and geochemical surveys of Mt. Spurr.	D. Turner E. Westcott	120
New Mexico Energy Institute	Partial Funding for Exploration Well at New Mexico State University.	L. Icerman	20
Utah State Geological and Mineral Survey	Geothermal Investigation of Washington County Geophysical Measurements and Hydrologic Studies in Existing Wells.	D. Mabey A. Smith	40
University of Utah	Coordination and Support of State Cooperative Geothermal Reservoir Analysis. Development of methods for data collection and interpretation and chemical analysis of fluid.	D. Foley	80
University of Hawaii	Geothermal Fluid Characterization for Silica Recovery. Determination of possible processes to recover a marketable form of silica from geothermal fluids.	B. Chen	40
University of North Dakota	Thermal Gradient Measurement in South Dakota. Measurement of thermal gradient and thermal conductivity for the calculation of heat flow in deep wells of South Dakota.	W. Gosnold	47
University of Nevada	Geothermal Enhancement of Mineral Processing. Develop methods to use low-temperature geothermal fluids for enhanced mineral processing and mine-dump leaching.	D. Trexler	110

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Western Research Institute	Identify and Quantify the Environmental Contaminate at the Hanna and HOE Creek Underground Coal Gasification Field Sites.	J. Covell	100
Lawrence Livermore National Laboratory	Develop High Frequency Electromagnetic (HFEM) Instrumentation and Tomographic Techniques to Provide Detailed Propagation and Attenuation Parametric Reconstruction of the Reservoir Cross-Section.	E.F. Laine	150
Sandia National Laboratories Albuquerque	Obtain Controlled Source Audio Magneto-telluric (CSAMT) Measurements and Analyze for Defining Reservoir Parameter, Thermal Front Mapping and Fluid Measurement Properties.	C.M. Hart	400
	Develop a Remote Instrumentation System (Seafloor Earthquake Measurement System-Sems) to Gather and Analyze Soil Stability Data for Eventual Input into Design of Structure.	D. Ingi	195
Western Research Institute	Post Burn Evaluation of Field Test Sites for Identification of Temperature Dependent Mineralogical Changes; also Development of a Geological Data Base for Use in the Prevention of Groundwater Contamination.	J. Covell	500
National Institute for Petroleum and Energy Research (NIPER)	Develop More Accurate Prediction Methodology of Spatial Variations (Heterogenities) in Reservoir Residual Oil Satuation, Permeabilities, Porosities and Other Critical	B. Sharma	1,620

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
NIPER (Continued)	Parameters Effecting EOR Operational Efficiency.		
University of Texas, Austin	Characterization of the Permeabilities Eolian (Wind Deposition) Stratification Types and Their Boundaries, Direction and Other Aspects as Precursors of EOR Efficiency to Improve Numeric Reservoir Simulations.	L. Lake	100
Stanford University	Evaluation of Reservoir Heterogeneties as They Effect CO_2 Flooding Efficiency in Sweep and Displacement.	F. Orr	205
Waterway Experimental Station	Evaluate Acoustic Emissions and Alternation in Rock Strata Upon Thermal Change as Detectors for the Thermal Front in Steam In Situ Tar Sand Extraction, Using Both U.S. and Canadian Test Resources.	J. Warriner	200
University of Wyoming	Physical Properties of Oil Shale: Determine the "Static-Fracture Toughness" and Related Physical Property Measurements on Different Grades of Oil Shales.	K. Chong	40
Los Alamos National Laboratory (LANL)	LANL will support Sandia National Laboratory in Developing a Predictive Capability (Modeling) Relating Shale Bed Preparation (Rock Fragmentation) and Process Efficiency for In Situ Retorting.	S.R. Skaggs	750
Sandia National Laboratories Albuquerque	Based on Rock Fragmentation Research Needs, the Research is Divided into Three Task Areas: 1) Laboratory & Modeling Efforts Aimed at	P. Hommert	900

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories Albuquerque (Continued)	Understanding the Retort Process in a Multi-Dimensional Situation; 2) Analytical Model Development to Predict Particle Size and Void Distribution as a Function of Blast Design; and 3) Field Experiments Conducted Initially to Generate Data for Developing the Long Term Motion Models and Later Conducted to Verify the Model Predictions.		
U.S. Army Corps of Engineers (Vicksburg)	This Research Addresses Combustion Front Migration in the Retorted Shale, Particle Breakdown, and Collapse Susceptibility of a Retorted Shale Pile. The scope of work will include the necessary sample collection, laboratory analyses, and data interpretation to perform the following tasks: 1) Estimate the combustion front migration velocity through loose retorted shale; 2) Estimated the effects of combustion and prolonged heating on individual particle size; 3) Estimate the collapse susceptibility of loose retorted shale during and after combustion.	J.S. Huie	45(1)
Terra Tek, Inc.	Reference Shale Samples and Data Bank: Collect, Analyze, and Make Available to Oil Shale Researchers Samples of Western and Eastern Oil Shales for Research Purposes.	D.D. Bona	121
University of Wyoming	This Research Will Test the Use of Radio Frequency (RF) Waves for Retorting Shale and the Possibility of Using this Energy	R. Inguva	200

(1) FY 1984 Funds.

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Wyoming (Continued)	Source to Enhance Permeability in the Linking Process for In Situ Retorting. Small-scale bench models will measure dielectric constants, permeabilities, gas pressures, oil yield, and porosities and incorporate the results into data already obtained from large field tests.		
Western Research Institute	Analyze Core for Trace Element Distribution and Oil Yield From the Parachute Creek Member of the Green River Formation, Colorado--Colorado Corehole 1.	P. Sullivan G.F. Dana	50
University of Tulsa	Methodology for Measurement of Natural Gas Composition and Stability in Deep Subsurface Sediments.	C. Barker	100
Global Geochemistry Corp.	Development of Methodology for Detecting the Existence of Deep Subducted Organic Gas and Segregating It From Gases of Suspected Organic Origin.	I.R. Kaplan	85
Colorado School of Mines	Measurement of Hydrate Pressure/Temperature Conditions In Situ to Model the Kinetic Rate of Hydrate Dissociation.	E.D. Sloan	96
U.S. Geologic Survey	Evaluation of the Hydrocarbon Potential of the Organic-Rich Shales in the Eastern United States.	J. Roen	105
	Evaluation of Geochemical/Geologic Factors Controlling the Generation/ Accumulation of Methane in Gas Hydrates.	K. Kvenvolden	40

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Geologic Survey (Continued)	Evaluation of the Potential for Deep Hydrocarbon Generation as a Result of the Sediment Subduction Plate Accretion and Other Tectonically Related Processes.	K. Kvenvolden	150
Columbia University	Development of Thermal History Models To Understand How Hydrocarbons May Be Generated From Deep Source Rocks.	G. Bond	83
Northwestern University	Investigation of Plate Tectonic Structure in Lesser Antilles (Barbados) Accretionary Prism and Hydrocarbon Occurrence.	R.C. Speed	50
Morgantown Energy Technology Center	Evaluation of Lineaments/Structure and Producing Gas Wells in Areas of Variable Tectonic Influence in the Devonian Shales.	J. Mercer	100
	Assessment of Geologic Factors Affecting Production in Coalbeds (Warrior Basin).	J. Mercer	50
	Determination of the Physiochemical Properties of Naturally Occurring Gas Hydrate.	W. Lawson	150
Columbia University	Verification of the Relationship Between In Situ Stress and Regional Geologic Structures.	T. Engelder	300
U.S. Geologic Survey	Geologic Investigations of Western Tight Gas Sands (Stratigraphy, Sedimentology, Seismology, Petrography, and Thermal Maturtion) to Characterize Piceance, Greater Green River, and Uinta Basins.	C. Spencer	313

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Geologic Survey (Continued)	Evaluation of the Interrelationships of Lithology, Stratigraphy, Permafrost to the Formation and Distribution of Gas Hydrates Within North Slope of Alaska	K. Kvenvolden	110
New Mexico Institute of Mining and Technology	Evaluation of Relationships of Pore Structure in Tight Sands to Flow Characteristics; Obtain Accurate Measurements of Tight Sands Matrix and Fracture Parameters in Core Analysis	N. R. Morrow	74
Geoexplorers International, Inc.	Evaluation of the Relationships of Geologic Age, Temperature Changes Over Time and Physical and Chemical Composition to the Stability and Formational Characteristics of Gas Hydrates in 25 Offshore Sites.	J. Krason	231
University of Arizona	Evaluation of Potential Source Rocks Which May Have Been Deeply Emplaced by Plate Tectonic Processes in North Central Alaska and Adjacent Areas of Canada.	P. J. Coney	0
Texas A&M University	Study of Sediment Subduction Process Through the Use of Accepted Plate Tectonic Principles and the Application of New Subduction Theory. These studies concentrate on marine geological environments.	T. W. Hilde	110
Science Applications, Inc.	Investigation of the Role of Natural Fractures and In Situ Stress on Gas Production from the Naturally Fractured Shale.	T. Blanton	300

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory	Evaluation of Hydraulic Fracturing Effectiveness in Jointed and Heterogeneous Rocks Subjected to In Situ Stress	F. Heuze	200
U.S. Steel Corporation	Assessment of the Variables Which Affect Hydraulic Fracture Development in Coalbeds. This will permit the prediction of the effect of in situ stress upon hydraulically induced fractures and the assessment of fracture containment.	C. Boyer II	140
Texas A&M University	Evaluation of Seismic Records Relative to Suspected and Confirmed Gas Hydrate Deposits in the Gulf of Mexico; Determination of the Geologic and Chemical Implications Pertaining to Gas Hydrate Formations.	J. Brooks	100
U.S. Geologic Survey	Electronmagnetic Energy Surveys to Detect Sedimentary Rock Units Associated with Subduction Zones and Their Relationship to the Earth's Mantle.	D. Stanley	149
Lawrence Livermore National Laboratory	Assessment of Diagnostic Tools to Measure In Situ Stress and Natural Fracture System Intensity.	F. Heuze	100
	Cross Well Topography to Detect Lenticular Sands Deposits and Open Natural Fractures.	J. Albright	150
CER Corporation	Correlation of Core/Log Results to Uncertainties Associated with Locating Productive Intervals in Tight Sand Formations.	R. Peterson	150

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INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
National Bureau of Standards	Determination of the Thermal and Mechanical Properties of Synthetic and Natural Samples of Gas Hydrates.	J. Callahan	100
University of Washington	Determination of the Thermomechanical Properties of Gas Hydrates Under Various Stress Conditions.	R. Corlett	30
Atomic Energy of Canada Lawrence Livermore National Laboratory	Technical Cooperative Program. Planning and testing in the Underground research laboratory near Lac du Bonnet, Manitoba, Canada.	K. Dormuth J. Yow	600
Colorado School of Mines	Test Program. Development of the heated block flat jack test as a potential in situ site-characterization test and studies of stress/deformation/fracture permeability relationships.	W. Hustrulid	200
Swedish Nuclear Fuel and Waste Management Company (SKB)	Stripa Multinational Project. Participation in multinational in situ test project in the Stripa Mine, Sweden; tests include geohydrological, geochemical, and geophysical studies; studies of shaft, room, and borehold plugging; and studies of sealing techniques.		400

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Berkeley Laboratory/ Agapito Associates	Rock-Mechanics Computer Code Development. Modification and documentation of existing distinct element, finite-element codes and development of block theory and discontinuous deformation analysis techniques to provide analytical capability for field test simulations and data interpretation.	R. Goodman	0
Ames Laboratory	Analytical Spectroscopy. New techniques for measurement of elements in geological samples.	V.A. Fassel	35
Brookhaven National Laboratory	Analytical Techniques with Synchrotron Radiation and Ion Beams. Microprobe techniques for characterization of solids, particularly of geological origin.	K.W. Jones	110
Oak Ridge National Laboratory	Mass Spectrometric R&D for Inorganic Analyses. Mass spectrometric techniques for elementral and isotopic analyses.	R.L. Walker	52
Pacific Northwest Laboratory	Analytical Atomic Absorption Spectrometry Research. New techniques for measurement of elements in geological and environmental samples.	D.L. Styris	108
University of Georgia	Fundamental Studies of Separation Processes. Fractionation of fossil materials by chromatography.	L.B. Rogers	32

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INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Maryland	Study of Highly Selective Sorptive Effects with Applications to Paraffins and Petroporphyrin Separations. Separation and identification of porphyrin components of fossil materials.	D.H. Freeman	35
University of Virginia	The Glow Discharge as an Atomization and Ionization Device. New techniques for direct analysis of solids such as minerals.	W.W. Harrison	16
University of Wyoming	Solid Surface Luminescence Analysis. Luminescence techniques for analysis of fossil hydrocarbons.	R.J. Hurtubise	45
Los Alamos National Laboratory	Radionuclide Migration.	J.L. Thompson	325
	Infrasonde Research.	J.P. Mutchlecner	500
	Nuclear Explosive Cratering.	T.F. Adams	200
	Nuclear Explosive Containment Simulation Model.	E.S. Gaffney	150
	SHALE Computer Code Development for Containment Purposes.	T.F. Adams	550
	Radionuclide Migration.	L.D. Ramspott	240
	Methods for Measuring Rock Properties.	J.R. Hearst	200
	Stress-Wave Effects and Containment Phenomenology.	L. Thigpen	650

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Seismic Methods of Locating Buried Interfaces.	N. Burkhard	245
	Geological Factors in Hard-Target Destruction.	D. Burton	550
	Seismic Array and Signal Processing.	D. Harris	665
	Explosive Detection and Location Capabilities of Local Arrays.	K. Nakanishi	675
	Regional Seismic Network Discrimination Capabilities.	S. Taylor	720
	Ground Coupling and Potential Test Ban Evasion Scenarios.	J. Scheimer	440
	Seismic Monitoring and Test Treaty Verification Analysis.		
	Site Selection Criteria for Seismic Stations.	D. Harris	140
	Southern Hemisphere Nuclear Explosive Monitoring.	R. Budwine	300
	Deep Seismic Sounding.	J. Zucca	250
	Laboratory Verification of Geochemical Code Predictions.	K. Knauss	200
	In Situ Measurements of Hot, Pressurized Boreholes.	P. Kasameyer	150

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Geological Effects of Large Meteorite Impacts.	J.B. Knox	56
Oak Ridge National Laboratory	Comparison of Pre- and Post-Bomb Radiocarbon in Soils and Soil Fractions.	J.W.C. White W.S. Broecker	126
	Soil Carbon in the Global Carbon Cycle.	Post, Mann, & Pastor	215
U.S. Geological Survey Sandia National Laboratories	Site Geology. To develop an understanding of the geologic framework and history of Yucca Mountain and to develop a geologic model that describes the structural and stratigraphic characteristics of the site.	R. Spengler J. Neal	699
U.S. Geological Survey	Topographic Analysis. To collect and analyze high-resolution topographic information from the site and to prepare topographic contour maps of the Yucca Mountain area.	S. Wu	120
	Gravity and Magnetics. To interpret the distribution and configuration of subsurface stratigraphy and geologic structure of the Yucca Mountain site and to evaluate the stability of subsurface conditions.	H. Oliver	300

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Geological Survey (Continued)	Seismic Investigations. To characterize the subsurface geologic framework of the crust, upper mantle, and Paleozoic and Tertiary rocks in the vicinity of the site.	W. Mooney H. Ackerman	414
	Rock Properties. To evaluate rock properties that can be used to identify and distinguish the principal stratigraphic units at Yucca Mountain.	L. Anderson J. Rosenbaum D. Miller	414
	Heat Flow. To provide reliable baseline temperature data at possible repository locations; to provide baseline thermal conductivity data for engineering studies; to determine heat-flux patterns at Yucca Mountain and on a regional basis; and to identify sites of vertical water circulation and lateral water movement.	J. Sass	125
	Tectonics. To understand Cenozoic tectonic dislocation of the pre-Cenozoic crust; to develop a tectonic model for analyzing changes resulting from climate and tectonic activity near Yucca Mountain; to identify erosional and depositional processes at the site; to locate Quaternary fault movement; to understand recurrent fault movement; and to compile geologic maps of site vicinity and area.	M. Carr	850

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INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Volcanism. To evaluate the hazards of future volcanism to a repository at Yucca Mountain; to calculate estimates of, and bounds on, the probability of igneous extrusion through the repository; and to estimate the distribution and concentration of radionuclides in materials extruded at the land surface.	B. M. Crowe	69
U.S. Geological Survey	Isotope Geology. To analyze the age and isotopic characteristics of rock units and calcite veins in the Yucca Mountain area.	J. Rosholt	175
	Seismicity and Strain. To assess the seismic hazard to the proposed Yucca Mountain repository; to monitor seismicity in the region and at the site; to prepare simple probabilistic ground motion maps; to conduct a site strain survey; and to measure in situ stress.	A. Rogers	718
Los Alamos National Laboratory	Hydrothermal Geochemistry. To produce a conceptual model to explain the present distribution of minerals and water compositions in Yucca Mountain and to predict future mineralogy and water compositions.	C. J. Duffy A. Meijer	222

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Solubility Determination. To determine the solubilities and speciation of important waste elements (plutonium, americum, neptunium, uranium, thorium, zirconium, radium, and nickel) under conditions characteristic of the proposed repository along flow paths from the repository to the accessible environment.	J. F. Kerrisk	704
	Sorption and Precipitation. To determine sorption coefficients for elements of interest in order to predict radionuclide movement from the proposed repository at Yucca Mountain to the accessible environment.	K. W. Thomas	963
	Retardation Sensitivity Analysis. To construct a geophysical/geochemical description of Yucca Mountain, using the results of other project investigations, as a basis for determining the sensitivity of radionuclide transport along potential flow paths to chemical and physical retardation properties.	B. Travis G. DePoorter	834
Lawrence Livermore National Laboratory	Geochemical Modeling Code EQ3/6. To further develop the geochemical modeling code EQ3/6 for use in long-term predictions of radionuclide release from a repository.	T. Wolery	556

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Alteration Mineralogy. To study the bulk rock and fracture alteration, including the alteration of primary glass to sorptive minerals, in order to understand the conditions, timing, and chemical transport phenomena that caused alteration at Yucca Mountain.	S. Schonn D. Vaniman	1,330
	Mineral Stability. To assess the impact of the proposed repository's thermal aureole on minerals that are important parts of the natural retardation system.	D. Bish D. Vaniman	
	Mineralogy of Transport Pathways. To assess mineral abundances and chemistry for variability and continuity along transport pathways in three dimensions; to study transport pathways in the unsaturated zone near the waste disposal containers where transport may be particularly slow; to substantiate the continuity of well-characterized rock properties; and to establish a petrologic and mineralogic stratigraphy.	D. Vaniman	
Sandia National Laboratories Albuquerque	Rock-Mass Analysis. To perform rock-mass thermomechanical analyses in order to develop and evaluate techniques for combining data from field tests that	S. J. Bauer	379

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories (Continued)	reflect rock-mass behavior and from laboratory tests that reflect the behavior both of fractures and the rock matrix.		
	Field Testing. To conduct field tests in G-Tunnel on the Nevada Test Site in welded tuffs that have stress states and thermal and mechanical properties similar to those of the welded tuffs in Yucca Mountain.	R. Zimmerman	941
	Laboratory Properties. To develop, through laboratory measurements, a data base for the bulk, thermal, and mechanical properties of the tuffaceous rocks from Yucca Mountain for use in thermal and mechanical analyses of temperature fields, of stresses introduced by the presence of underground openings and heat-producing waste, and to estimate rock-mass properties.	F. B. Nimick	525
Argonne National Laboratory	Trace Element Migration in the Earth's Crust.	M. Seitz, et. al.	120
	Migration of Heavy Element Chemical Species in Geologic Media.	F. Schrieiner, et. al.	120
	Thermochemistry of Geothermal Materials.	P.A.G. O'Hare, et. al.	120
Lawrence Berkeley Laboratory	Deep Electro-Magnetic Soundings in Thermal Regimes.	H.F. Morrison N.E. Goldstein	90

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Berkeley Laboratory (Continued)	Effect of Fracture Characteristics Upon Acoustic Wave Propagation in Boreholes.	M.S. King	40
	Properties of Silicate Liquids and Glasses.	I.S.E. Carmichael	130
	Chemical Transport in Natural Systems.	C.L. Carnahan J.S. Ramer	90
	Generation & Primary Migration of Petroleum and Its Precurser Compounds.	O. Weres	85
	Generation of Abiogenic Methane.	J.A. Apps	40
	Asteroid Impacts and Mass Extinctions.	L. Alvarez, et. al.	150
	Transport Properties of Rock-Fluid Systems at Elevated Temperatures and Pressures.	M.S. King, et. al.	75
	Aqueous Solution Data Base.	S.L. Phillips	70
	Fluid Flow in Fractured Rock Under Stress.	P.A. Witherspoon Y.W. Tsang	60
	Geophysical Measurements Facility.	T.V. McEvilly	70
	CSDP: Workshop on Geophysical Modeling for Long Valley.	T.V. McEvilly H.F. Morrison	15
	Hydrogeochemistry in Thermal Regimes.	H.A. Wollenberg A.F. White	100

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Berkeley Laboratory (Continued)	Geomechanical Laboratory Studies of SSSDP Core Samples.	M.S. King	15
	In situ Fluid Sampling of the Salton Sea Scientific Drilling Program Well.	A.F. White	9
	Reflection Profiling at the Salton Sea Deep Hole Site.	E.L. Majer T.V. McEvilley	75
	Surface Studies Involving the Mineral Surface/Radionuclide Ion Solution Interface.	D.L. Perry	60
Lawrence Livermore National Laboratory	Rock Mechanics: Thermal & Creep Behavior of Generic Repository Rocks.	H. Heard, et. al.	160
	Diffusion in Silicate Materials.	A.J. Piwinskii	95
	Electrical Conductivity and Temperature in the Upper Mantle.	A. Duba	85
	Attenuation and Dispersion in Partially Saturated Rocks.	Chin	110
	Surface Wave Method for Determining Earthquake Source Mechanisms with Applications to Regional Stress Field Studies.	Patton Taylor	90
	Underground Imaging.	J. Lytle,* et. al.	285
	Thermal Stress Microfracturing of Granite.	H. Heard	70

* Deceased

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory (Continued)	Thermodynamics, Kinetics, and Transport in Aqueous Electrolyte Solutions.	J. Lytle* H. Heard	150
	Kinetic and Compositional Model of High-Pressure Kerogen Pyrolysis.	J. Lytle* H. Heard	100
	Continental Drilling Program Information and Data Management Unit.	N. W. Howard	100
	Viscosity and Electrical Conductivity of Rock Melts: Continental Scientific Drilling Program.	A. J. Piwinskii	55
	CSDP: Imperial Valley Information Base.	D. Emerson P. Kasameyer	40
	Salton Sea Scientific Drilling Program Science Management Activities.	A. Duba P. Kasameyer	65
	Seismic Studies of Possible Magma Injection and Magma Chambers in the Long Valley Region.	Mills, et. al.	150
	Constraints from Borehole Gravity on Geothermal System Models & Resource Definition in the Salton Sea Geothermal Field.	P. Kasameyer J.H. Hearst	19
	Physical & Chemical Laboratory Studies of Cores from the Salton Sea Scientific Drilling Project.	Daily Linn	19

*Deceased

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory (Continued)	Shallow Hole Drilling Investigations of Long Valley, Valles, and Salton Sea Thermal Regimes.	L.W. Younker	200
	Thermal and Petrologic Studies of Large Silicic Systems.	L.W. Younker P. Kasameyer	80
Los Alamos National Labortory	Electrical Conductivity, Temperature, and Radiative Transport in the Earth.	T. Shankland	120
	Nonlinear Generation of Acoustic Beams.	T. Shankland	120
	Creep Deformation of Rock.	J. Blacic	120
	Coal Maturation: Occurrence, Form, and Distribution of Sulfur and Mineral Matter in Peat.	R. Raymond, et. al.	190
	Rock-Water Interactions and Element Migration in the Jemez Hydrothermal System.	R.W. Charles, et. al.	280
	The Geochemistry of Ru and Tc and Geochemical Controls on the Redistribution of Multivalent Elements in the Lithosphere.	D.B. Curtis, et. al.	110
	Geologic, Geochemical, and Sr, Nd, and Pb Isotopic Studies on an Anomalous Late Cenozoic Basalt Province in the Southwestern Great Basin.	B.M. Crowe, et. al.	80
	Physiochemical Basis of the Na-K-Ca Geothermometer.	T.M. Benjamin, et. al.	60

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Trace Element Geochemistry of Volcanic Gases & Geothermal Systems.	B.M. Crowe D.B. Curtis	20
	Origin and Extent of the Toledo Caldera, Jemez Mountains, New Mexico.	G.H. Heiken F.E. Goff	60
	Search for Magma Beneath the Jemez Mountain Volcanic Field.	K.H. Olsen	150
	Shallow Hole Investigation of Long Valley, Valles, and Salton Sea Thermal Regimes.	F.E. Goff, et. al.	150
	Studies of the Polvadero Group, Jemez Mountains, NM.	S. Baldridge D. Vaniman	110
	Valles Caldera Information Base.	S. Goff N. Marashak	35
	CSDP Drilling Sample & Data Management	S. Goff	130
	In Situ Fluid Sampling of Salton Sea Scientific Drilling Project Well.	F.E. Goff	24
Oak Ridge National Laboratory	Geochemistry of Crustal Processes to High Temperatures and Pressures. These studies focus upon:		480
	(A) Silicate Melt Geochemistry	M. Naney	
	(B) Hydrothermal Geochemistry:		
	(1) Homogeneous Equilibria.	D. Wesolowski	
	(2) Heterogeneous Equilibria.	E. Drummond	
	(3) Kinetics.	E. Drummond D. Cole	
	(4) Modeling.	D. Cole, et. al.	

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Pacific Northwest Laboratory	Remote Sensing: Geoscience Data Analysis and Integration.	A.P. Foote, et. al.	140
	Chemical Migration by Contact Metamorphism Between Pegmatite - Country Rock.	J.C. Laul	105
Sandia National Laboratories Albuquerque	CSDP - High Temperature Geophysical Research Techniques.	H.C. Hardee, et. al.	300
	Magmatic Emplacement.	C.R. Carrigan	70
	CSDP Long Valley-Mono Craters Site Assessment.	J.B. Rundle J.C. Eichelberger	50
	Inyo Domes Research Drilling Program.	J.C. Eichelberger	141.5
	Geoscience Research Drilling Office.	R.K. Traeger	600
	Long Valley-Mono Craters (CA) Information Base.	J.C. Eichelberger	20
	Crustal Strain.	J.B. Rundle	75
	Time-Dependent Deformation and Fracture of Brittle Rock.	L.S. Costin D.J. Holcomb	110
	Creep Response of NaCl at Low Stresses and Temperatures.	W.R. Wawersik	100
	Hydrothermal-Magma Systems.	W.C. Luth, et. al.	250
	Clay H_2O Interactions.	J.L. Krumhansl	70

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Arizona State University	Drilling Investigation of a Young Magmatic Intrusion Beneath the Inyo Domes, Long Valley, California: Structural and Emplacement Studies.	J.H. Fink	22
*	Silicate, Aluminosilicate and Boro-silicate Melts: Thermochemical Studies by High Temperature Calorimetry.	A. Navrotsky	83
Brown University	Thermal Regimes of Major Volcanic Centers: Magnetotelluric Constraints on the Coupling of Deep-Seated Magma Genesis to High-Level Geothermal Reservoirs.	J.F. Hermance	166.3
California Institute of Technology	In Situ Stress in Deep Boreholes.	T.J. Ahrens	160
	Infrared Spectroscopy and Hydrogen Isotope Geochemistry of Hydrous Silicate Glasses.	E. Stolper	50
University of California, Berkeley	Advective-Diffusive/Dispersive Transport of Chemically Reacting Species in Hydrothermal Systems.	H.C. Helgeson	120
	Isotopic Studies on Rare Gases in Terrestrial Samples and in Natural Nucleosynthesis.	J.H. Reynolds	232.6
	Long Valley Caldera: Monitoring Studies of Gas Composition and He, Ar, and Carbon Isotopes.	Rison & H. Craig	40.6

* Now at Princeton University

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of California, Los Angeles	Adiabats and Gruneisien Parameter at High Temperatures and High Pressure.	R. Boehler M. Nicol	85
	Determination of Thermodynamic Functions of Minerals at High Temperature.	O.L. Anderson	74
University of California, Riverside	Sulfate-Oxide-Silicate Phase Equilibria and Associated Fluid Inclusion Properties in the Salton Sea Geothermal Systems.	E. McKibben	50
University of Southern California	Continental Scientific Drilling Program: The Seismology of Continental Thermal Regimes.	K. Aki	150
University of Chicago	Depth to and Concentrations of Water in Large Bodies of Silicic Magma.	A.T. Anderson	46
Columbia University	Energetics of Silicate Melts from Thermal Diffusion Studies Seismo-tectonics of the Eastern Aleutian Arc and Associated Volcanic Systems.	D. Walker	78.5
	Seismo-tectonics of the Eastern Aleutian Arc and Associated Volcanic Systems.	K. Jacobs L. Sykes	360
	Fluid Transport Properties of Rock Fractures.	C.H. Scholz E.E. Engelder	150
DOSECC, Inc.	Workshop on Continental Scientific Drilling.	B. Raleigh	6

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Hawaii at Manoa	Physical Characterization of Magma Samples.	M. Manghnani	200
Harvard University	Energetics & Thermochemical Properties of Rocks and Minerals.	J. Thompson, et. al.	115.1
University of Maryland	Salton Sea Geothermal System Using Be Isotope and Trace Element Geochemistry.	N. Vallette-Silver	42.6
Massachussetts Institute of Technology	Microcracks and Energy.	G. Simmons	80
Michigan State University	The Effects of Pressure, Volatiles, and Thermal History on Chemical Heterogeneity in Magma Systems.	T.A. Vogel	31.3
Michigan Technological Institute	Geothermal Alteration of Sediments in the Salton Sea Scientific Drill Hole.	S.D. McDowell	50
National Academy of Sciences	Studies in Geophysics.	T.M. Usselman	32
	Committee on Seismology.	J.W. Berg, Jr.	10
	U.S. Geodynamics Committee.	P.J. Hart	59
	Continental Scientific Drilling Committee.	R.S. Andrews	65
	Board on Earth Sciences.	J.W. Berg, Jr.	10
	Geophysics Film Commmittee.	B. Valentino	20

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
City University of New York, Brooklyn College	Deep Burial Diagenesis in Carbonates.	G.M. Friedman	95.1
State University of New York, Albany	Thermal Evolution of Sedimentary Basins.	T.M. Harrison	118
University of North Carolina	Activity-Composition Relations in Silicate Melts.	A. Glazner	38.2
University of Oklahoma	Source Material and Mechanisms of Generation & Migration of Oils in Anadarko Basin, Oklahoma.	P. Philp	83.7
Pennsylvania State University	The Geochemistry of Coal Origins in Relation to Coal Structure.	P.H. Given, et. al.	123
Rice University	Structural Evolution of the Central Brooks Range, Alaska.	H.C. Ave Lallemont	124
South Dakota School of Mines & Technology	Thermally Induced Chemical Migration: A Natural Analog Approach.	J.J. Papike	100
	SSSDP Cores: Metamorphic Reaction Progress as a Function of Chemical & Thermal Environment.	J.J. Papike	50
Stanford University	Porosity with Fluids: Origin and Effects on Physical Properties of Crustal Rocks.	A.M. Nur	172
	Structure and Emplacement of the Inyo Domes Intrusion, Long Valley, California.	D.D. Pollard	39

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Texas A&M University	Deformation of Granitic Rocks at Elevated Temperatures and Pressures.	M. Friedman	100.2
University of Texas, Arlington	Volcanological Investigation of the Banco Bonito Eruption and Subsurface Geology at the Ring Fracture Zone, Valles Caldera, New Mexico.	S. Self	43
University of Tulsa	Stability of Natural Gas in the Deep Subsurface.	C. Barker	80
University of Wisconsin	Thermal Stress Microfracturing of Granite.	H.F. Wang	52.3
Woodward-Clyde Associates	Earthquake Analyses for Structural Definition & Material Characteristics of the Mono Craters and Long Valley Magma Systems.	L.J. Burdick D.M. Cole	40
Yale University	Opening Mode Crack Growth in Rock.	R.B. Gordon	
Rockwell Hanford Operations	Geologic Investigations. Conduct stratigraphic, petrographic, structural, tectonic, geomorphic, and economic geology investigations to determine the feasibility of siting a repository in the basalts underlying the Hanford Site, Washington.	S.M. Price	4,535
Rockwell Hanford Operations	Rock-Mechanics Investigations. Evaluate rock-mechanics properties of basalt to determine the feasibility of siting a repository at the Hanford Site, Washington.	D.J. Dodds	430

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Rockwell Hanford Operations	Geochemical Investigations of Waste Package Environment. Establish the ambient physical and chemical environment expected for a nuclear waste repository constructed in the basalts underlying the Hanford Site, Washington. Evaluate the effect of emplacing waste in that environment. Investigations include characterization of the geochemical parameters of the system, including redox condition, evaluation of radionuclide reactivity in the system, and evaluation of effects of temperature, pressure, and radiation on the system.	P.F. Salter	700
Rockwell Hanford Operations	In Situ (Underground) Testing. Conduct planning for exploratory shaft facility to evaluate the site-specific geologic and hydrologic environment of basalts. Geologic, hydrologic, and rock-mechanics testing in facility will be used to assess the feasibility of constructing a repository in the basalts beneath the Hanford Site, Washington.	M.B. Arndt	1,130
Rockwell Hanford Operations	Drilling and Testing. Provide water-level monitoring structures, pumping wells, basalt cores and boreholes to support hydrologic, geologic, and rock-mechanic investigations. Collect water-level monitoring data, hydrologic test data, geologic core logging, geophysical logging, and drilling data to determine the feasibility of siting a repository in the basalts underlying the Hanford Site, Washington.	W.H. Price	6,530

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Boeing Aerospace	X-ray Spectroscopic Investigation Metamictization and Annealing in Crystalline Materials.	R.B. Greegor F.W. Lytle*	10
Carnegie Institute	Static Megabar Pressures. High temperature high pressure studies using diamond anvil cell.	P.M. Bell H.K. Mao	**
Research Institute of Colorado	Molecular Solids at High Pressure and Temperature. Equation of state and lattice dynamics	R.D. Etters	70
Los Alamos National Laboratory	The Effect of Self-Irradiation on Stability of Ceramic Nuclear Waste.	F. Clinard, et. al.	10
	Materials Under Extreme Conditions. High temperature high pressure studies using diamond anvil cell.	R.L. Mills, et. al.	240
Massachusetts Institute of Technology	Irradiation Damage Microstructures in Nuclear Ceramics with Applications in Fusion Energy Technology and Nuclear Waste Disposal.	L.W. Hobbs	10
University of New Mexico	Radiation Effects and Annealing Kinetics in Crystalline Complex Nb-Ta-Ti Oxides, Phosphates, and Silicates.	R.C. Ewing	20

* Deceased
** No Cost Extension

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
State University of New York, Stony Brook	Participating Research Facilities at the National Synchrotron Light Source.	J. Bigeleisen	80
Oak Ridge National Laboratory	Preparation and Characterization of Research Materials. Growth of single crystal research specimens.	L.A. Boatner, et. al.	350
BCD	Geochemistry Support. Consulting support for review, planning, and management of geochemistry activities	J.Means	0
Colorado School of Mines	RN Concentration in Permian Salt Brines. Calculational routine to determine how ground-water ages should be calculated from isotopic data.	D.Langmuir	49
Earth Technology Corporation	Geologic Project Manager--Southern Region. Geologic and hydrologic characterization of the southern region leading to the identification of potentially acceptable sites for a geologic repository.	K.L. Wilson	3,110
Georgia Institute of Technology	Stability and Thermal Decomposition of Repository Salt.	C. Weaver	60
Bendix Field Engineering Corporation	Geochemical and Petrological Analyses. Development and application of procedures and methodology for chemical and petrographic analyses of geologic and hydrologic materials.	C. Jones	1,053

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Livermore National Laboratory	Thermal Properties of Repository Rocks. Experimental measurement of thermal properties of repository rocks over range of pressures and temperatures simulating repository conditions.	D.E. Emerson	31
	Q3/6 Model Development. Development of of geochemistry computer code for brine systems at repository temperatures.	R. Wolerly	350
Louisiana State University (LSU)	LSU Core Storage Facility. Maintain Louisiana salt core at LSU facility.		43
Pacific Northwest Laboratory Office of Nuclear Waste Isolation (Battelle)	Site Evaluation. Manage and integrate site evaluation studies conducted by various contractors in the three salt basins under investigation by the Salt Repository Project.		2,429
RE/SPEC, Inc.	Soil Thermal Testing. Routine and specialized thermal testing of soil rock samples; development and procurement of thermophysical properties testing equipment.	G.D. Callahan	0
Seismic Acoustics Laboratory University of Houston	Physical Modeling of Seismic Reflection Surveys. Construction of three-dimensional physical models to represent geologic conditions at a candidate site; data collection, processing, and interpretation simulate industry practices to evaluate field techniques and resolution of geologic structures.	G.H.F. Gardner J.A. McDonald	0

SOLID EARTH GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Stone & Webster	Geologic Project Manager--Permian Basin Study. Geologic and hydrologic characterization of the Permian Basin leading to the identification of potentially acceptable sites for a geologic repository.	E.M. Washer	4,526
Texas Bureau of Economic Geology	Geologic Studies of West Texas Bedded Salt Deposits. Evaluate geologic and hydrologic environments of Palo Duro and Dalhart Basins of West Texas.	Bigler	2,852
University of California, Riverside	Near-Field Geologic Analog. Data collection from Salton Sea Geothermal Field for use in goechemistry model validation.	W. Elders	350
U.S. Geologic Survey	Geologic Exploration and Technology Development. Project liaison, review of programs, plans, model evaluation, Paradox Basin consultation and technical studies in Paradox and Palo Duro Basins.	A.M. LaSala, Jr.	299
Woodward-Clyde Consultants	Geologic Project Manager--Paradox Basin. Geologic and hydrologic characterization of the Paradox Basin leading to the identification of potentially acceptable sites for a geologic repository.	McLeary	2,210
Arizona State University	Stable Isotope and Fluid Inclusion Studies. Development and application of procedures and methodology for stable isotope and fluid inclusion in salt and related geologic materials for geothermal, hydrologic, and geologic characterization.	L.P. Knauth	98

ATMOSPHERIC GEOSCIENCES

ATMOSPHERIC GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Berkeley Laboratory	Photochemistry of Materials in the Stratosphere.	H. Johnson	250
University of California, Irvine	Research in Chemical Kinetics/Atmospheric Chemistry.	F.S. Rowland	95
Los Alamos National Laboratory	Ionospheric Monitoring.	J.H. Wolcott	1,000
	Nuclear Winter Studies.	R.C. Malone	400
	Low-Altitude Nuclear Weapons Atmospheric Phenomenology.	R.W. Whitaker	300
	Intermediate and High-Altitude Nuclear Weapons Atmospheric Phenomenology.	D.S. Sappenfield	200
	Atmospheric Microwave Propagation.	R.A. Roussel-Dupre	300
	Atmospheric Electromagnetic Pulse Production Studies.	T.C. Murphy	300
	Ionosonde Explosion Detection Research.	S. Warshaw	450
	Global Effects of Nuclear War.	M. MacCracken	2,000
	Nuclear Winter Dialogue.	J.B. Knox	210
	Climate Simulation Modeling.	M. MacCracken	250
	Nuclear Accident, Atmospheric Effects Modeling.	M.H. Dickerson	150

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Arizona	Accurate Determination of C-13/C-12 in CO_2 of Past Atmospheres.	A. Long	84
Atmospheric & Environmental Research, Inc.	Humidity/Cloud-Radiation Feedback & Possible Climatic Perturbations Due to Fossil Fuel Utilization.	W-C. Wang	138
	A Research Program on Natural and Antropogenic Climate Change.	W-C. Wang	100
National Center for Atmospheric Research	Enhanced Research Program on the Long-Range Climatic Effects of Increasing Atmospheric CO_2.	W.M. Washington	260
Brown University	Model Validation Research: Comparison of Simulated and Observed Climate Patterns for the past 18,000 Years.	T. Webb, III	459
University of Colorado	Lake Ice Occurrence as a Possible Detector of Atmospheric Carbon Dioxide Effects of Climate.	R.G. Barry	35
	Analysis of Southern Hemishpere CO_2 Data in Relation to Variations in Atmospheric Circulation and Sea Ice Conditions.	R.G. Barry	24
Cornell University	Merging the Tropical Biosphere Model and Carbon Inventory Estimates with Land Use Change Estimates.	C.A.S. Hall	33
Duke University	Land Use and Vegetation Changes in South and Southeast Asia, 1700-1980 AD.	J.F. Richards	240

ATMOSPHERIC GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of East Anglia	Validation of General Circulation Model Control Runs.	T.M.L. Wigleg	20
Universities of Illinois and Puerto Rico	The Role of Tropical Forests in the Global Carbon Cycle.	S. Brown & A. Lugo	88
Lamont-Doherty Geological Observatory	Study of Carbon Dioxide Source/Sink Distributions with a 3-D Model.	I.Y-S. Fung	150
	Recent Climate Change in North America and CO_2: Search in Stratified Daily Data.	G. Kukla	133
	Variations in Arctic Cloud Cover in Summer.	G. Kukla	25
Lawrence Berkeley Laboratory	The Role of Carbonaceous Aerosol in Climate Modification.	H.J. Rosen	250
Lawrence Livermore National Laboratory	Cloud/Radiation Interactions and Climate.	F.M. Luther	225
	CO_2 Effects Research.	M.C. Maccracken	870
	Trace Gas Interactions in the Global Atmosphere.	D.J. Wuebbles	250
Marine Biological Laboratory	Mathematical Models for Use in Defining the Role of the Terrestrial Biota in the Global Carbon Cycle.	R.A. Houghton	274
	Remote Sensing of Deforestation in the Amazon Basis.	G.M. Woodwell	257
Marshall Space Flight Center	Study of a CO_2 Observational Platform System (CO-OPS).	C.H. Guttman	200

ATMOSPHERIC GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Massachusetts	Studies of Climatic Variability During the Period of Instrumental Records.	Bradley, Kelly, Jones, Diaz	150
National Bureau of Standards	High Accuracy Standards and Reference Methodology for CO_2 in Air.	E.E. Hughes	200
National Center for Atmospheric Research	Enhanced Research Program on the Long Range Effects of Increasing Atmospheric CO_2.	W.M. Washington	260
New York University	Geophysical Models of the Fossil Fuel CO_2 Problem.	M.I. Hoffert	160
Oak Ridge Associated Universities	Uncertainties in Future CO_2 Emissions.	J. Edmonds	100
	Estimate of CO_2 Emissions from Fossil Fuel.	R.M. Rotty	150
Oak Ridge National Laboratory	Sensitivity Analysis of the Impact of Carbon Dioxide Accumulation on Climate.	D.G. Cacuci	100
	Carbon Cycle Program Management.	C.C. Coutant	21
	The Global Carbon Cycles and Climate.	Emanuel, Peng, Deangelis	385
Oregon Graduate Center	Atmospheric Methane: Research Program for a Study in China.	R.A. Rasmussen	264
Oregon State University	Research on the Dynamics of the Climate.	W.L. Gates	225
	On the Increase of Total Carbon Dioxide in the World Oceans.	C-T. Chen	101
	Model Intercomparison.	W.L. Gates	100

ATMOSPHERIC GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Pacific Northwest Laboratory	Atmospheric CO_2 Abundance--An Archival Study of Spectroscopic Data.	G.M. Stokes	
University of Southern Florida	The Role of Aragonite in the Marine Carbon Cycle.	R.H. Byrne	82
State University of New York at Stony Brook	Research Project on CO_2-Induced Climate Change.	R.D. Cess S. Hameed	308
University of Washington	Geochemical Determination of Biospheric CO_2 Fluxes to the Atmosphere.	M. Stuiver	32
U.S. Geological Survey	Future Climates. To assess the Quaternary climate and hydrologic conditions in the Yucca Mountain area as a basis for predicting future conditions and to evaluate the effects of climatic changes on waste isolation.	L. Benson	597
Science Applications International Corporation Reynolds Electrical and Engineering Co.	Meteorological Monitoring. To continuously monitor meteorological conditions at Yucca Mountain in order to characterize climatic conditions.	E. McCann V. Gong	475
Argonne National Laboratory	Network Monitoring of Acidic Dry Deposition.	M.S. Wesely	96
	Atmospheric Bound Layer Transport and Dispersion Studies.	M.S. Wesely	179
	Nonlinearity of Acid Precipitation Processes.	M.S. Wesely	560

ATMOSPHERIC GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Atmospheric Turbulence Diffusion Laboratory	Atmospheric Turbulence and Diffusion.	B.B. Hicks	661
Brookhaven National Laboratory	Atmospheric Aerosol Microphysics.	W.H. Marlow	136
	Atmospheric Chemistry and Physics of Organic Pollutants.	J. Gaffney	275
	Aerosol Chemistry and Dynamics.	I.N. Tang	160
	Atmospheric Tracer and Instrumentation Developments.	R.N. Dietz	160
	Nonlinearity.	P. Michael	2,580
	Temporary Assignment for Acidic Deposition Program.	G. Hendry	205
E.I. DuPont De Nemours and Company, Inc.	Air Transport of Contaminants.	A.H. Weber	194
Lawrence Berkeley Laboratory	Aerosol Chemistry by ESCA Technology.	T. Novakov	360
Lawrence Livermore National Laboratory	Support Complex Terrain Studies.	P.H. Gudiksen	391
	Ascot Management.	M.H. Dickerson	149
	Regional Atmospheric Modeling.	P.M. Gresho	116
	Atmospheric Studies Complex Terrain.	M. Dickerson	342
Los Alamos National Laboratory	Project Airstream Measurement.	E. Mroz	90

ATMOSPHERIC GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Terrain Influence Meteorology.	S. Barr	500
Oak Ridge National Laboratory	Atmosphere - Canopy Interactions.	S.E. Lindberg	115
	Ion Chemistry and Atmospheric Cluster Phenomena.	W.R. Garrett	399
Pacific Northwest Laboratory	Coupling/Decoupling of Synoptic and Valley Circulations.	C. Whiteman	100
	Dry Deposition and Resuspension.	G.A. Sehmel	160
	Atmospheric Boundary Layer Studies.	T.W. Horst	165
	Atmospheric Diffusion in Complex Terrain.	M.M. Orgill	140
	Nonlinearity/Acid Precipitation Processes.	W. Slinn	1,820
	MAP3S Network.	M. Dana	28
University of California	Photochemical and Thermal Reactions of Combustion Related Particular Organic Matter.	R. Atkinson	85
Colorado State University	General Circulation Variability Medium to Long-Range Forecasting and Energy-Industry Related Applications.	E. Reiter	60
U.S. Department of Commerce	Atmospheric Transport and Dispersion of Pollutants and Related Meteorological Studies.	J. Heffter	259

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
University of Delaware	Chemistry of Atmospheric Precipitation at Lewes.	T. Church	30
Ford Motor Company	Studies of Optimal Techniques for OHR and HO_2 Measurements in Ambient Air.	C. Wang	48
University of Illinois	Resolution of Source Contributions to Environmental Samples.	P. Hopke	30
	Atmospheric Pollution Scavenging.	R.G. Semonin	260
Institute of Ecosystem Studies	MAP3S Ithaca Site.	G.E. Likens	33
University of Maryland	Objective Prediction of Monthly Mean Surface Temperatures.	F. Baer	37
	Megameter-Scale Atmospheric Transport and Dispersion.	F. Baer	20
Miami University	MAP3S Precipitation Station.	J.C. Klink	10
University of Michigan	Estimation of Potential and Probable Source Regions for Acid Precipitation.	P. Samson	4
New York University	Interaction of Radiation with Matter.	M. Pope	350
State University of New York	Maintenance of a Rural Precipitation Chemistry Center at Whiteface Mountain.	J. Kadlecek	1
	Rural Precipitation Chemistry Center at Whiteface Mountain.	J. Kadlecek	18

ATMOSPHERIC GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Pennsylvania State University	Dynamics, Energetics and Structure of Microclusters.	A.W. Castleman	90
	Precipitation Chemistry Network - MAP3S Program.	R. De Pena	34
University of Rochester	Infrared Excitation of Clusters and Ions of Atmospheric Interest.	J.S. Muenter	40
SRI International	Homogeneous and Heterogeneous Chemistry of Atmospheric Species.	D.M. Golden	68
University of Virginia	MAP3S Program.	J.N. Galloway	34
Oak Ridge National Laboratory	Global Effects of World-Wide Emissions on the Atmosphere. To clarify a broad range of atmospheric perturbation issues which arise from human and natural processes--past, present, future--and which are or may become significant magnitude to impact future priorities for resource development.	D. Moses	75

OCEAN GEOSCIENCES

OCEAN GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Pacific Northwest Laboratory	Laser-Based Analytical Techniques. Laser Spectroscopic Techniques for Isotopic Measurements on Noble Gases in Deep Aquifers and Ocean Waters.	T.J. Whitaker	91
Lamont-Doherty Geological Observatory	Ocean Tracer Modeling: Data Evaluation and Comparison of Preliminary Models.	W.S. Broecker	120
	Assessment of CO_2 Sink/Source in the Oceanic Areas: Seasonal and Geographic Variability.	T. Takahashi	194
University of Miami	Indian Ocean Radiocarbon.	H.G. Ostlund	49
University of New Hampshire	Ocean Models in the Global Carbon Cycle.	B. Moore, III	106
Princeton University	Models of Nutrient and Carbon Cycles in the Oceans.	J.L. Sarmiento	155
Scripps Institution of Oceanography	Development of a 3-D Model of the Natural Carbon Cycle in the Ocean and its Perturbation by Anthropogenic Carbon Dioxide.	R.B. Cacastow	149
Woods Hole Oceanographic Institution	Organic Geochemistry of Outer Continental Margin and Deep Ocean Sediments.	J.W. Farrington J.K. Whelan	223
	Development of Provisional Siting Guidelines.	B. Tucholke	6
Lamont-Doherty Geologic Repository	Site Assessment for Deep-Sea Waste Repositories.	D. Hayes	153

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Oregon State University	Development and Verification of Complex Models for Site-Performance Predictions.	N. Pisias	114
Sandia National Laboratories, Albuqueruqe			954
Texas A&M University		W. Bryant	26
Oceano Instruments, Inc.	Development of Tools to Identify and Quantify Sediment Properties. Barrier assessment for isolated wastes within the deep-sea sediments.	A. Driscoll	18
University of Rhode Island		M. Leinen	72
Mound Laboratory	Studies of the Thermal Response of the Waste Package.	E. Johnson	60
Naval Oceanographic Research Development Activity		R. Bennett	150
Sandia National Laboratories, Albuquerque		L. Mondy	803
Scripps Institute of Oceanography		G. Shor	300
University of Rhode Island		A. Silva	105
University of Washington Applied Physics Laboratory		L. Olson	500
Sandia National Laboratories, Albuquerque	Studies of Waste-Package Interactions with the Clay Sediments.	R. Diegle	160
Sandia National Laboratories, Albuquerque	Studies of Interactions Between Near-Field Sediments and Radionuclides.	J. Krumhansl	
University of Minnesota		W. Seyfried	
Woods Hole Oceanographic Institute		F. Sayles	

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Argonne National Laboratory	Studies of Interactions Between Far-Field Sediments and Radionuclides.	F. Schreiner	125
Woods Hole Oceanographic Institute		G. Sayles	92
Sandia National Laboratories, Albuquerque			366
Arizona State University	Studies of Sediment Response to Intrusion of Waste Package.	W. Houston	48
Cornell University		P. Dawson	10
Sandia National Laboratories, Albuquerque		D. McTigue	322
University of Rhode Island	Engineering Emplacement of Waste Canisters into Deep-Sea Sediments.	A. Silva	40
	In Situ Assessment of Sediment Characteristics.	A. Driscoll	940
Sandia National Laboratories, Albuquerque	Development and Performance of Field Tests to Emplace Wastes in Deep-Water Sediments.	S. Burchett	600
	Environmental Studies To Assess Impacts of Subseabed Disposal.		
Harvard Unversity	Physical Oceanography of Deep-Sea Environments.	A. Robinson	40
Oregon State University		J. Dymond	248
Sandia National Laboratories, Albuquerque			485
State University of New York		J. Cochran	50
University of Rhode Island			202
University of Washington		S. Riser	15
Woods Hole Oceanographic Institute		H. Livingston	75

OCEAN GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Sandia National Laboratories, Albuquerque	Biological Oceanography of the Worlds Oceans.		125
Scientific Information Management, Inc.		D. Jackson	140
Scripps Institute of Oceanography		R. Hessler A. Yayanos	645
Oregon State University		K. Smith	125
Applied Physics Corporation	Environmental Modeling of Radionuclide Transfer from Wastes to Management.	J. Garner	108
Florida State University		G. Weatherly	20
Sandia National Laboratories, Albuquerque	Radiological and safety studies of the subseabed emplacement concept.	D. Deitrich	552
Technadyne Engineering Consultants		W. Simmons	255
G_2vanTsl, Inc.	Prediction of the Effectiveness of the Subseabed Disposal System.	G. Hertel	108
Massachusetts Institute of Technology		H. Marcus	22
Sandia National Laboratories, Albuquerque	Performance Assessments of the Total Systems Engineering.	A. Treadway	205
The Analytic Sciences Corporation		C. Koplik	300
University of California, Los Angeles	Distribution and Fate of Biogenic and Petroleum-Derived Substances in Marine Sediments.	I. Kaplan	95
	Program of Mineralization and Cycling in Marine Systems: Organic Geochemistry and Particulates and Sediments.	I. Kaplan	91

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Columbia University	Transport and Transfer Rate in Waters of the Continental Shelf.	P.E. Biscaye	1,092
University of Georgia	Production and Turnover of Suspended Organic Detritus in the Coastal Water of the Southeastern Continental Shelf.	L.R. Pomeroy	100
Lawrence Livermore National Laboratory	Environmental Behavior of Radionuclides in the Marine Environment.	V.E. Noshkin	360
Oregon State University	The Role of Zooplankton and Micronektron in the Cycling and Remineralization of Chemical Materials in the Southern California Bight.	L.F. Small C.A. Huh	87
Scripps Institution of Oceanography	Sources and Composition of Organic Materials in Waters and Sediments of the Southern California Coastal Zone.	P.M. Williams	122
	The Flux and Recycling of Reactive Substances in the Surface Sediments of the Deep Basins Off Southern California.	R.A. Jahnke	53
Skidaway Institute of Oceanography	Trace Metal Geochemistry of South Atlantic Bight.	H.L. Windom	132
Woods Hole Oceanographic Institute	The Oceanic Geochemistry of Natural and Artificial Radionuclides.	E.R. Sholkovitz	100
	Distribution of Some Chemical Elements Between the Dissolved and Particulate Phases in the Ocean.	D.W. Spencer M. Bacon	154

SPACE AND SOLAR/TERRESTRIAL GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Charged Particle and Radiation Effects on Satellites.	D.N. Baker	250
	Space Aerosols.	I.B. Strong	50
	Energy Transport in Space Plasma.	S.P. Gary W.C. Feldman	
	Electrodynamical Aspects of the Solar Wind-Magnetosphere Interaction.	E.W. Hones, Jr. J. Birn	
	Theory of Energetic Particle Acceleration and Precipitation in the Terrestrial Magnetosphere.	D.N. Baker	
	Calculations in Support of Modeling/ Modeling of Magnetosphere.	S.P. Gary D.N. Baker	20
Pacific Northwest Laboratory	DOE Insolation. Aeronomy Studies: Insolation Studies, Aeronomy Studies.	J.J. Michalsky W.W. Kleckner	350
University of Arizona	Solar Variability Observation Through Changes in Solar Figure & Mean Diameter.	H.A. Hill	121.2

HYDROLOGICAL GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Argonne National Laboratory	Behavior of Transuranic Elements in Natural Waters.	D.M. Nelson W.R. Penrose	422
Columbia University	Plutonium, Cesium, and Uranium Seri Radionuclides in the Hudson River Estuary and Other Environments.	H.J. Simpson	60
Louisiana State University	Microseismic monitoring, subsidence measurement, and water and air quality monitoring.	C. Groat	464
University of Arizona	Numerical Modeling of Groundwater Flow and Water Quality at Underground Coal Gasification Sites Model.	D. Contractor	52
U.S. Army Corps of Engineers (Vicksburg)	Develop Conceptual Research Designs and Design Parameters for Physically Modeling Retorted Shale Interactions in the Disposal Site; Hydrology, Hydrogeology, and Climatic and Geologic Regimes.	W.E. Strohm, Jr.	98
Institute of Mining and Mineral Research, University of Louisville	Through Laboratory Studies, to Provide Data on Leachate Formation Mechanisms and Also Data on Disposal Strategies Through Field Leaching Studies.	T. Robl	150*
Pacific Northwest Laboratory Office of Civilian Radioactive Depository	HYDROCOIN Flow Code Benchmarking. Participation in international effort at benchmarking mathematical models and computer codes used to simulate ground-water flow.	A. Brandstetter	99

* FY 1984 Funds

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Pacific Northwest Laboratory (Continued)	Area Scoping Performance Analyses. Performance of scoping postclosure analyses and formulation of preliminary hydrogeologic conceptual models of ground-water flow and radionuclide transport for areas under study.	J. Doesburg	215
	Canadian Performance Assessment Cooperation Evaluation of a ground-water flow computer code CEEST, using data From AECL research in Canada, and evaluation of two Canadian computer codes, SYVAC and MOTIF, as to their applicability to the U.S. Crystalline Repository Project.	A. Brandstetter	0
	Performance Assessment Strategy and Model Development. Identification and development of groundwater flow and radionuclide transport codes and the evaluation of initial geochemical and waste-package codes.	A. Brandstetter	205
Ohio State University	Fossil Natural Analog Study. Determination of radionuclide mass transport in a hydrothermal system in crystalline rock, evaluation of the parameters affecting transport under natural conditions, and evaluation of of mineral migration characterizing by Laboratory Techniques.	R. Goodman	60

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Lawrence Berkeley Laboratory	Critical Behavior of Ionic Systems. Thermodynamics of high pressure brines related to geologic methane reservoirs.	K. Pitzer	138
	High-Pressure Phase Equilibria in Hydrocarbon-Water (Brine) Systems. Thermodynamics of high pressure brines related to geologic methane reservoirs.	J.M. Prausnitz	75
Los Alamos National Laboratory	Actinide Chemistry in Near-Neutral Solutions. Actinide chemistry under conditions found in groundwaters.	T.W. Newton	27
Oak Ridge National Laboratory	Basic Aqueous Chemistry in Near-Neutral Solutions. Actinide chemistry under conditions found in groundwaters.	T.W. Newton	27
Florida State University	Research in Actinide Chemistry. Solution chemistry, including interactions with ligands found in groundwaters.	G.R. Choppin	2
Stanford University	Fundamental Studies of Flow and Instabilities in Porous Media. Transport of viscous fluids through porous media related to secondary oil recovery.	G.M. Homsy	25
Lawrence Livermore National Laboratory	Modeling of Fluid-Flow Through Porous Rocks.	T. Buscheck	150

HYDROLOGICAL GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
U.S. Geological Survey	Stream Flow. To predict flood and debris-flow hazards at Yucca Mountain.	P. Glancy	83
	Geochemical Monitoring for Interpretation of the Effects of Production on Geothermal Reservoirs. Observation of the geochemical aspects of geothermal reservoir depletion.	A. Truesdell	30
	Ground-Water Flow Analysis. To identify ground-water flow paths at Yucca Mountain and to develop an understanding of flow in fractured rock.	R. Waddell	695
	Saturated-Zone Hydrology. To develop a three-dimensional model of flow beneath Yucca Mountain; to determine the distribution of hydraulic head beneath Yucca Mountain; and to compile parametric data for hydrologic characterization and the saturated zone.	J. Robison	459
	Unsaturated-Zone Hydrology. To determine the water influx to the unsaturated zone beneath Yucca Mountain; to determine the moisture content of the unsaturated zone; to compile parametric data for characterization of the unsaturated zone; and to develop a conceptual model of unsaturated-zone hydrology.	P. Montazer	1,284
	Future Ground-Water Conditions. To assess Quaternary hydrologic conditions in the Yucca Mountain region as a basis for predicting future conditions.	J. Downey	98

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory	Ground-Water Chemistry. To determine the composition of ground-water in and near Yucca Mountain; to model the groundwater composition along flow paths from the repository to the accessible environment before and after waste emplacement; to develop a model of Eh and pH buffering capacities of the tuff/water/air system; to estimate the effects of particulate transport for waste elements in the saturated zone of Yucca Mountain on total transport and retardation; and to demonstrate in a field test the overall retardation of waste elements in the saturated zone.	A. Ogard	469
	Natural Isotope Chemistry. To determine the distribution of naturally occurring radioactive materials at Yucca Mountain as part of the work to characterize the infiltration of precipitation, the velocity of water movement through the unsaturated zone, and the retardation of radionuclide transport.	A. Norris	63
	Dynamic Transport Process. To determine the rate of movement of radionuclides along the potential flow paths at Yucca Mountain to the accessible environment and to examine the effects of diffusion; absorption, dispersion, anion exclusion, sorption kinetics, and colloid movement in the flow geometrics and hydrologic conditions in the scenarios to be used in performance assessment of the proposed repository.	R. Rundberg	433

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Los Alamos National Laboratory (Continued)	Applied Diffusion. To conduct field experiments to determine whether the results of laboratory-scale diffusion measurements can be extrapolated accurately to predict the rates of aqueous transport of such nonsorbing radioactive waste species as pertechnetate and iodine-129 under the conditions at Yucca Mountain.	A. Norris	221
Sandia National Laboratories Albuquerque	Water Migration Analysis. To determine the mechanisms of water movement when the proposed repository is under a thermal load from the emplaced waste and to determine water fluxes and pathways to be used in radionuclide-transport analyses.	E. A. Klavetter	429
Lawrence Berkeley Laboratory	Non-Isothermal Reservoir Dynamics.	C.E. Tsang, et. al.	95
	Thermodynamics of High Temperature Brines.	K.S. Pitzer	100
Los Alamos National Laboratory	Thermodynamic Properties of Aqueous Solutions at High Temperatures and Pressures.	P.A. Rogers & C.E. Holley	110
Rockwell Hanford Operations	Hydrogeologic Investigations. Evaluate the ground-water flow system of the Hanford Site using physical hydrologic techniques to determine the feasibility of siting a repository in the basalts underlying the Hanford Site, Washington.	S.M. Baker	1,500

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Pacific Northwest Laboratory	Site Performance Assessment Support. Support for long-term site modeling, including effects of climate changes and other natural processes on ground-water system.	P. Eddy	250
S. S. Papadopulos & Associates, Inc.	Hydrogeologic Testing Plans. Preparation of hydrogeologic testing plans for hydrologic characterization of the Permian Basin leading to the identification of potentially acceptable sites for a geologic repository.	S.S. Papadopulos	0
Los Alamos National Laboratory	Hydrologic Transport in Southwestern Ecosystems.	E. Springer	300
Oak Ridge National Laboratory	Hydrologic Transport of Trace Elements in Contrasting Watersheds.	R. Luxmoore	275
	Biogeochemical Transport Processes and Modeling.	C. Francis G. Yeh	475
	Experiments Using Natural Dissolved Organic Matter in the Subsurface.	J. McCarthy	150
Pacific Northwest Laboratory	Aqueous/Nonaqueous Fluid Dynamics in Groundwater.	W. Nelson, C. Simmons Streile	150
Massachusetts Institute of Technology	Groundwater Transport of Colloidal Microparticles and Organic Macromolecules.	P. Gschwend	75

HYDROLOGICAL GEOSCIENCES

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Clarkson University, Notre Dame	Multisolute Subsurface Transport Modeling.	T. Theis	80
Princeton University	Hydrophysical Transport of Nonaqueous Organic of the Southeastern Continental Shelf.	G. Pinder	80
Yale University	Fate of Nuclides in Natural Water Systems.	K.K. Turekian	83
Los Alamos National Laboratory	Hot Dry Rock System Flow Tests. Evaluation of fractured reservoir through three flow tests and data analysis.		107
	Reservoir Thermal and Fluid-Dynamic Modeling and Analysis.		925
	Reservoir Geochemical Processes. Conduct studies to detect downhole deposition of silica scale.		346
Lawrence Berkeley Laboratory	Migration of Injected Fluids. Development of mathematical methods for predicting and analyzing the flow of fluids, chemical species, and heat resulting from injection.	K. Pruess G. Bodvarsson	100
	Fluid Compositional Effects on Injection. Development of a description of thermophysical properties of fluid mixtures for incorporation into computer codes modeling transport processes in geothermal reservoirs.	K. Pruess S. Benson	95

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Idaho National Engineering Laboratory	Fundamental Transport Processes of Injected Brine. Validation of numerical models and analytical methods to evaluate fluid flow through fractured and porous rocks.	L. Hull T. Clemo	170
	Field Testing of Tracers and Instrumentation. Injection tests to gather data for validation of models.	S. Steiger L. Hull	90
University of Utah Research Institute	Tracer Analysis of Injected Fluid Flow and Development of New Tracers.	J. Moore	200
Stanford University	Analysis of Tracer Returns to Determine Fluid Flow Path.	R. Horne J. Gudmundsson	200
Lawrence Berkeley Laboratory	Field Case Studies. Measurement and analysis of reservoir response to production and development of field models.	S. Benson M. Lippmann	100
	Fault and Fracture Mapping. Development of geophysical techniques to locate and map faults and fractures.	N. Goldstein E. Majer	250
Stanford University	Reservoir Determination from Well Test Analysis. Determination of reservoir size with the effect of compressibility in two-phase systems, from pressure-transient analysis of double-porosity systems, and from analysis of well-test anisotropy.	H. Ramey W. Brigham	200

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Stanford University (Continued)	Application of Reservoir Analysis Techniques to Field Data. Development of a lumped-parameter model to predict depletion, and analysis of flashing flow in fractures.	R. Horne S. Sageev	100
Los Alamos National Laboratory	Develop Downhole Fluid Sampler to Operate in Hostile Brine Environment and Collect Fluids at Formation Temperature and Pressure Conditions.	F. Goff B. Dennis	60
Idaho State, Department of Water Resources	Geothermal Reservoir Analysis of Twin Falls County. Fluid pressure measurements in production and injection wells.	L. Street	60
Rockwell Hanford Operations	Hydrochemical Investigations. Evaluate the ground-water flow system of the Hanford Site using hydrochemical techniques; characterize the radionuclide reactivity in the same flow system to determine the feasibility of siting a repository in the basalts underlying the Hanford Site, Washington.	S.M. Baker	1,240
U.S. Geological Survey	Geochemical Monitoring for Interpretation of the Effects of Production on Geothermal Reservoirs. Observation of the geochemical aspects of geothermal reservoir depletion.	A. Truesdell	30

INSTITUTION	TITLE/PROJECT DESCRIPTION	PRINCIPAL INVESTIGATOR	FY 1985 FUNDING (IN THOUSANDS)
Pennsylvania State University	Energy-Based Runoff and Erosion Potential Analysis with High Resolution Digital Remote Sensing Techniques.	R. Eyton	114(1)
	Hydrologic-Ecologic Research Experiments on Watersheds in Alaska, Nevada-Arizona and Pennsylvania.	G. Petersen	200(2)
University of Arizona	International Congress-Hydrology of Low Permeability Rocks.	G. Simpson	15
Purdue University	Simulation of Water-Organic Chemical-Clay Systems Using Supercomputers.	J. Cushman	178(1,3)

(1) Multiyear university grants with estimated annual contribution.

(2) Consolidated project title and budget estimate are shown. Includes several remote sensing experiments as a part of multidisciplinary research in watersheds. Remote sensing conducted as part of ecological research using new or advanced technologies, with attention to hydrologic-ecologic interactions using National Laboratory-University consortia or multi-university associations.

(3) Representative of hydrogeochemical research with a component applicable to hydrologic transport.

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