TECHNICAL ASSISTANCE

Experimental Practices

During the fiscal year OSM continued to monitor various research and development projects and initiated a new project designed to improve mine operations and reclamation state-of-the-art for state and industry use. Among the nine projects is an experimental practice using gravity transport techniques for spoil material from an upper seam to a lower bench for distribution in horizontal layers in the final fill position. Another project deals with development of an industrial area on top of a valley fill. Studies relating to soil horizon mixing to increase crop productivity, revegetation of a slurry pond without soil cover and several innovative methods of excess spoil fill construction were continued.

Small Operator Assistance

The Small Operator Assistance Program (SOAP) which was originally scheduled to take effect during the permanent regulatory program was initiated early so data collection and analysis could be completed to allow permit applications to be submitted within the time tables for the permanent regulatory program. By the end of the fiscal year, 782 operators applied for assistance and 648 were approved.

Data collection, analysis, and interpretative reports required in the operator's permit application are supplied by qualified laboratories under contract to the regulatory authorities. During the fiscal year, 420 SOAP contracts were awarded totaling about $10.5 million.

In line with the regulations which delegate SOAP responsibility to states, 15 states were operating their own programs and awarded contracts with qualified laboratories totaling $9.5 million.

Experimental Practices

STATE	DESCRIPTION	REGULATIONS AFFECTED	DATE APPROVED
COLORADO	Construction of an excess spoil fill with no under-drives and using 100-foot lifts of material.	816.71-.73	Pending
ILLINOIS	Mixing and soil drainages to improve overall crop productivity.	816.21, .24, .100, 816.101, and .102	11/13/79
ILLINOIS	Reclamation of a slurry pond by vegetation instead of soil cover.	816.103	7/17/81
KENTUCKY	Gravity transport of spoil material from an upper seam to a lower bench prior to rehandling in the construction of an excess spoil fill.	816.71, .74	7/11/81
KENTUCKY	Develop an industrial area on top of a hollow fill. Partial highwall retention is part of this experimental practice to provide a spoil source.	816.102	1/12/82
OHIO	Construction of excess spoil fill using an up-stream construction technique. Four sites, each with different characteristics are being constructed.	715.15(a)(7)	8/13/80

EXPERIMENTAL PRACTICES

Small Mine Operator Assistance Program: Grants To States
(in dollars)

STATE	ADMINISTRATION GRANTS		OPERATIONAL GRANTS	
	FY 1980	FY 1981	FY 1980	FY 1981
ALABAMA	33,172	118,100	2,500,000	0
ARKANSAS	20,798	0	49,525	0
COLORADO	29,182	0	0	240,000
ILLINOIS	0	20,000	312,000	300,000
IOWA	4,000	0	63,040	0
KANSAS	10,500	0	0	0
KENTUCKY	0	296,205	7,700,000	0
MARYLAND	35,000	0	300,000	200,000
MISSOURI	0	0	0	138,000
MONTANA	13,783	0	57,335	0
NEW MEXICO	0	0	0	100,000
OHIO	65,783	90,151	2,500,000	0
OKLAHOMA	0	15,000	0	0
VIRGINIA	69,138	138,765	325,000	609,000
WEST VIRGINIA	0	0	1,633,862	4,000,000
TOTAL	81,356	678,221	15,440,762	5,587,000

RESEARCH & MINERAL INSTITUTES

Research

The Applied Research Branch deals with problems and issues confronted mainly by two program elements, namely, a regulatory program and an abandoned mine program. To accomplish the objectives of these programs, the research program has been organized to (a) initiate short-term research projects; (b) develop and improve cost-effective reclamation technologies and (c) ensure interagency research coordination. The magnitude of the research program has averaged about $2 million dollars a year between 1978 and 1981.

The applied research program is concerned mainly with these areas: geotechnical problems to develop alternative and more cost-effective methods for design and construction of engineering structures such as sedimentation ponds, valley fills, and coal waste embankments; environmental issues such as control of mine water discharge and coal waste leachate; monitoring procedures for surface and ground water, fish and wildlife, and revegetation success; and reclamation methods including revegetation techniques and native species selection.

The inception of regulatory reform in 1981 to emphasize the performance standards and provide flexibility for design and reclamation techniques has created a great demand for technical guidance in the implementation of regulatory programs. Consequently, the emphasis on the research program has been redirected to include the development of technical handbooks, manuals, and alternative approaches to assist the industry and states in achieving regulatory compliance. Areas which are and will be studied include backfilling and grading, excess spoil disposal, access roads, sedimentation ponds, prime farmland, alluvial valley floors, highwall stability, and hydrologic consequences of mining.

Mineral Institutes

The Mining and Mineral Institutes Branch continued grant support of various research and development projects with 31 leading colleges and universities across the country under the Mining and Mineral Institute program. These institutions were responsible for conducting approved research efforts and demonstration projects that relate to mining and mineral development activities impacting such resources as recreation, biological values, and related ecosystems. The program is also responsible for training scientists and mineral engineers in mining and mineral-related resource fields. At the end of the fiscal year these activities were transferred from OSM to the Bureau of Mines as part of an agreement between the two agencies.

Applied Research Initiated & Completed In FY 1981

Three applied research projects were completed in fiscal year 1981 using OSM funding.

The first project entitled, "Mineral Planning in Great Britain and its Relevance to the American Mining Industry" was funded with $7,497 from the fiscal year budget.

The project revealed that British mining permits are granted within a much broader system of land use control than is practiced in the United States. The British system operates through planning authorities that consider the definite life of mining and the merits of postmining land use schemes.

The primary objections to mining are loss of a mature landscape and the loss of agricultural productivity. In many ways, Great Britain's planning systems are set up to minimize permanent loss of agricultural land to development.

The second project completed during the fiscal year using OSM funds was a $9,000 project establishing a Field Institute on Western Energy Opportunities, Problems, and Policy Issues.

The institute is conducted by the Colorado School of Mines during the August congressional recess for approximately 40 selected aides for the congressional and executive branches of the federal government. The five-and-one-half day institute sessions begin at the school with an introduction to western energy issues and is followed by a five-day field trip to energy sites which reflect current energy issues and problem areas. U.S. Department of the Interior sponsors include the Bureau of Mines, the Office of Surface Mining, the Bureau of Land Management and the U.S. Geological Survey.

The third applied research project completed during the fiscal year required an expenditure of $14,300 from OSM's budget for a project, "Study on Disposal of Excess Spoil."

This research effort consisted of a nationwide review of engineering practices and physiographic and environmental conditions which have an impact on the disposal of excess spoil for surface and underground coal mining.

New And Continuing Applied Research Projects

(in dollars)

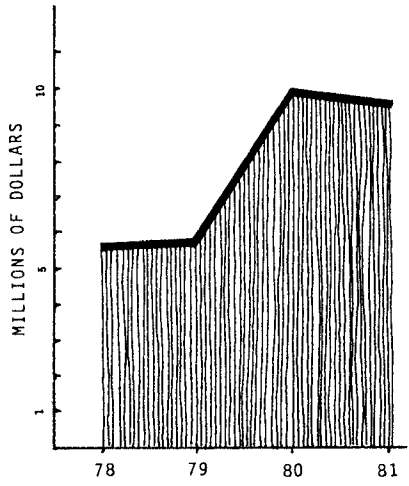
TITLE	FY 1981 FUNDING	FISCAL YEAR OF FINAL FUNDING	COMPLETION DATE
Development of Post-mining Land Reclamation Opportunity Handbook	62,000	1981	6/82
Qualification of the Efficiency of Alternative Sediment Measures	88,409	1981	6/82
Development of Design Manual for Backfilling and Grading of Surface Coal Mine Areas	76,424	1981	10/82
Development of Environmental and Design Manual for Disposal of Excess Coal Mine Spoil	79,300	1981	3/82
Assessment of Technology for Coal Mine Roads	37,565	1981	4/82
Coal Water Leachate Problems (MOD)	12,856	1981	3/82
Assessment of Topsoil Fertility at Reclamation Sites in the United Kingdom and West Germany in Comparison	9,562	1981	12/82
Design Manual for Diversion on Surface Mining	5,030	1981	1/82
Approval Criteria for Final-Cut Lakes	16,295	1981	1/82
Development of a Management Goal for Line Managers to Optimize Inspection Personnel Productivity	12,000	1981	12/81
Affects of Drill Stem Grease on Overburden Samples	18,620	1981	10/82
Collection of Representative Coal Refuse Samples for Leachate Generation Studies	45,767	1981	9/82
Highwall Stability Analysis	24,192	1981	9/82
Hydrologic Connection between Surface Waters and Ground Waters in the Carbondale Group of Indiana Counties	25,594	1981	9/82
Development of Diversion Manual	9,740	1981	1/82
Coors Ridge Mining Demonstration	71,673	1979	3/83
Evaluation of Methods of Handling Toxic Materials	85,000	1980	3/82
Study of Environmental Effects of Valley Fill Versus Abandoned Bench Storage of Initial Cut Spoil Material	44,088	1981	6/82

Interagency Research Projects

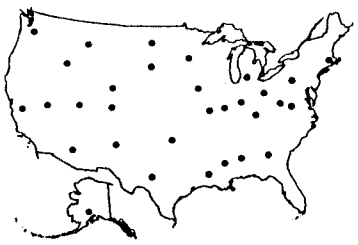
PROJECT TITLE	COOPERATING AGENCIES	FY 1981 FUNDING (DOLLARS)	OSM FUNDING TO COMPLETE (DOLLARS)	ESTIMATED COMPLETION DATE
Tug Fork Watershed Hydrologic Study	USGS	97,050	0	4/85
Federal High-altitude Photography Program	USGS	95,000	190,000	12/84
Wetland Identification and Management Criteria for the Western Kentucky Coal Field	FWS	16,000	0	12/82
Update of "Coal and the Environment Abstract Series"	EPA/BCR	35,000	0	9/82
Stoney Fork Coal Hydrology Study	USGS	40,000	0	9/87
Soil Conservation Service Plant Materials Studies to Identify Plant Associations Suited to Coal Mine Reclamation	SCS/USDA	92,000	184,000	12/84
Detailed Design and Demonstration of Underground Disposal of Coal Mining Waste	USBOM	400,000	0	9/83
Establishment of Cooperative Statewide Fish and Wildlife Species Information System	FWS	400,000	0	9/82
Thermal Infrared Data of Centralia, Pa.	EPA	8,000	8,000	12/81
Sediment/Hydrology on 18 Small Watersheds of the Appalachian Plateau of Maryland, Pennsylvania, and West Virginia	TVA	225,000	0	10/84
Mine Operators Manual for Describing Site-Specific Hydrologic Conditions	USGS	250,000	0	12/82
CORE Program Support	NASA	55,000	55,000	9/82
Optimum Moisture Requirements for the Establishment of Natural Species on Top Soiled Coal Mine Spoils in the Four Corners Area of New Mexico	USGS/USDA	168,000	280,000	12/82
Ground Water (Georgia)	TVA	48,000	0	9/82
TOTAL		1,929,050	717,000	

Mineral Institutes FY 1981 Grants (in dollars)

INSTITUTE	ALLOTMENTS	SCHOLARSHIPS & FELLOWSHIPS	RESEARCH
University of Alabama	110,000	0	200,063
University of Alaska	82,500	0	53,541
University of Arizona	82,500	0	302,492
University of California	82,500	0	280,122
Colorado School of Mines	82,500	0	248,714
Georgia Institute of Technology	110,000	160,000	67,798
University of Idaho	82,500	0	49,656
Southern Illinois University	82,500	0	608,707
Purdue University	82,500	160,000	207,285
Iowa State University	82,500	160,000	50,948
University of Kentucky	110,000	0	379,536
Louisiana State University	110,000	160,000	72,510
Massachusetts Institute of Technology	82,500	0	227,183
Michigan Technological University	110,000	0	270,123
University of Minnesota	82,500	0	105,488
University of Mississippi	82,500	0	104,789
University of Missouri-Rolla	82,500	0	69,734
Montana College of Mineral Sci. & Tech.	82,500	0	244,046
University of Nevada-Reno	110,000	160,000	48,515
New Mexico Institute of Mining and Tech.	82,500	0	223,763
University of North Dakota	110,000	160,000	54,760
Ohio State University	82,500	0	146,605
University of Oklahoma	82,500	0	54,027
Pennsylvania State University	82,500	0	401,694
South Dakota School of Mines and Tech.	110,000	160,000	71,970
University of Texas-Austin	82,500	0	44,077
University of Utah	82,500	0	250,586
Virginia Polytechnic Institute	110,000	160,000	197,003
University of Washington	110,000	160,000	29,184
University of West Virginia	82,500	0	120,721
University of Wyoming	82,500	0	14,370
TOTAL	2,860,000	1,440,000	5,300,000



FY 1978 - 1981 MINERAL INSTITUTES APPROPRIATIONS


MINERAL INSTITUTES

Mineral Institutes Research Projects

SCHOOL/LOCATION	PROJECT TITLE
University of Alabama University, Alabama	Surface Mining Blasting Effects on Underground Coal Mine Stability
University of Alaska Fairbanks, Alaska	Streamflow Estimation for Surface Mining in Northern Regions
University of Arizona Tucson, Arizona	Characterization and Processing of Coal-Fired Copper Reverberatory Flue Ground and Air Vibrations from Blasting
University of California Berkeley, California	Improvements of the Performance of Copper Electrowinning in Fluidized Bed Processing Mineral Fines by Column Flotation Role of Rock-Fluid Reactions in the Recovery of Petroleum
Colorado School of Mines Golden, Colorado	Use of Surfactants to Improve Oil Recovery Revegetating Disturbed Areas to Protect the Environment
Georgia Institute of Technology Atlanta, Georgia	Structural Location and Role of Hydrogen Ions in Kaolinite and its Products in Aluminum Removal
Southern Illinois University Carbondale, Illinois	Stable Isotope Variations in Coals and Associated Mineral Matter Coal Fines Recovery and Utilization Ground Water Leachate of Pyrite Coal Mine Spoils and the Effects on Water Reserves Productivity of Parent Materials on Mined Prime Farmlands Using Alternate Sources of Organic Materials Compared to Topsoil Replacement

YEARS IN PROGRESS/ TOTAL ESTIMATED DURATION	FY 81 FUNDS	TOTAL THOUGH FY 81
1.5/3	$273.565	$398,186
1/2	49,665	103,206
1/2	33,094	69,876
1/2	76,415	201,691
1/2	34,770	108,981
1/2	38,757	91,038
1/3	88,527	145,977
1/2	60,096	137,004
1/3	59,884	193,738
1/3	115,908	183,706
3/3	49,286	154,576
3/3	76,072	292,973
3/3	28,987	151,987
2/3	129,088	199,873

Mineral Institutes Research Projects -continued-

SCHOOL/LOCATION	PROJECT TITLE
Purdue University West Lafayette, Indiana	Applicability of the Universal Soil Loss Equation to Reclaimed Surface Mine Area Concurrent Establishment of Ground Cover and Hardwood Trees on Reclaimed Mineland and Unmined Reference Sites
Iowa State University Ames, Iowa	Conditions of Soil Compactation on Mineland and Their Response to Deep Tillage
University of Kentucky Lexington, Kentucky	Enhanced Suspended Solids Removal in Surface Mine Sediment Ponds Using Chemical Flocculating Agents Nursery Techniques for Production of Free Seedlings Infected with Specific Mycorrhizal Fungi for Surface Mining Reclamation Erodibility and Sediment Yield from Surface Mine Spoil and Reconstructed Topsoil Development of Models for Simulating Stormwater Runoff for Surface Coal Mined Lands The Environmental Consequences of Burial Depth of Toxic Spoils and of Excessive Compection of Prime Land in the Growth of Plants
Mining and Mineral Resources Research of the Massachusetts Institute of Technology Cambridge, Massachusetts	Combined Stability-Deformation Analysis for Rock Slopes in Open Pit and Strip Mines The Competitive Position of the United States Copper Industry: 1980-2000 Fast Fluidized Beds in Minerals Processing
Michigan Technological University Houghten, Michigan	Elastic Stress Wave Propagation in Underground Hardrock Mining The Development of Guidelines for Closing Underground Mines

YEARS IN PROGRESS/ TOTAL EST. DURATION	FY 81 FUNDS	TOTAL THROUGH FY 81
2/3	$262,602	$403,477
2/3	117,529	183,939
2/3	43,133	94,081
2/2	34,404	115,277
3/3	57,206	261,752
3/3	47,935	170,189
3/3	26,719	96,312
2/3	43,600	83,567
2/3	45,508	100,361
2/3	108,861	168,480
2/2	39,575	89,185
2/2	47,452	112,941
2/2	41,928	131,265

Mineral Institutes Research Projects
-continued-

SCHOOL/LOCATION	PROJECT TITLE
University of Mississippi University, Mississippi	An Evaluation of the Engineering Properties and Lignite Resources of Wilcox Group (Lower Eodene) in Mississppi, West Virginia, Tennessee, and Alabama
University of Missouri-Rolla Rolla, Missouri	Fluid Cavitation as a Rock Crushing and Fragmentation Tool Autoclaved Lime-Aluminsilicate Mineral for Alumina Extraction and Construction Determination of the Washability and Flotation Characteristics of Missouri Coal Seams
University of Nevada Reno, Nevada	Geochemical Exploration for Precious Metals Using Mn/Fe Oxide Joint Coatings Elucidation of the Fundamental Chemistry and Recovery of Gold from Carbonaceous Ore Bodies
New Mexico Institute of Mining and Technology Socorro, New Mexico	Gases in Hydrous Alteration Minerals: An Exploration Tool for Ore Deposits Radionuclide and Heavy Metal Distribution in Recent Sediments of Major Streams in the Grants Mineral Belt Extraction of Radionuclides from Lowgrade Ores and Mill Failings
University of North Dakota Grand Forks, North Dakota	Mineral Resources Potential Problems Associated with Mining of Cenozoic Rocks of the Williston and Powder River Basins, Northern Great Plains
Ohio State University Columbia, Ohio	Fracture Mechanics and Structural Resource Investigations Associated with Energy Recovery Automated Blast Hole Logging and Design Characterization of Limestone in Ohio

YEARS IN PROGRESS/ TOTAL EST. DURATION	FY 1981 FUNDS	TOTAL THOUGH FY 81
2/2	$ 89,772	$ 194,561
2/2	43,490	98,543
2/2	31,075	71,657
2/2	46,160	105,102
2/2	17,566	66,081
2/3	90,939	144,760
2/3	62,126	98,177
2/2	33,784	75,702
3/3	59,495	224,426
2/2	141,768	196,528
3/3	36,097	134,324
2/3	23,987	124,711
2/3	38,769	126,329

Mineral Institutes Research Projects
-continued-

SCHOOL/LOCATION	PROJECT TITLE
University of Oklahoma Norman, Oklahoma	In Situ Mining of Bituminous Coal with Fluorinated Solvents
The Pennsylvania State University University Park, Pennsylvania	Processing of Dolomites for Refractory Applications Cobalt Behavior in Ammonia Leaching Systems Handbook for State and Local Taxation of Minerals Design Procedures for Coal Mine Tunnels Removal of Pyrite from Coal by Heap Leaching Development of a Procedure for Land Use Potential Evaluation for Surface Mined Land Control of Blackwater in Coal Preparation Plant Recycle and Discharge Point Defects in Hydrometellugical Process
South Dakota School of Mines and Technology Rapid City, South Dakota	Oxidation of Pyrite to Maghemite
University of Texas-Austin Austin, Texas	Rheology of Viscoelastic Fluids for Oil Recovery
University of Utah Salt Lake City, Utah	Ground Control in Multi-Level Room Pillar and Mining Air Sparged Hydrocyclone The Use of Coal Wastes for the Production of Alumina Modeling of Solution Mining Systems for Deep Mineral Resource Recovery

YEARS IN PROGRESS/ TOTAL EST. DURATION	FY 81 FUNDS	TOTAL THROUGH FY 81
2/2	$ 44,841	$ 98,868
2/3	79,281	129,638
2/3	86,548	143,542
2/3	19,989	61,464
3/3	37,832	131,728
3/3	27,520	128,895
3/3	39,776	132,458
3/3	31,694	128,007
3/3	40,435	138,173
2/3	23,834	95,804
3/3	34,213	128,887
2/2	30,588	69,448
2/2	63,592	151,150
3/3	33,036	120,614
3/3	53,390	190,943

Mineral Institutes Research Projects -continued-

SCHOOL/LOCATION	PROJECT TITLE
Virginia Polytechnical Institute and State University Blacksburg, Virginia	Ground Control Mechanisms in Multi-Seam Mining Computer Simulation of Mining Subsidence Using the Zone Area Method Applications on Image Processing for the Benefication of Fine-Grained Complex Sulfide Ores Probatilistic Modeling of Soil Loss From Surface Mining Areas
University of Washington Seattle, Washington	Catalysis of Chlorination Reactions
West Virginia University Morgantown, West Virginia	Development of Roof Control Criteria for Underground Long-wall Mining A Model for the Evaluation of Systematic Variabilities in the Composition and Thickness of High Sulpher-High Ash Coals

YEARS IN PROGRESS/ TOTAL EST. DURATION	FY 81 FUNDS	TOTAL THROUGH FY 81
2/3	$117,623	$193,863
2/2	72,098	198,698
2/3	91,164	174,274
2/3	25,128	55,291
2/2	23,801	52,985
2/3	57,362	105,542
3/3	57,540	218,644
TOTAL	$3,836,909	$8,890,445

FY 1982

Looking Ahead

A new and important role lies ahead for the new fiscal year for OSM as the states take over surface mining activities. The new OSM will be responsive to and closely in step with reclamation practices and other technical needs for every coal producing region. In less than two years, OSM will have ended four years of restrictive policies and will have progressed to the stage where the states and coal industry can concentrate on recovering coal in environmentally acceptable ways on an economically competitive basis.

The Director's View

In the words of OSM Director James R. Harris, "Our goals for the agency--Credibility, Cooperation and Compliance--are well on the road to realization."*

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*March 8, 1982; House Interior Insular Affairs Committee, Interior Energy Environmental Subcommittee.

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