

BUSINESS LINE: *TECHNOLOGY DEVELOPMENT AND TRANSFER*

| | | FY 2001 Enacted | Uncontrollable Costs | Program Change | FY 2002 Request | Difference from FY 2001 |
|----------------------------|----------|--------------------|-------------------------|-------------------|--------------------|-------------------------------|
| Regulation & Technology | \$\$\$ | 11,820 | 331 | 0 | 12,151 | 331 |
| | FTE | 117 | 0 | 0 | 117 | 0 |
| Abandoned Mine Land | \$\$\$ | 3,591 | 45 | 500 | 4,136 | 545 |
| | FTE | 16 | 0 | 0 | 16 | 0 |
| TOTAL | \$\$\$ | 15,411 | 376 | 500 | 16,287 | 876 |
| | FTE * | 133 | 0 | 0 | 133 | 0 |

Operational Processes (Program Activities): The Technical Training, Technical Assistance and Technology Transfer program activities enhance the technical skills that States and Tribes need to operate their regulatory and reclamation programs in order to effectively implement SMCRA. Thus, these program activities are an integral part of accomplishing the Environmental Restoration and Environmental Protection business lines to achieve their goals and outcomes.

THIS BUSINESS LINE SUPPORTS BOTH MISSION GOALS OF RESTORATION AND PROTECTION BY IMPROVING SERVICE TO OSM CUSTOMERS, PARTNERS AND STAKEHOLDERS, THROUGH OPEN COMMUNICATIONS, TECHNICAL TRAINING OPPORTUNITIES, TECHNICAL ASSISTANCE, AND THE TRANSFER OF TECHNOLOGY IN ORDER TO HAVE BETTER INFORMATION AND SKILLS TO MAKE DECISIONS

OSM provides technical training to OSM staff, States and Tribes on a variety of topics. New technologies, changes in regulations, and staff turnover necessitate the need for continued technical training. To solve problems related to the environmental effects of coal mining, OSM provides multi-disciplinary technical assistance and works with industry, States, Tribes and the public on technical issues arising from new regulations. Other technical assistance efforts include the Technical Information Processing System (TIPS), the Applicant Violator System (AVS), Electronic Permitting (EP), and the Small Operator Assistance Program (SOAP). Technology transfer is a major part of OSM's

cooperative effort with States and Tribes.

OSM's technology transfer program will continue its support for electronic permitting efforts, sponsoring interactive technical forums and workshops, providing a regional technical services library, and more efficient access to COALEX (a computer-assisted library search service).

Strategic Outcome: Knowledgeable Federal, State, and Tribal regulatory and reclamation staff to effectively implement SMCRA, supported by the technical training and assistance provided by OSM specialists.

Indicator Measures: Performance will be measured through the number of staff technically trained (including knowledge and skills taught and applied), the utilization of automated technologies (such as TIPS), and the quality and timeliness of technical assistance provided by OSM, determined via evaluations and customer service surveys.

Office of Surface Mining Reclamation and Enforcement

| Table 14: Strategic Measures and FY 2002 Measures | 2000 Actual | 2001 Enacted | 2002 Estimate |
|--|------------------------|-------------------------|--------------------------|
| <i>By 2005, OSM will attain a 90% customer satisfaction (or service) rate (quality, timeliness, and quantity) for efforts within this business goal.</i> | | | |
| In FY 2002, OSM will: | | | |
| C Attain a 90% customer satisfaction rate in the quality of our technical training. | 94% | 90% | 90% |
| C Attain a 90% customer service rate in the quality of our technical assistance activities. | 93.3% | 90% | 90% |
| C Attain a 90% customer satisfaction rate for technical training in the use of Technical Information Processing System (TIPS). | 89.7% | 90% | 90% |
| C Attain a 90% customer satisfaction rate in the quality of our technology transfer activities. | | | |
| C Train 900 students. | 98.5% | 90% | 90% |
| C Attain a 90% customer satisfaction rate in the quality and timeliness of Applicant Violator System (AVS) provided services. | 902 | 900 | 900 |
| | 97% | 90% | 90% |

Note: FY 2002 goals are lower than FY 2000 actual performance. FY 2000 data collection was a one-year snapshot. Therefore percentages have been adjusted to better reflect data that are representative of long-term actual customer service. We plan to maintain or improve on FY 2000 performance, but will wait to update performance goals until we have at least three years of customer service data.

Data Verification and Validation for Measures: Technical training measures are based on customer surveys already in place and readily available course attendance records. Measures of general technical assistance, technology transfer and AVS success will be based on customer surveys approved by OMB and in use in since early FY 1999.

The measures of this business line are varied, based on the diversity of activities involved in achieving this goal. The satisfaction of those customers with the quality and relevance of the technical assistance provided will be indicated by customer surveys and questionnaires. Other measures will include the number of times TIPS is used.

Actions Required to Achieve Annual Goals: In FY 2002, OSM plans to continue its efforts in this

business line. For example, as responses are received from the customer surveys, the activities within the business lines will be evaluated to identify any needed improvements or changes. Also, TIPS, the Mine Map Repository, and AVS will increase access to users by providing material on the Internet.

Resources, Skills, and Technology Needed: A goal for FY 2002 is to continue ensuring that States, Tribes, and OSM have the best available technical data and information needed to make good science-based decisions regarding mining plans, reclamation project design, permit reviews, and acid mine drainage remediation and prevention. To successfully implement the surface mining regulatory and reclamation programs, OSM, as well as the States and Tribes, must maintain multi-disciplinary staffs that are fully competent in addressing a wide variety of technical issues that impact these programs.

The FY 2002 President's Budget requests \$10.9 million for Technical Assistance (including the Applicant Violator System, of which \$1.5 million is for the Small Operators Assistance Program; \$2.2 million for Technical Training; and \$3.1 million for Technology Transfer efforts to meet the annual goals set forth above.

Included in the FY 2002 President's budget request for Technical Transfer is \$200,000 for the Acid Drainage Technology Initiative (ADTI), an ongoing effort of OSM, State and other Federal agencies, academia, and industry as part of the Clean Streams Program. The objectives of the ADTI are to compile, assess, and document the "best-science" technology solutions to acid mine drainage (AMD) reclamation problems as well as to refine the most effective methods for accurate AMD prediction.

The following section details, by program activity, the funding and FTE resources required to meet the annual performance measures. It also includes examples of the types of technical training, assistance efforts, and transfer activities provided by this business line.

Office of Surface Mining Reclamation and Enforcement

Table 15 - Justification of Program and Performance
Technology Development and Transfer
 Summary Increases/Decreases for FY 2002
 (Dollars in Thousands)

| Program Activity | | Regulation & Technology | | Abandoned Mine Lands | | Total | | Inc/Dec |
|----------------------|--------|-------------------------|--------|----------------------|-------|--------|--------|---------|
| | | 2001 | 2002 | 2001 | 2002 | 2001 | 2002 | |
| Technical Assistance | \$\$\$ | 8,382 | 8,611 | 2,334 | 2,345 | 10,716 | 10,956 | 240 |
| | FTE | 80 | 80 | 4 | 4 | 84 | 84 | 0 |
| Training | \$\$\$ | 1,898 | 1,951 | 223 | 234 | 2,121 | 2,185 | 64 |
| | FTE | 18 | 18 | 4 | 4 | 22 | 22 | 0 |
| Technology Transfer | \$\$\$ | 1,540 | 1,589 | 1,034 | 1,557 | 2,574 | 3,146 | 572 |
| | FTE | 19 | 19 | 8 | 8 | 27 | 27 | 0 |
| TOTAL | \$\$\$ | 11,820 | 12,151 | 3,591 | 4,136 | 15,411 | 16,287 | 876 |
| | FTE | 117 | 117 | 16 | 16 | 133 | 133 | 0 |

ONGOING PROGRAM

The following program activities support OSM's goal to strengthen the capabilities of the States, Tribes, and OSM staff to implement SMCRA effectively through quality technical and scientific information, expertise, and training.

OSM's stakeholders (States, Tribes, industry) continue to express support for Technology Development and Transfer (TDT) efforts and encourage OSM to provide the types of technical support needed to effectively and efficiently meet SMCRA, the National Environmental Policy Act, and other environmental and safety laws. Cost-effective compliance will help industry remain competitive with other energy sources. Helping industry achieve up-front compliance will reduce the need for additional regulatory resources. The TDT program area described in the following pages represents those activities where OSM staff provide direct technical support ongoing efforts in other business lines.

1. Technical Assistance

This program activity provides assistance to State regulatory and reclamation staff, and to the OSM staff who review and monitor State programs, develop rules or policy, litigate SMCRA challenges or enforcement actions, or maintain other technical support infrastructure like TIPS, AVS, and technical training programs. Technical activities such as permit review, citizen complaint evaluation, and cumulative hydrologic impact assessment takes place where OSM is the regulatory authority.

Technical work also occurs in AML project design and monitoring where OSM is responsible for AML emergency and priority projects. However, these types of endeavors are integral parts of the Environmental Protection and Restoration business lines. They are not included in the TDT program activity.

OSM intends to attain an 90 percent customer service rate for its technical assistance efforts in FY 2002. Customer surveys are used to document the responsiveness of OSM's technical assistance to its customers in a timely and professional manner. By meeting the technical assistance needs, OSM can help effectively achieve OSM's Environmental Restoration and Environmental Protection mission goals.

a. Technical Policy Assistance

OSM specialists provide technical assistance to State and OSM regulatory and reclamation policy staff. The areas of assistance include rulemaking; citizen complaint investigations regarding the mining-relatedness of offsite impacts; guideline development; State program amendments; State mining permit

evaluation; AML problem evaluation; blasting policy; prime farmland reclamation standards; coal combustion by-product disposal; reclamation bonding; threatened and endangered species; lands unsuitability determinations; participation as technical experts on interagency committees; Acid Mine Drainage (AMD) prevention and remediation; bond release and sufficiency; mountaintop mining and valley fills; permit findings; re-mining; subsidence caused by underground mining; and assistance in fostering Tribal primacy by helping Tribes develop technical capabilities.

Projected activities for FY 2002 include:

- Mountaintop mining and valley fills: In steep-slope areas of Appalachia, surface coal mining operations often remove the upper portion of a mountain and deposit large volumes of overburden in engineered fills in adjacent valleys. The conditions favoring these type of operations are most common in central Appalachia, especially southern West Virginia and eastern Kentucky. In recent years, concerns have been raised regarding the impacts of these fills, especially those that cover significant segments of intermittent or perennial streams.

Under a settlement agreement arising from litigation concerning mountaintop mining and valley fills in West Virginia, OSM and other Federal and State agencies are planning to: (1) release a draft Environment Impact Statement (EIS) in FY 2002 with special emphasis on impacts on streams and fish and wildlife; (2) establish a coordinated process for obtaining authorization for surface coal mining operations in wetlands under section 404 of the Clean Water Act; and (3) OSM also plans to assist West Virginia in reviewing permit applications.

During FY 2000 and FY 2001, OSM committed over 40 technical staff to these two efforts, including technical studies assessing future mining potential; evaluating the impact of mining restrictions on coal recoverability, economics, and environmental impacts; analyzing offsite impacts of mine dust and blasting fumes; valley fill hydrology; and documenting stream conditions downstream from mountaintop mining.

- Impoundment Leaks into Underground Mine Workings: During the coal preparation process waste rock is separated from the coal. The larger, coarse fragments of coal waste (typically shale) are used to construct an embankment or dam, which impounds the fine coal waste fraction in a slurry (i.e., mixed with water). Other types of coal mining-related impoundments are built for acid mine drainage treatment, sediment control, fly ash disposal, or coal preparation process water. In heavily mined areas, many of these impoundments must be constructed over active or abandoned underground coal mine workings.

Since 1994, there have been six reported unplanned discharges into underground mine workings from overlying impoundments. Four of these breakthroughs had discharges to the surface. The latest breakthrough occurred in early FY 2001 (October 2000), in Martin County, Kentucky when

more than 250 million gallons of coal waste slurry and black water entered underground mines through subsidence cracks, exiting two mine portals in two different watersheds. The slurry moved downstream until the tributaries joined, entering the Tug Fork River, and continued flowing through the Big Sandy River until assimilated by the Ohio River. Water users all along the path of the slurry were forced into alternative sources. A monumental environmental cleanup effort continues.

During FY 2001, OSM has joined with the Appalachian States and other Federal agencies (EPA and MSHA) to:

- Evaluate why this slurry leak occurred;
- Evaluate all other mining-related impoundments over underground mines to assure against future incidents;
- Scope and implement a study by the National Academy of Sciences (NAS) to address technical issues related to impoundments above underground mines; and
- Determine whether existing regulations and engineering practices may need revision to ensure adequate protection of public health, safety, and the environment.

Upon completion of these studies, in FY 2002, OSM, working with the States and MSHA, will consider whether existing regulations and engineering practices may need revision to ensure protection of public health, safety, and the environment.

- *Blasting*: The use of explosives is an integral part of most surface coal mining. Overburden must be broken, often through the use of explosives, before it can be removed to expose the coal for mining. Citizens living near a mine sometimes express concern about the vibrations, noise, and flyrock resulting from blasting. SMCRA and OSM's regulations contain requirements limiting the energy of blasts to protect the public and property from damage caused by blasting.

Many States, including Pennsylvania, Ohio, Alabama, Missouri, Oklahoma, and Kentucky frequently ask for OSM help in evaluating blasting damage complaints, reviewing blasting plans, or setting vibration limits to ensure the prevention of damage to property. OSM helps the States measure damage potential through field studies and set protective limits on unique structures such

as historic buildings, mobile homes, hospitals, water towers, and log homes.

During FY 2001 and FY 2002, OSM plans to evaluate data specific to unique structures (e.g. hogans) to determine amplification factors and damage potential from ground vibration and airblast. This information also will generate data that will be used to evaluate the effect of ground vibrations from large cast blasting operations water wells less than 100 feet deep.

- Designating Areas Unsuuitable for Surface Coal Mining: Section 522 of SMCRA (Designating Areas Unsuuitable for Surface Coal Mining) establishes a process by which the public may petition the regulatory authority to limit or prohibit all or certain types of surface coal mining operations on non-Federal lands to protect certain features or environmental values. OSM receives and processes these petitions for all lands for which it is the regulatory authority. The decision-making process includes preparation of an environmental impact statement and a takings implication assessment.

OSM also is responsible for making valid existing rights determinations under section 522(e) for all Federal lands and all lands for which OSM is the regulatory authority. Section 522 (e) prohibits or limits surface coal mining operatins within certain areas, subject to valid existing rights.

Both unsuitability determinations and valid existing rights determinations require substantial technical and programmatic resources. They also involve litigation support if a takings claim is subsequently filed against the Federal Government.

- Subsidence: OSM technical staff have been involved with States in implementing the 1995 subsidence rules and investigating subsidence damage complaints. We anticipate that this involvement will continue during FY 2002. We also expect to inititate rulemaking in response to the 1999 remand of certain provisions of our subsidence rules.
- Acid Mine Drainage (AMD): Surface and underground coal mining activities expose iron sulfide minerals in rock to weathering. The interaction of these rocks/minerals with air and water can result in acid mine drainage, the number one water quality problem in Appalachia and to a lesser, but still serious, extent in other coal and hard rock mining regions. OSM technical staff resources are focused on advancing and applying the best science to remediate AMD from abandoned pre-SMCRA mines and to prevent active mines from contributing additional new sources of AMD. OSM contracted an actuarial study to develop a reliable formula for determining and projecting AMD treatment costs that was completed in FY 2000 and distributed to State authorities. An inventory of AMD discharges at active and forfeited mine sites also was completed during FY 2000. The inventory, along with projected treatment costs, will be updated annually by OSM and

the States. Technical assistance efforts, particularly in West Virginia and Pennsylvania, will continue in FY 2001 and FY 2002, together with an effort to clarify bonding requirements for postmining and pollution discharges.

- *Invasive Species:* Executive Order (EO) 13112 of February 3, 1999, Invasive Species, directs Federal agencies whose actions may affect the status of invasive species to identify those actions and to the extent practicable and permitted by law, take actions to address the problem (consistent with their authorities and budgetary resources); and not authorize, fund or carry out actions that the agency believes are likely to cause or promote the introduction or spread of invasive species.

Educational materials are being developed for placement on OSM's home page and information on invasive species issues is being developed for inclusion in the course, Soils and Revegetation, which is taught as part of OSM's Technical Training Program. States will be surveyed to determine their efforts to prevent the introduction and spread of invasive species through mining and reclamation of coal.

b. Site-Specific Technical Assistance

OSM specialists assist in the technical aspects of compliance monitoring (including inspection and enforcement assistance), experimental practice reviews, reclamation cost estimate calculation, bond release application reviews, bond approval reviews, bond forfeiture reclamation designs, lands unsuitability determinations, surveying, revegetation, geologic sampling, AML designs, subsidence and AMD abatement, and any technical assistance on citizen complaints and ten-day notices. Below are examples of the types of assistance provided to States and Tribes.

- *Bond Approval and Administration:* To assure that bonds for permits on lands for which OSM has and shares regulatory authority responsibilities are sufficient to reclaim forfeited sites, OSM calculates bond amounts using science-based, reclamation cost estimates. OSM also evaluates whether all legal and financial requirements are met. OSM provides technical assistance and training on bonding activities, and a technical review of any issues identified in a State program's bonding activities.

In FY 2000, technical specialists that comprise an OSM-wide bonding team completed revision of the 1987 OSM Handbook for Calculation of Reclamation Bond Amounts. To ensure complete and accurate cost estimates, the handbook was expanded to include calculations for subsidence damage repair; water supply replacement; long-term treatment of unanticipated water pollution;

and adjusting for inflation. The handbook also was revised to update costs for indirect contingency allowances and profit and overhead. Calculating costs for revegetation was expanded. OSM staff use this handbook for operations on Indian Lands and in Federal Program States such as Tennessee and Washington. In addition, States, Tribes, industry and other Federal agencies use the handbook as a guide. The principles in the handbook are used as the basis for an OSM technical training course on reclamation cost estimating.

On-line dissemination of reclamation bonding information is used by OSM to provide technical assistance to State and Federal employees on bonding, and to provide updates on a list of surety companies authorized by the U.S. Treasury Department to write Federal bonds.

During FY 2000, OSM received 80 requests for technical assistance on reclamation bonding from States, Tribes, other Federal Agencies, and the coal mining industry. Approximately 85 requests are expected in FY 2001 and again in FY 2002. Technical assistance was provided on procedures for ensuring legal execution of bonding instruments; explanations about bonding mechanisms, regulations and legal forms; procedures for revising existing bonds; procedures for replacing surety bonds, qualifying applicants for self-bonding; financial statement review; and estimating reclamation costs.

In FY 2000, OSM completed special on-site bonding training for Colorado and Missouri on reclamation bonding. The training included bond review procedures, legal forms, bonding regulations, security and tracking. In addition to the State's coal mining program, staff from the minerals mining program, environmental, and land management programs requested and received this training as well. OSM anticipates receiving several requests for on-site bonding training in FY 2001 and the same for 2002.

In FY 2001, and continuing into FY 2002, OSM will conduct outreach to the minerals and environmental programs in various States to identify and respond to requests for bonding technical assistance that can be provided in conjunction with bonding assistance to the coal mining programs or provided separately in response to special needs.

- *Hydrologic Balance Issues from Underground Mining:* Over a century of extensive underground coal mining in Pennsylvania and West Virginia have left miles of interconnected, flooded workings called mine pools. The water level in these mine pools may rise and overflow into streams or could potentially create a mine "blowout," which may result in rapid and sometimes catastrophic discharges of large amounts of stored mine water—often acidic in nature.

For instance, the Fairmont Mine Pool covers more than 27,000 acres comprised of several pre- and post-SMCRA mines. These mines, which have filled with acidic water, threaten to discharge into the Monongahela River. EPA Region III, OSM, and West Virginia are cooperating on a study to delineate the extent of these pools, identify discharge points, and, ultimately develop strategies to prevent degradation of streams from potential discharges. During FY 1998, OSM installed a monitoring network of boreholes to assess the fluctuating pool levels and allow modeling of the hydrology of the pool. In FY 2001, OSM plans to extend the monitoring network northward to other mined-out areas and join forces with the USGS in increasing study efforts beyond the West Virginia assessment. This study will assist Pennsylvania, West Virginia, other States, OSM, and EPA to evaluate possible regulatory solutions to protect the hydrologic balance from future "Fairmont Pools."

- *West Virginia Technical Assistance Work Plan:* During FY 2000, OSM received \$9.8 million in supplemental funding to ensure that the State of West Virginia received adequate funds to carry out its regulatory responsibilities under SMCRA. Of this amount \$6.2 million was for OSM to enter into a cooperative agreement with the West Virginia Division of Environmental Protection to enhance program capabilities. The remaining amount was provided to address the West Virginia Office's staffing deficiencies.

Late in FY 2000, OSM entered into a Technical Assistance Work Plan with the West Virginia Division of Environmental Protection (WVDEP) to improve consistency and regulatory compliance within the State's permitting program. The plan provided that permit application and review templates, associated guidance, and training programs would be developed to address 18 permitting areas where it was mutually agreed that improvements could be achieved. Development of the templates and guidance for the identified areas is anticipated in late FY 2001 and continue into FY 2002. OSM has lead responsibility for development of the templates and guidance and WVDEP has lead responsibility for development and presentation of the training efforts.

c. *Mine Map Repository*

OSM maintains a mine map repository authorized under the former Bureau of Mines and subsequently transferred to OSM. This repository, located in OSM's Appalachian Regional Coordinating Center in Pittsburgh, Pennsylvania, maintains the only national inventory of maps of abandoned coal and non-coal mines throughout the United States. Mapping information is used to fulfill customer requests for unique information that can range from rare maps for small uncommon projects to a national collection for assisting in large interstate projects. OSM customers include State regulatory and reclamation staff, local government agencies, developers, engineering and mining companies, architects, universities, law firms, environmental consultants, pollution control boards, realtors, law-enforcement agencies, historical societies, and homeowners.

The repository is automating its operational process. The new technology will enable OSM customers to retrieve mine maps and related information more efficiently via the Internet. Future enhancements are planned through partnering with the United States Geologic Survey (USGS). Operating revenues will increase due to a new and revised fee schedule for business clients.

d. Small Operator Assistance Program (SOAP)

Section 507(c) of SMCRA provides that up to \$10 million may be appropriated each year from AML fees to assist eligible small operators by paying certain costs associated with obtaining hydrologic, geologic, and other environmental information needed to prepare coal mining permit applications. Public and private laboratories under contract to regulatory authorities collect the data and provide the environmental analyses. Mine operators with annual coal production of less than 300,000 tons per year are eligible for assistance under SOAP.

States with approved regulatory programs are responsible for administering SOAP. They receive grants from OSM to pay qualified laboratories to provide the technical services authorized under the program. OSM is responsible for SOAP programs in non-primacy States, such as Georgia, Tennessee, and Washington. In FY 2000, six State SOAP programs (Alabama, Kentucky, Maryland, Ohio, Pennsylvania and West Virginia) assisted 107 operators. In Pennsylvania, each dollar spent on SOAP assistance in the year ending June 30, 2000, generated \$5.85 in AML related benefits: \$2.33 in AML fees paid, and \$3.52 in reclamation completed at no cost to AML.

Administration and monitoring of SOAP grants by OSM staff is funded under the Environmental Protection business line. The FY 2002 request for SOAP is \$1.5 million.

e. Permitting:

West Virginia Permitting Assistance: During FY 2002, OSM will continue to work with West Virginia permitting staff to review mountaintop mining permits involving valley fills and coordinate permit application review with other Federal agencies, as provided in the settlement agreement of Bragg v. Robinson. OSM will also continue to work with West Virginia to develop technical and programmatic guidance documents for use in the permitting process.

Western Region Coal Mine GIS: OSM staff continue to develop a Geographic Inventory of western coal mines where OSM is the regulatory authority. This inventory includes data such as disturbance, soils, grading, seeding, bonding, slopes, location of hydrologic structures, and postmining topography. Actual

data acquisition is accomplished by a variety of methods including the Global Positioning System (GPS), satellite imagery and digital photographs. Data also comes from new GPS tools used by inspectors. A user will be able to view a wide variety of maps that cover all aspects of the mining and reclamation process. This effort will continue in FY 2002.

f. Technical Information Processing System (TIPS)

The Technical Information Processing System (TIPS), is comprised of off-the-shelf computer hardware and software supported by OSM in partnership with the States and Tribes. The system consists of Windows-based computers at State, Tribal, and OSM offices with access to TIPS license servers via the Internet and OSM's Wide Area Network.

The TIPS suite of core software aids the technical decision-making associated with conducting reviews of permits, performing cumulative hydrologic impact assessments, quantifying potential effects of coal mining, preventing acid mine drainage, quantifying subsidence impacts, measuring revegetation success, and assisting in the design of abandoned mine land reclamation projects. It also provides a scientific basis for environmental assessments and environmental impact statements. TIPS is a key element in the implementation of the OSM Electronic Permitting Initiative and GIS Initiatives on Federal and Tribal lands and in the States.

TIPS maintains fully electronic training centers in its three regional offices in Denver, CO; Pittsburgh, PA; and Alton, IL. Training of State, Tribal, and OSM personnel in the practical application of TIPS is an integral part of the system operation. The TIPS Steering Committee, which is made up of representatives from State coal organizations and OSM offices, meets regularly to assist OSM in determining the direction of TIPS and how it can best meet their needs.

TIPS has been fully operational since 1989 and is being used extensively by States and OSM offices, as well as the industry. The States continue to expand the use of TIPS on Title V permitting and inspection issues and for the design of Title IV reclamation projects. With the expanding use of the TIPS tools, the States are generating higher quality permit reviews in shorter times and are able to produce quality Title IV reclamation designs much quicker.

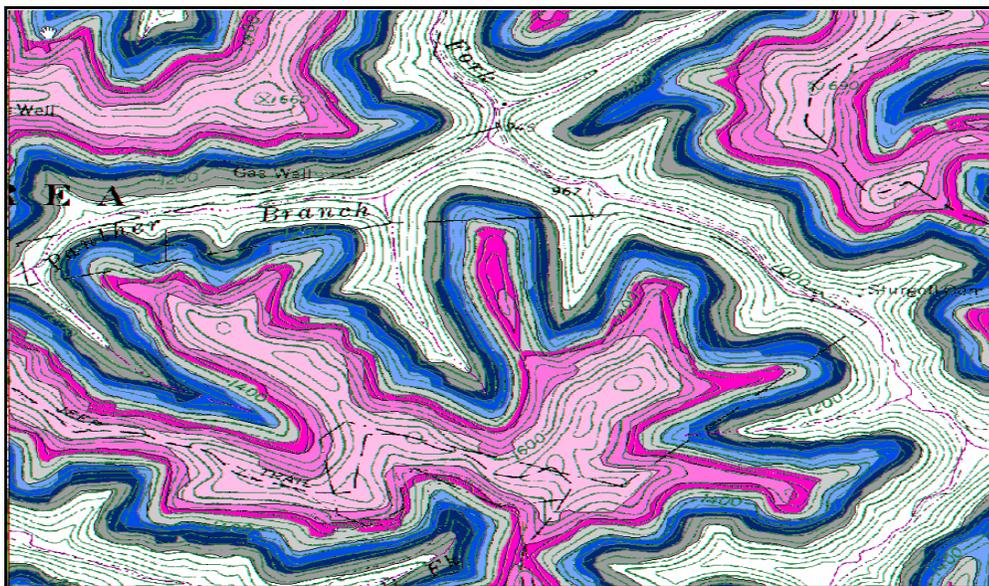
In FY 2001, TIPS completed an initiative to distribute scientific and engineering software directly to customer's desktop workstations, thereby making TIPS tools available to more users. A new effort was begun in FY 2001 to answer the needs of TIPS customers in the area of remote sensing and image processing and analysis. Remote sensing tools allow SMCRA authorities to evaluate the effects of mining and reclamation with airborne and satellite images. Such information triggers a timely application

of remedial measures resulting in faster and more effective reclamation. Remote sensing will also help SMCRA authorities monitor the progress of mining and reclamation, identify potential environmental hazards and offsite impacts.

TIPS Website: The TIPS website (www.tips.osmre.gov) provides information about TIPS, including current TIPS training classes, descriptions of TIPS software, access to digital data files for public domain TIPS software, lists of TIPS specialists, standardized AML emergency design drawings, and digital topographic maps for coal-producing areas within the United States.

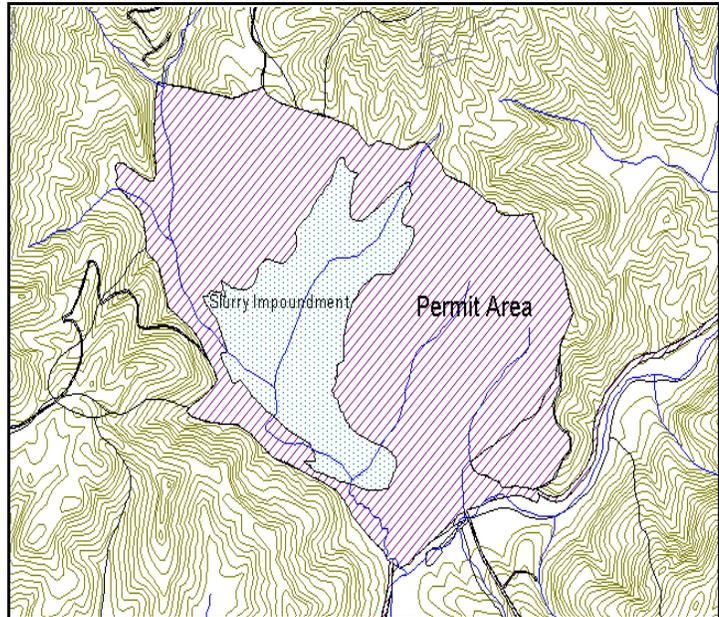
g. Reclamation Support Activities:

Future Mountaintop Mining Sites: During FY 2000, OSM obtained geologic information on coal seams from the West Virginia Geologic and Economic Survey, Kentucky Geologic Survey, and Virginia Polytechnic Institute and State University. During FY 2001, OSM is developing GIS mapping of feasible surface mining areas in southwest Virginia, central and southern West Virginia, and eastern Kentucky. The TIPS GIS tools allow removal of past mining areas from the geologic extent of coal beds. Then, applying three-dimensional analysis, the coal and overburden volumes are calculated and compared. Economic extraction is determined based on standard mining engineering-derived stripping ratios.



Coal seam model generated to predict stripping ratios for potential mountaintop removal mining

Tennessee GIS: Tools provided by TIPS are used for the continuing development of the Geographic Information System (GIS). The system contains digital data sets used by Field Office specialists to support technical decision making regarding the potential impacts of surface coal mining operations within the State of Tennessee and by Field Office Inspection personnel to support GPS field data collection efforts during mining inspections. OSM makes this data available to its external customers including other federal agencies, States and Tribes, colleges and universities, the mining industry, and the general public. Since its establishment, the GIS has responded to 119 external requests for GIS data and has distributed approximately 2,717 data sets. The GIS has also contributed to the analysis of the Mountaintop Mining EIS, OSM's Impoundment/Underground Mining Study, the AMD National Inventory, and Lands Unsuitable for Mining Petitions. OSM's GIS will continue its programmatic support of these and future similar issues during FY 2002.



Map data from the Tennessee GIS showing the location of a slurry impoundment within the Permit Area.

Enhanced Contemporaneous Evaluation of Reclamation: As part of an effort to more effectively evaluate reclamation as it occurs at each mine, inspectors from OSM with assistance from technical specialists have begun using GPS units to locate the boundaries and input data for the areas as they are reclaimed. The field data (slopes, topsoil depths, etc) are subsequently downloaded into a GIS being developed for each mine. This process will enable the OSM, States and industry professional and technical staff to keep track of the status of reclamation on each acre of mined land as it occurs.

Pittsburgh Coal Seam Model: Recently, OSM completed modeling the Pittsburgh coal seam for the northern two-thirds of the Appalachian bituminous coal basin. Using TIPS software and workstations, the project included mine mapping and prediction of acid-drainage problems. The data also will be used in predicting mine pool discharges and 3-dimensional hydrologic modeling of pool elevations as part of the Monongahela River Mine Pool project.

Washington AML Program: The Federal AML program in Washington employs Global Positioning Satellite (GPS) equipment to accurately locate abandoned mine shafts and record field data such as shaft dimensions, depth, and condition. The use of this data is two-fold: (1) the database and maps provide a

valuable AML project management tool, and (2) the database will ultimately be provided to municipalities for use in planning and zoning. TIPS GPS and GIS training is provided to support this effort.

h. Applicant/Violator System (AVS)

The primary purpose of the Applicant Violator System (AVS) is to provide State and Federal regulatory authorities with a centrally maintained national database containing information related to ownership and control of surface coal mining operations and outstanding violations incurred by those operations. Regulatory authorities check the AVS to evaluate an applicant's mining and violation history along with their eligibility to receive new permits. OSM receives approximately 4,000 requests each year for reports for use in the review of pending permit applications. OSM and the States also use the AVS to determine the eligibility of potential recipients of AML reclamation contracts.

In addition, the Bureau of Land Management, the Mine Safety and Health Administration, the Internal Revenue Service, the National Labor Relations Board, and the Small Business Administration use the AVS for assorted purposes. The Tennessee Valley Authority uses the AVS to avoid purchasing coal from persons with outstanding violations of SMCRA. The coal industry, citizen groups, and the general public routinely use the system to verify corporate information and the status of violations.

OSM conducts or assists State regulatory authorities and other Federal and State agencies in conducting ownership and control investigations, negotiating and tracking settlement agreements, responding to coal operators' rebuttals of agency decisions on ownership and control, and resolving conflicts concerning information in the AVS. These efforts will continue during FY 2001 and FY 2002.

2. Technical Training

a. National Technical Training Program

OSM established the National Technical Training Program in 1985, recognizing the need for an ongoing educational program to increase the technical competence and professionalism of Federal, State, and Tribal personnel. The program delivers training related to permit approval, bond release, reclamation, and enforcement. The training received updates technical expertise and fosters consistent application of standards. Participants trained represent each of the disciplines involved in implementation of SMCRA, which include engineering, hydrology, blasting, agronomy, and botany. The program ensures such

training is available as to enable SMCRA staff to maintain the ability to gather and present information as an expert with the most recent data available. In addition, periodic training is needed to disseminate the latest technological and other changes in regulatory and associated reclamation activities.

Without a comprehensive technical training program, significant problems would likely develop in regulatory and reclamation program implementation. To help avoid these controllable consequences, OSM recognizes the need to provide training to States, Tribes, and OSM personnel. All aspects of the training program, from needs identification through course development and presentation, are a cooperative effort of State, Tribal, and OSM offices. Each year, OSM surveys all State, Tribal, and OSM offices to determine their technical training needs.

A session of *SMCRA in the 21st Century* recently was held for OSM, State and Tribal authorities. This course showcases model State and Federal performance evaluation systems and enhances a common understanding between States, Tribes and OSM of better ways to agree on and meet our common goals for regulatory and reclamation programs.

A new course on permit findings was added to course offerings in FY 2001. This class enhances the skills of permitting staff, and will assist in the expeditious processing of valid permits and a consequent reduction in potential litigation.

In FY 2000 and FY 2001, several special course sessions were tailored to meet the specific needs of States and Tribes in managing AML programs, and in serving as an expert witness. In FY 2001, a new course on subsidence will be offered to assist with implementation of the Energy Policy Act requirements. And, an orientation course for OSM staff is being developed to provide an overview of OSM's mission and structure. States have requested that pertinent parts of this course also be made available for their staff.

In FY 2000, the training program offered 47 sessions of 27 courses for 902 participants of which 50 percent of the instructors were from OSM, 44 percent from States, 5 percent from Solicitor's offices, and 1 percent from other sources, and exceeded its target customer satisfaction rate of 89 percent by 5 percent.

In FY 2001 and FY 2002, OSM intends to meet its 90 percent customer satisfaction rate for its national training efforts and provide training to approximately 900 students. Future plans for the training program for FY 2001 and FY 2002 include completing development of a new *Historical and Archeological Resources* course to provide up to date information on recently revised Section 106 of the National Historic Preservation Act. Also, the *Spoil Handling and Disposal* course will be revised and updated to reflect the final Federal Court ruling/settlement agreement and its ramifications on excess spoil disposal

and mountain top mining in steep slope areas/States. Until the ruling is final, the course has been informally updated. The program, in response to State, Tribal and OSM requests will continue to offer custom tailored training to meet special situations.

b. TIPS Software Application Training

TIPS established a software application training program specific to the use of the software in Title IV and V applications, including permitting analysis, AML reclamation design, construction and monitoring. TIPS software training is a cooperative State-Federal effort: 20 of the 53 current TIPS instructors are from State programs.

In FY 2000, 325 technical professionals from the States, Tribes, OSM, and industry were trained in 31 classes under the TIPS computer applications training program. Fifteen of these classes were held at OSM's regional computer training facilities. Sixteen of these classes were conducted at customer sites. The table below shows the various courses conducted at customer sites in FY 2000. These classes are specially designed to address mining specific applications, as requested by TIPS users and the TIPS steering committee, and therefore are uniquely different from courses available from the vendors.

TIPS Customer Courses Conducted in FY2000

| Courses |
|--------------------------------------|
| Global Positioning Systems (GPS) |
| Geographic Information Systems (GIS) |
| Computer-Aided Reclamation Design |
| Statgraphics |
| earthVision |

For FY 2001 and 2002, the TIPS training program plans on scheduling 25 classes to be held at regional training centers each year, with at least fifteen classes conducted at trainee sites per year.

In FY 2000 , the TIPS training program exceeded its target customer satisfaction rate of 87 percent by 2.7 percent. In FY 2001 and FY 2002, OSM intends to meet its 88 and 90 percent customer satisfaction rate, respectively, for its TIPS national training efforts and to provide training for approximately 425 students in each year.

TIPS is currently developing a number of courses in hydrology, computer-aided design, and engineering applications. These courses will be delivered in FY2002 and will provide training on the new Windows NT-based applications recently added to the TIPS core software. TIPS staff will investigate alternative approaches of using the Internet as a medium in providing supplemental education to TIPS customers. Technologies that will be explored include streaming video and web-enhanced conferencing.

c. Regional/Site Specific Training

OSM has regional training centers, which offer classes on area-specific topics and provide facilities for the national training program to minimize travel expenses. In FY 2001 and FY 2002, examples of such training may include:

- Tribal Training: OSM offers training to tribal staff in formal OSM training classes (NTTP and TIPS) as well as through courses offered by State universities and attendance at OSM forums and workshops. This effort is carried out under provisions of the Energy Policy Act of 1992, which includes:
 - (1) courses relating to SMCRA to assist the Tribes (Navajo, Hopi, Crow and Northern Cheyenne) in their development of regulations and programs for assuming the regulation of surface coal mining and reclamation operations on Indian lands.
 - (2) courses to enable the Tribes to assist OSM in the inspection and enforcement of surface mining activities on Indian lands, including, but not limited to, permitting, mine plan review, and bond release.
- Advanced Applied Statistics Training: In FY 2000, four advanced statistical workshops were conducted for State and OSM staff on the application of statistics to the review and analysis of permit application and bond release application data: Topics included Regression Analysis, Statistical Sampling for Baseline Studies (two sessions), and Statistics for Evaluating Water Resource Data. The four workshops provided advanced statistical analysis technology to a total of 48 attendees.

In FY 2002, statistical expertise will become more important as final bond release applications are considered by OSM and the States. Courses focused in this area are an effort by OSM and certain States to build familiarity with advanced statistical techniques among the mining regulatory community to enable it to better cope with bond release proposals, especially those

developed under the direction of professional statistics consultants working for industry. OSM will continue to provide, on-demand, advanced applied statistics courses dealing with soils, vegetation, and hydrology issues in the arid and semi-arid western States.

- Electronic Permitting Workshops: In FY 2000, four electronic permitting workshops were conducted for western State, OSM, and industry staff providing an opportunity for the 93 attendees to interact with others in the field of GIS and electronic permitting.
- AML Inventory Training: During 2000, OSM conducted two AML Inventory courses to train State and OSM personnel in inventory methods, priority selection and the use of the enhanced AMLIS computer system. State Program support and training on Inventory issues will continue during 2001.

3. Technology Transfer

A sound technical development program ensures that the most current and valid scientific information is available to the industry, States, and Tribes. In FY 1999, OSM began using customer surveys to measure the success of its Technology Transfer activities. OSM plans to attain an 90 percent service rate in FY 2002.

a. Technology Development

OSM seeks to meet the needs of State, Tribes, and all OSM staff, as well as the public and the coal industry by solving problems related to reclamation projects, and regulatory implementation through cooperative research efforts with other bureaus. OSM does not fund research of its own. OSM's research needs are coordinated with the regulatory and research programs of USGS and other Federal agencies having responsibility for or supporting environmental protection.

OSM participates on the Department of the Interior's Base Mapping Needs Committee to coordinate OSM's mapping needs with other Interior bureaus. The Base Mapping Needs Committee ranks and funds mapping requests based on multi-party needs.

OSM works with the academic community and private research organizations to identify potential areas of cooperation. The National Mine Land Reclamation Center (NMLRC), located at West Virginia University, receives funding from several Federal and State agencies including OSM and industry organizations to research solutions to environmental problems associated with coal mining.

An industry/government (State and Federal) academic task force developed joint action plans to define "best science" practices that are expected to solve AMD problems, and to work toward implementation of those practices throughout the coalfields. Cooperative efforts involving many agencies, groups, and individuals are implementing the Acid Mine Drainage Technology Initiative (ADTI). NMLRC acts as the coordinator.

The National Mine Land Reclamation Center acts as the Executive Secretariat for the ADTI cooperative effort. In FY 1999, the National Mine Land Reclamation Center issued an AMD technical solutions handbook. In FY 2001, it issued a handbook on AMD prediction methods. Both will be updated periodically as the science related to AMD progresses. During FY 2001 and FY 2002, field validation of technical approaches used to control AMD will be a focus of the ADTI.

b. Electronic Permitting

The goal of Electronic Permitting is to obtain computer-generated permit applications in which all text, baseline data, models, drawings, and maps are in electronic media. The applications can be loaded onto the regulatory agency's local area network for review and specific items can be loaded into the agency's databases. This will simplify the transfer of information with our citizen and industry stakeholders during the permitting process.

Electronic permitting provides State, Tribal, and OSM permit reviewers with computer-based tools to access electronic documents, maps and data, and to perform necessary environmental analyses. Electronic data and information can be downloaded directly onto computer systems, where users can access the computer databases and analytical software, such as those provided by TIPS, making data manipulation and analyses more efficient and accurate. Electronic permitting saves staff time by reducing many clerical aspects of accessing and transferring hard copy information. Additional benefits include the ability to share computer-based data with managers, field personnel, other agencies, the public and industry.

In FY 2002, OSM plans to continue to (1) coordinate activities with States, Tribes and industry; (2) sponsor interactive forums, training and workshops for States, Tribes and industry; and (3) expand Federal/Industry electronic data exchange initiatives. OSM will support States' electronic permitting initiatives by concentrating on the States' needs in the area of data conversion, acquisition and storage, and interpretation of remote sensing data.

Examples of electronic permitting achievements include the following:

- North Dakota's partnership with its coal industry produced the nation's first fully paperless coal mine permit. The permit is a CD-ROM on file at the Public Service Commission, OSM, and at the County Auditor's Office - the public access site, and contains all the information normally contained in approximately 14 three-inch thick binders, including 130 AutoCAD maps and drawings. In addition, North Dakota is digitizing 15 to 25 year-old maps, submitted in paper format in early permits, to create an electronic library of lignite resource areas prior to mining disturbances.
- New Mexico received its first fully electronic permit application for an underground coal mine and the staff used the established protocol for electronic desktop review and in-house modeling capabilities to issue the permit.
- Alaska reviewed and approved its first fully electronic permit application.
- Colorado has developed an extensive permitting/tracking database that generates electronic reports and correspondence automatically and on demand. The Colorado State Geological Survey supports the permitting efforts with an electronic coal database system, reports, and GIS coverages. The Colorado Integrated Reclamation Cost Estimating System (CIRCES) Program will be completed in FY 2001 allowing permit reviewers to check and calculate reclamation bonds with the help of an automated software system.
- Utah is maintaining and making enhancements to its coal fields water-quality database, continuing its accessibility on the WEB.
- Several Wyoming mining companies are submitting annual reports and major permit revisions electronically on CD-ROMs to the regulatory agency and to court houses of record in the mining communities.
- Montana has delivered permit review capabilities to the desktop, developed a permit information database alongside its extensive geographic information system (GIS) support database, with the Montana Bureau of Mines and Geology providing coal and ground water quality data electronically.

c. Technology Transfer and Publications

Technology Transfer is accomplished through a variety of activities. State technical representatives meet frequently with OSM regional staff to share resources whenever practicable to resolve regional technical issues. OSM sponsors or attends interactive technical forums, computer applications workshops, and technical seminars to address mining and reclamation environmental issues. After coordinating the needs of States, Tribes, and industry, OSM plans and presents technical topic forums. The following describe the types of forums:

Mountaintop Mining EIS Workshops: To document the state-of-the-art in reclamation technology and explore impacts of regulatory decisions on mining practices, the Mountaintop Mining EIS Steering Committee sponsored several workshops. The workshops were targeted for specialized audiences based on expertise and experience in various topics and attendance was generally by invitation only. OSM was instrumental in the planning of the workshops, which were organized by the U.S. Department of Energy through an arrangement with U.S. EPA. The Aquatic Ecosystem Restoration workshop explored using the reclamation process to restore aquatic habitats and reshaping mine sites to a more natural-looking configuration. This workshop was held during FY 2000 in Charleston, WV and was attended by more than 125 persons. The Mountaintop Mining Groundwater Hydrology Workshop occurred in July 2000 in Nitro, WV and was attended by more than 30 hydrologists from industry, environmental organizations, government, and academia. The Groundwater Workshop involved discussions of the requirements for baseline data collection, hydrologic consequence analyses, and typical hydrologic impacts related to surface mining.

Bond Release: The third in a series of five Interactive Bond Release Forums on Arid and Semi-Arid Areas was conducted in August 2000. This forum was entitled "Approaching Bond Release: Cumulative Hydrologic Impact Assessment (CHIA) and Hydrology Topics for the Arid and Semi-Arid West. A series of two additional bond release forums are scheduled through FY 2002:

- FY 2001 topic: Approaching Bond Release: Wildlife Habitat Construction for Reclamation and Surface Mining Applications in the Arid, Semi-Arid West
- FY 2002 topic: Approaching Bond Release: Post Mining Land Use (PMLU) for Reclamation and Surface Mining Applications in the Arid, Semi-Arid West

Coal Combustion By-Products: OSM has successfully pioneered numerous technology transfer events and products on this topic with the focus on the use of these materials in reclamation, beginning with its first national technical interactive forum in 1996. During 2000, OSM co-sponsored its second technical interactive forum, improved its technical information Website, participated in interagency negotiations

with the U.S. EPA on future rulemaking and served on related national and international technical steering committees. An additional technical interactive forum is being planned for 2002 and the proceedings of the 2000 forum will be published in 2001. Technology transfer products during 2000 on this topic include:

- The Coal Combustion By-Product Technical Interactive Forum: A technical interactive forum on “The Use and Disposal of Coal Combustion By-Products at Coal Mines was held in Morgantown, WV on April 10-13, 2000 (the second national forum conducted by OSM on this topic).
- The Coal Combustion By-Product Technical Information Website: The OSM sponsored Coal Combustion By-Products (CCB) Steering Committee developed and maintains a user friendly informational Website (The CCB Information Network).
- Combustion By-Products Recycling Consortium: OSM staff serve on the newly formed National Steering Committee for the Combustion By-Products Recycling Consortium that is attempting to develop technologies for use by the coal utilities and their suppliers that will be useful in solving problems related to the handling of by-products from their clean coal processes. During the 2000 review cycle, the steering committee selected and recommended \$1.29 million be awarded by Department of Energy to 17 research projects, including several with direct application to coal mining.
- Technical Program Committee International Ash Utilization Symposium: OSM staff serve on the technical steering committee that plans this biennial event for the Center for Applied Energy Research at the University of Kentucky. The 1999 symposium was held in October of 1999 and OSM staff are currently planning for the October of 2001 symposium.

Reforestation Initiative: OSM began an effort to encourage reforestation practices that would increase the amount of mined land reclaimed as forest. This effort has resulted in technical and policy symposia, a website, speaking at professional organizations, a video, and publications that transfer state-of-the-art science and technology. In September of 2000, the Secretary of the Interior and DOE signed an MOU to promote a market-based approach to reclaiming abandoned mined lands through reforestation. OSM will work with numerous private, tribal, and State interest groups to identify potential reforestation sites and work to facilitate funding partnerships between potential donors. A technical interactive forum on the “*Economics of Reforestation*” is currently being planned for FY 2002.

Reports, Forum, and Workshop Proceedings: OSM publishes and co-sponsors the publications of numerous forum and workshop proceedings and various topical reports. These publications are distributed to interested parties at technology transfer events, upon request, and at various websites

maintained by OSM. The Agency uses the Internet to make available and seek comments to its reports and technology transfer products from as wide a client audience as possible. In FY 2002, OSM will continue to develop, distribute, and communicate these products. Products developed and distributed in FY 2000 included:

- Publication of 2nd CCB Forum Proceedings: “The Use and Disposal of Coal Combustion By-Products at Coal Mines: A Technical Interactive Forum.”
- Published Proceedings on Reforestation of Surface Coal Mines: The proceedings for the “Enhancement of Reforestation at Surface Coal Mines: Part II: A Technical Interactive Forum.”
- The Old Ben Scout Reservation Natural Resources and Mining Handbook: During 1999 and 2000, the Office of Surface Mining, in cooperation with the Buffalo Trace Council of the Boy Scouts of America, developed natural resource and mining information to help visitors understand the plants, animals, topography, soils, and water features that they find at the Old Ben Scout Reservation (a previously mined area). This cooperation has resulted in turning the trails and mining features of the reservation into an outdoor classroom. Additional requests for resource material are anticipated in FY 2002.
- Technology Transfer CD: An electronic copy of all existing technical interactive forum proceedings has been produced on a CD format for distribution at OSM technology transfer functions. This single CD includes the following technology transfer publications: 1996 Coal Combustion By-Products Associated with Coal Mining-Interactive Forum; 1998 Prime Farmland Interactive Forum; 1998 Prime Farmland Reclamation Workshop; 1998 Mid-Continent Regional Coal Symposium; 1999 OSM Mid-Continent Region Electronic Enhancement Workshop; 1999 Enhancement of Reforestation at Surface Coal Mines: A Technical Interactive Forum; and the 2000 Old Ben Scout Reservation Natural Resource and Mining Information Handbook.

OSM Technical Library: OSM maintains a technical library in its Western Regional Coordinating Center located in Denver, Colorado that houses reference materials and a collection of scientific and technical materials. The library projects that it will receive approximately 300 requests in FY 2000 and again in FY 2001 and FY 2002. As well as providing technical information and services to State Regulatory Agencies and other OSM customers on a variety of mining-related topics, the technical library shares its collection through interlibrary loan with libraries around the world.

d. Experimental Practices Program

Section 711 of SMCRA allows variances from Sections 515 and 516 performance standards as alternative or experimental mining and reclamation practices to encourage advances in mining technology or to allow innovative industrial, commercial, residential, or public (including recreational) post-mining land uses. However, the experimental practices must at least be as environmentally protective as the performance standards promulgated under Sections 515 and 516 of SMCRA. The experimental practice also must not reduce the protection afforded public health and safety below that provided by the applicable performance standards. Approval and monitoring of a permit containing an experimental practice requires a close working relationship between the operator, the regulatory authority, and OSM.

Since the inception of the program, 33 experimental practices have been approved. Fourteen were determined to be successful and three unsuccessful; eleven are currently underway; one was terminated due to regulation change, and four have been completed but final reports not yet received.

OSM anticipates that ten new experimental practices may be submitted by Virginia, Kentucky, West Virginia, Ohio and Utah in FY 2001. It is likely that the interest in experimental practices will continue, at the same level in FY 2002.

e. Educational Outreach

To make the public, students, and foreign visitors aware of OSM's responsibilities and of its environmental stewardship mission, OSM staff provide educational outreach to the science teachers' associations, science classes, educational fairs, Earth Day events, career days, foreign visitors, grassroots organizations, and professional associations and societies. This outreach includes demonstrating surface mining reclamation using an open-pit mine model with reclamation equipment and activities in place and providing educational posters and materials involved in permitting, monitoring and reclaiming a mine site. Additional outreach is provided through publication and distribution of forum proceedings, the Boy Scout Mining Information Handbook, and the integration of the *Handbook of Western Reclamation Techniques* into university curriculum.

Justification of Program Changes:

| Technology Development and Transfer | FY 2002 Budget Request | Program Changes (+/-) |
|-------------------------------------|------------------------|-----------------------|
| \$(000) | 16,287 | 500 |
| FTE | 133 | 0 |

Program Changes:

An increase of \$500,000 is proposed by a transfer of funds from Environmental Restoration activities to readjust administrative funding to appropriate levels between the two business lines. This transfer will allow funds to be obligated in an activity - technology transfer - that enables operators, States, and the public to better meet their FY 2002 resource needs.