

TECHNOLOGY DEVELOPMENT AND TRANSFER

(dollars in thousands)

		2004 Actual	2005 Estimate	Uncontroll. & Related Changes (+/-)	Program Changes (+/-)	2006 Budget Request	Change from 2005 (+/-)
Regulation & Technology	\$\$\$	12,592	13,300	258	1,568	15,126	+1,826
	FTE	104	115	0	0	115	0
Abandoned Mine Land	\$\$\$	4,133	4,479	54	-611	3,922	-557
	FTE	17	21	0	0	21	0
TOTAL	\$\$\$	16,725	17,779	312	957	19,048	+1,269
	FTE	121	136	0	0	136	0

The Technology Development and Transfer business line (program activity) provides resources for technical assistance, training, technology development and technology transfer program sub-activities. This program activity supports and enhances the technical skills that States and Tribes need to operate their regulatory and reclamation programs in order to effectively implement SMCRA. Thus, this program activity is an integral component and supports accomplishment of OSM's Environmental Restoration and Environmental Protection business lines goals.

Through support of OSM's restoration and protection goals TDT funds support two of the Departmental Strategic plan mission quadrants (Resource Use and Resource Protection) and implements the Secretary's 4C's - Communication, Consultation, and Cooperation, all in the service of Conservation. TDT is a nation-wide program that provides resources to States and Tribes that meet their specific technical and training needs in carrying out the requirements of the SMCRA.

In 2006, OSM will continue to expand the use of Technical Innovation and Professional Services (TIPS) in technical decision-making processes related to SMCRA; address the remediation of acid mine drainage through participation in the Acid Drainage Technology Initiative; finalize changes and focus on implementation of the final "Ownership and Control" rule; and provide training and technical assistance to meet identified needs of States and Tribes. Also, OSM's technology transfer program will continue its support for electronic permitting and mobile computing efforts, by sponsoring interactive technical forums and related workshops. In addition, OSM will continue to provide regional technical service, libraries, and more efficient access to COALEX (a computer-assisted library search service).

Operational Process (Program Activities): The Technology Development and Transfer program activities enhance the technical skills that States and Tribes need to operate their regulatory and reclamation programs in order to more effectively implement SMCRA. These program activities are an integral part of accomplishing Environmental Restoration and Environmental Protection to achieve OSM's goals and outcomes.

OSM provides technical training to OSM staff, and 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 Innovation and Professional Services (TIPS), the Applicant Violator System (AVS), and Electronic Permitting (EP).

TECHNOLOGY DEVELOPMENT & TRANSFER
ENCOMPASSES:
Technology Development
Technology Transfer
Technical Training
Electronic Permitting (EP)
Technical Innovation and Professional Services (TIPS)
Applicant Violator System (AVS)

OSM also established an intergovernmental team, the National Technology Transfer Team (NTTT) to provide direction, communication and coordination of efforts related to technology transfer and development. This team is a permanent entity and will continue throughout FY 2006. Technology transfer is a major part of OSM's cooperative effort with States and Tribes.

The outcome of TDT program performance is ultimately measured by the success of the Surface Mining program in carrying out the environmental restoration and protection missions. In addition, performance for the business line is 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.

Actions Required to Achieve Annual Goals: In FY 2006, OSM plans to increase 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, the National Technical Training Program (NTTP), TIPS, the Mine Map Repository, and AVS will increase access to users by continuing to provide material on the Internet and supporting the administration's e-government initiative. In addition, the newly established National Technology Transfer Team will

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provide direction, communication and coordination efforts related to technical issues and studies.

Resources, Skills, and Technology Needed: A goal for FY 2006 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.

In addition, activities under TDT were reviewed under the FY 2006 Program Assessment Rating Tool (PART) in support of the Federal Regulatory and Abandoned Mine Land Program. One of the recommendations from the PART is to “Target funds in the FY 2006 Budget to increase the technical capacity of OSM staff and inspectors.” The increase in funds for our TIPS and technical training programs are in support of this recommendation.

The total request for this business line is \$19.0 million. The FY 2006 President’s Budget requests \$12.4 million for Technical Assistance (including the Applicant Violator System); \$3.4 million for Technical Training; and \$3.2 million for Technology Transfer efforts are allocated to meet the annual goals set forth above.

Included in the FY 2006 President’s budget request for Technology Transfer program activity is \$200,000 for the Acid Drainage Technology Initiative (ADTI), an ongoing effort of OSM, State and other Federal agencies, academic, 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 our customer satisfaction performance measures. It also includes examples of the types of technical training, assistance efforts, and transfer provided by this business line.

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**Table 11– Justification of Program and Performance
Technology Development and Transfer
Summary Increases/Decreases for FY 2006
(Dollars in Thousands)**

Program Activity		Regulation & Technology			Abandoned Mine Lands			Total			Inc/Dec
		2004 Actual	2005 Estimate	2006 Request	2004 Actual	2005 Estimate	2006 Request	2004 Actual	2005 Estimate	2006 Request	
Technical Assistance	\$\$\$	8,978	9,423	10,851	2,328	2,302	1,546	11,306	11,725	12,397	+672
	FTE	70	74	74	5	9	9	75	83	83	0
Training	\$\$\$	1,984	2,240	2,600	243	625	815	2,227	2,865	3,415	+550
	FTE	17	20	20	5	7	7	22	27	27	0
Technology Transfer	\$\$\$	1,630	1,637	1,675	1,562	1,552	1,561	3,192	3,189	3,236	+47
	FTE	17	21	21	7	5	5	24	26	26	0
TOTAL	\$\$\$	12,592	13,300	15,126	4,133	4,479	3,922	16,725	17,779	19,048	+1,269
	FTE	104	115	115	17	21	21	121	136	136	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. Skill and knowledge enhancement is critical to the continued success of the Surface Mining program and accomplishment of the Department's Resource Protection and Resource Use goals.

OSM's stakeholders (States, Tribes, and industry) continue to express support for Technology Development and Transfer 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 provides direct technical support and 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 that 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 take place where OSM is the regulatory authority. Of the \$12.4 million requested, \$1.0 million support OSM's Environmental Restoration and \$11.4 million supports OSM's Environmental Protection mission goals.

Technical assistance also is provided for AML project design and monitoring where OSM is responsible for AML emergency and priority projects. These types of endeavors are integral parts of the Environmental Protection and Restoration business lines and are not included in the TDT program activity.

OSM intends to meet a 94 percent customer service rate for its technical assistance efforts in FY 2006. 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 placement; reclamation bonding sufficiency and bond release; threatened and endangered species; land unsuitability determinations; participation as technical experts on interagency committees; acid mine drainage (AMD) prevention and remediation; stream and underground mine flooding; mountaintop mining and valley fills; permit findings; re-mining; impoundment stability; subsidence caused by underground mining; and assistance in fostering tribal primacy by helping tribes develop technical capabilities.

Projected activities for FY 2005 include:

- Mountaintop Mining and Valley Fills: (MTM/VF) OSM, the Fish and Wildlife Service (FWS), Environmental Protection Agency (EPA), Corps of Engineers (COE), and West Virginia Department of Environmental Protection (WVDEP) released a comprehensive draft programmatic EIS on possible future actions to further minimize the environmental effects of MTM/VF. The agencies continue to review and address over 83,000 public comments and are targeting publishing a final EIS and Record of Decision in late FY 2006 to mid-FY 2007. Thereafter, the agencies will begin the process to effect new policies, guidelines, and coordinated decision making procedures consistent with the Record of Decision. In the interim, OSM will continue to work to ensure appropriate coordination among the various State and Federal agencies responsible for approval of surface coal mining operations, particularly under Section 404 of the Clean Water Act.
- 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 slurry (i.e., mixed with water). In heavily mined areas, many of these impoundments must be constructed over active or abandoned underground coal mine workings.

Since 1994, there were six reported unplanned discharges into underground mine workings from overlying impoundments. Four of these breakthroughs caused pollutional discharges to streams in Virginia, West Virginia, and Kentucky. The latest breakthrough occurred in October 2000 in Martin County, Kentucky, where more than 300 million gallons of coal waste slurry and “black water” entered underground mines through subsidence cracks, exiting two mine portals in two different watersheds.

In FY 2005 and 2006, OSM, the States, and MSHA will continue to assess whether revisions to existing engineering practices are necessary as follow through from impoundment investigations and the National Academy of Sciences study of technical issues related to impoundments above underground mines. OSM and MSHA will continue cooperating with the states to address technical issues related to underground mining and surface facilities.

- 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 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's studies and set protective limits on unique structures such as historic buildings, mobile homes, hospitals, water towers, and log homes. OSM is also providing specialized training for West Virginia in the use of a computerized blasting evaluation program developed by OSM staff. The program is called the "Blast Log Evaluation Program". This program has been made available for free download from the TIPS website.

During 2005, OSM will continue to evaluate data specific to unique structures (e.g. Navajo hogans) to determine amplification factors and damage potential from ground vibration and air blast. This information also will generate data that will be used to evaluate the effect of ground vibrations from large cast blasting operations on water wells less than 100 feet deep.

OSM will publish a revised Blasting Guidance Manual during FY 2005 in concert with the States and the technology transfer program. The manual will provide updated technical information on blasting technology, monitoring, complaint investigation, and enforcement investigations and should ultimately lead to reductions in blasting risk and complaints.

OSM is also revising the Federal Blasters Certification Test questions so as to be more relative to the current blasting technology. The new questions will provide the agency with assurance that the applicants have sufficient knowledge of state of the art blasting techniques.

- Designating Areas Unsuitable for Surface Coal Mining: Section 522 of SMCRA (Designating Areas Unsuitable 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 operating 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.

- EPA Rulemaking on Coal Combustion By-Products (CCBs): OSM continues to work with EPA on reviewing and analyzing information related to EPA's intended drafting of a proposed rule concerning the placement of CCBs at mine sites. This rulemaking is currently scheduled for 2007. During FY 2005, in response to a request from Congress, the National Academies of Science (NAS) will be conducting a study that will examine the health, safety and environmental risks associated with using coal combustion by-products for reclamation in active and abandoned coal mines in all major coal regions. A review committee from NAS will focus its efforts on coal combustion by-products from utility power plants and independent power producers rather than from small businesses, industries and institutions. The study will determine whether CCBs were placed and disposed of in coal mines with inadequate safeguards and whether this activity is degrading water supplies in coal mines in contravention of SMCRA. At its first meeting with the committee, OSM provided a SMCRA perspective and copies of all of the OSM publications, regulations, and Website materials on the subject. OSM will continue to assist the NAS by providing technical support at each of the four site visits during 2005 to the States of New Mexico, Texas, Indiana and Pennsylvania.
- 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, which is 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.

During FY 2005 and 2006, OSM will continue to participate in the Acid Drainage Technology Initiative (ADTI). ADTI is a collaborative effort among federal agencies, industry, the states, academia, and the National Mine Land Reclamation Center (NMLRC) to promote communication and technology enhancement in the field of acid mine drainage. The main goals of ADTI are to identify, evaluate and develop "best science" practices to prevent acid mine drainage and to describe, for existing sources of acid mine drainage, the best technology for avoidance/remediation practices.

OSM staff contributed significantly to the ADTI Coal Mining Sector's efforts to address the goals of prediction of potential sources of acid mine drainage, as well

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as avoidance or remediation of existing sources of acid mine drainage associated with coal mining. Ongoing projects that OSM is sponsoring in FY 2005 include:

- Continued assistance in evaluating acid mine drainage producing sites, water quality, treatment designs and system evaluations and follow up monitoring of the performance of passive treatment systems installed under the Appalachian Clean Streams Program. This effort will include the analysis and summation of site evaluations of passive treatment systems constructed in recent years in order to classify the degree of treatment success or failure of the system. This information will then be used to develop decision-making criteria to guide in determining best-use practices for future passive treatment installations.
- Examined long-term trends in AMD production from several types of underground coal mines to follow up on earlier work that suggested significant declines in AMD production over a 30 year period measured during a prolonged dry period. The current effort will evaluate whether the same trends are seen after a prolonged wet period, as well as study the mine water chemistry at both successful and unsuccessful passive treatment systems to identify the underlying site and construction factors.
- Continued support for the development of standardized kinetic test procedures for evaluating coal-mine related acid mine drainage potential by more realistically simulating the chemical conditions under which acid mine drainage forms.
- Continued work to identify geologic sources of selenium associated with coal mines, understand and predict the chemistry governing the mobilization of selenium into coal mine discharges, and identify effective methods to predict, prevent and mitigate the offsite discharge of selenium-contaminated discharges.

During FY 2005, OSM worked with other ADTI partners to develop and begin implementation of a five-year roadmap for future activities, with implementation to begin during FY 2005. The roadmap will continually be refined during FY 2005 and 2006.

Mine Mapping. Technical studies initiative for FY 2005-2006 will also include work on underground mine mapping. Mine maps have been created for centuries by miners, mine engineers and surveyors for use in mine planning and management decisions. Maps can provide information today for use by mine engineers, community planners, developers and regulators when making decisions on land use, development, property purchase, and environmental protection. Also see discussion under the Mine Map Repository in section c.

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, land unsuitability determinations, surveying, revegetation, geologic sampling, AML designs, subsidence and AMD abatement, and any technical assistance on citizen complaints and ten-day notices. Site-specific technical assistance varies from year to year and we cannot predict what specific types of assistance will be needed in FY 2006. Below are examples of the types of assistance provided to States and Tribes.

- Full-cost Bonding: At the request of the Pennsylvania Department of Environmental Protection (PADEP), 100,000 acres of the southern Anthracite field was mapped using color aerial photography in support of the full-cost bonding program. One-foot pixel orthoimagery and 5-foot contours were delivered to the Pottsville office of the PA-DEP to support this work, along with TIPS hardware and software to support the volumetric analysis. Several bond amounts were changed as a result of the work. This project demonstrated that the technology works and other OSM customers will demand access to the method. Therefore, similar projects are expected through 2005. Aerial photography can be very costly, but the savings realized in setting correct bond amounts outweighs the cost.
- Hydrologic Balance Issues from Underground Mining: Over a century of extensive underground coal mining in Pennsylvania and West Virginia left miles of interconnected, flooded workings that we call “mine pools.” The water level in these mine pools may rise and overflow into streams. The pools could also potentially create a mine “blowout.” Rapid and sometimes catastrophic discharges of large amounts of stored mine water may occur in either case. The mine pools may present dangers to life, property, and surface stream water quality.

The Fairmont Mine Pool extends for more than 27,000 acres, encompassing several pre-and post- SMCRA mines. These mines have filled with acidic water and threaten to discharge into the Monongahela River. EPA Region III, OSM, and West Virginia are cooperating on studies 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 2002, OSM extended the monitoring network to other mined-out areas. Three new monitoring wells were drilled in the mine pool in FY 2003 to allow more comprehensive data collection. This study will assist Pennsylvania, West Virginia, other States, OSM, and EPA by serving as a model approach for evaluating possible solutions to protect the hydrologic balance from future “Fairmont Pools.” In FY 2004 OSM hosted an intergovernmental/interagency workshop to evaluate all research and monitoring

efforts to date in an effort to partner together on solutions and next steps to address this issue.

OSM and the States plan to explore the feasibility of developing a computer application that will model existing underground mine pools and predict potential flooding rates and discharge locations/amounts. If the application is deemed feasible, OSM will undertake development of this product in FY 2005.

- Bond Approval and Administration: To ensure that bonds are sufficient to reclaim forfeited sites on permits situated on lands for which OSM has or shares regulatory authority responsibilities, OSM calculates bond amounts using engineering and science-based reclamation cost estimates. OSM also evaluates bond mechanisms posted with OSM to ensure legal, financial, and regulatory requirements are met. OSM provides technical assistance and training on bonding activities, including the newly launched bond calculator software, and a technical review of any issues identified in a State program's bonding activities.
- AMD Mitigation Techniques for Alabama AML: The Alabama Department of Industrial Relations AML program asked for technical assistance in reviewing the mitigation techniques used in five completed Clean Streams Projects (CSP). During the summer and fall of 2004 OSM staff conducted water sampling to evaluate the water quality in and around the projects sites. OSM staff prepared water sampling guidance to be used for these projects. Based on the results of water sampling, recommendations will be made for treatment techniques and how they should be applied in various situations encountered in the Alabama coal fields.

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. Some of the costs for this program are paid out of offsetting receipts from the sale of maps.

A recent environmental disaster in Kentucky and trapped miners in Pennsylvania have sparked increased public and government interest in accurate mine map archiving and the NMMR. Staffs from the NMMR and the Appalachian regional office are involved in several related important initiatives to improve mine map acquisition, archiving, and

availability. These include a benchmarking initiative to share best practices and discuss issues with mine map archiving and use and developing a TIPS training course to provide useful information on relating underground mine maps to surface map features. The increased awareness of the value of historical mine maps has resulted in a large influx of new maps to the NMMR collection from public and private sources.

The current collection and new acquisitions are gradually undergoing conversion to a digital format (in addition to the existing photographic record). Ultimately, the NMMR collection will allow retrieval of mine maps and related information more efficiently via the Internet.

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 to meet the costs of regulation. SOAP pays some costs of obtaining the hydrologic, geologic, and other environmental information needed to prepare coal mining permit applications. Regulatory authorities contract with public and private laboratories to 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 may receive grants from OSM to pay qualified laboratories to provide the authorized technical services. OSM is responsible for SOAP programs in non-primacy States such as Tennessee. In FY 2004, 5 State SOAP programs (Alabama, Kentucky, Maryland, Pennsylvania and West Virginia) assisted 59 small mine operators. The program generates benefits for AML around 5 times its costs because the small operators pay AML fees, and also remine and reclaim abandoned mine lands which would otherwise be eligible for AML funding. The program is expected to operate at a similar level in 2005.

OSM is not requesting funding in FY 2006 for this program.

e. Permitting

Western Region Coal Mine GIS: An Internet Map Server system has been implemented for five western mines that allows OSM Western Region users to access high resolution satellite imagery of each mine permit. As additional image acquisitions are made, users will be able to compare changes in each mine over time. The system will streamline regulatory inspection, tracking, and permitting.

Tennessee GIS: The Knoxville Field Office Geographic Information System (KFO GIS) is the only federal repository of coal mining geographic data sets for mining operations located within Tennessee. OSM, the mining industry, and the general public use these spatial data sets of coal mining-related impacts to visualize and understand the relationships of coal mining operations to the environment. In FY 2004, KFO GIS

provided approximately 490 information products and services. KFO expects increases in user requests in FY 2005 and 2006. In FY 2004 KFO began to digitally map the extent of underground mine works in Tennessee by scanning 284 underground mine maps. Several hundred mapped areas are planned to be completed in FY 2005.

Mobile Computing: OSM continues leading efforts in applying mobile computing technologies to mine inspection, permitting and AML field work. The technology allows Inspectors to take maps and mine permit data to the field for inspection and verification of mining and permitting activities. AML applications include site investigation, inventory and reclamation design. Connecting high accuracy survey equipment to full function computers in the field allows field staff to respond immediately to AML emergencies with in-field design and re-design. This improves response times to emergency abatement and protects lives in the coal fields. In FY 2005, OSM continued to place tablet computers in various States to begin the expansion of this technology to our customers. The use of this technology will result in a more efficient means of implementing SMCRA.

f. Technical Innovation and Professional Services (TIPS)

The goal of TIPS is to provide State and OSM personnel with a comprehensive set of analytical tools to aid in technical decision-making processes related to the SMCRA. Services include: providing the technical tools to complete regulatory and reclamation tasks faster and more accurately, ensuring that the tools allow for electronic sharing of data, providing a comprehensive training program in core software for users, providing core-software tools at the user's desktop; conducting the necessary research and development that ensures that core software is the state-of-the-art; and providing technical assistance in software and hardware use. Customers include states, tribes and OSM offices nationwide.

The system is comprised of off-the-shelf computer hardware and software supported by OSM in partnership with the States and Tribes. TIPS consists of Windows-based computers at State, Tribal, and OSM offices with access to system license servers via the Internet. The software that the system provides covers a wide range of subjects necessary to assist technical staff in carrying out their duties in both the environmental protection and restoration programs under SMCRA. There are 19 commercially available software applications covering geospatial, hydrology, engineering, and statistical topics. These applications assist in the technical decision-making associated with conducting reviews of permits, performing hydrologic assessments, quantifying potential effects of coal mining, preventing acid mine drainage, quantifying subsidence impacts, measuring revegetation success, assisting in the design of abandoned mine land reclamation projects, and providing the scientific basis for environmental evaluations.

Examples of OSM TIPS related initiatives include:

TIPS Geospatial Conference: TIPS officially entered the conference and information forum realm as OSM jointly sponsored the “*Advanced Integration of Geospatial*

Technologies in Mining and Reclamation” with IMCC, NAAML, and WIEB on December 7-9, 2004, in Atlanta, Georgia. The conference was organized in response to recommendations by the TIPS Steering Committee. The three-day event featured 57 speakers with an attendance of 162 persons from States, Tribes, OSM, industry and academia. The conference was well received with numerous compliments and discussion requesting that this event become annual or bi-annual. All speaker presentations and associated materials will be published on the TIPS website.

Field Mapping Using Mobile GIS: During 2003, OSM staff used GPS enabled tablet computers and ArcPAD GIS software to map several thousand acres of land that were mined and left inadequately reclaimed due to the bankruptcy of a mining company in Missouri. The mapping effort was initiated to aid in estimating reclamation liability of this multiple-permit bond forfeiture area. The work clearly demonstrated the usefulness of Mobile GIS technology for mapping, data collection and reclamation cost analysis. Additional efforts were underway during 2004 in Alabama and Illinois to improve the quality and accuracy of water and soil data collection. In 2005, OSM is using mobile computing technologies to aid in bond release decision making on 10,000 acres of permitted mine lands in Missouri. During 2005, OSM will continue to conduct workshops, assistance efforts and hands-on training sessions with state regulatory and AML programs to help introduce them to Mobile GIS and Mobile computer aided design (CAD) technologies for their program operations. During 2006, TIPS OSM and state participants in the Mobile Computing effort will work with other SMCRA programs to further perfect the technology and integrate it in SMCRA operations.

Mobile GIS: Bond Release Vegetation Assessment AECI: In spring of 2004 OSM's Mid-Continent Regional staff conducted vegetation assessments for bond release areas on the AECI Mining sites in Missouri. The data provided by the coal mine operator included: 78 paper copy (blue line) maps with data indicating permit boundaries, bond status, land use, pond locations, release areas, vegetation sampling locations and other various permit information. The paper maps were scanned, the line work was vectorized, and the map attribute information was captured. Free topographic, aerial photography and public land survey information were obtained from the internet, and all information was incorporated into a GIS. The GIS information was loaded onto a mobile computing device to locate spatially complex bond release areas and conduct verification of the bond release data through vegetation data collection and analysis.

Resource Analysis:

With Mobile Computing Technologies:

2 days for various resource professionals to conduct field data collection.

10 days for various GIS data collection and analysis.

Total = 12 days.

With Traditional Existing Methods:

60 days for GPS/Survey specialists to flag and orient maps for resource professionals.

10 days for resource professionals to conduct field data collection.

15 days for GIS data input and analysis.

Total = 85 days.

The net result with Mobile computing technologies is 85% less time and resources needed to complete this task. Furthermore, the natural resource professionals involved in this project believed that this work could not have been accomplished using traditional methods due to the complex spatial nature of the bond release areas. The mobile computing devices allow the user to visualize the land areas, permit boundaries, sample points, topography, and bond status, and other data live on the ground.

OSM Geospatial Team Development: TIPS has begun the establishment of a Geospatial Team to help make geospatial information and technologies more readily available to the national community of coal mining states, tribes, and OSM offices. The Geospatial Team will identify geospatial activities, policies, standards, and products that will increase the effectiveness and efficiencies of organizations working on SMCRA related projects on a national scale. Specifically, the team will assess the need for geospatial resources to support all regulatory aspects of mining and reclamation activities and the availability of geospatial information, systems, and expertise. The team will evaluate the gap between the requirements, information holdings, system capabilities and expertise; identify critical geospatial tools and services for federal, state, and tribal managers and staff; facilitate improved interoperability and sharing of geospatial resources; and will help to coordinate federal geospatial resources and initiatives to meet

departmental and national requirements. The effort is a strategic component of the Geospatial One-Stop Government initiative. The Geospatial Team's work involves:

- Developing a national strategy for implementing and promoting the use of geospatial technology within the SMCRA community;
- Providing solutions to problems affecting implementation of enterprise Geographic Information System (GIS) within OSM; and
- Communicating the results of their work to others.

Remote Sensing Program: The remote sensing initiative provides direction for the use of remote sensing as a tool to support Titles IV and V of the Surface Mining Control and Reclamation Act (SMCRA). General remote sensing support activities are: 1.) Conduct applied research in partnership with other OSM offices, tribes, states and other federal agencies, 2.) Distribute image processing and associated Geographic Information System (GIS) software to offices for on site processing and analysis, 3.) To provide formal training, on site workshops, technical support and general technology transfer, and 4.) To provide technical assistance for special project applications as requested.

TIPS Website. For more examples and information, visit 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. Upgrading and improving the website and its capabilities will continue into FY 2005.

g. Reclamation Support Activities

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 are 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 under development 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.

Indiana Enos AMD Wetland Design: The Indiana Division of Reclamation requested assistance in designing an AMD treatment wetland at the Enos tipple and gob pile area of the Patoka watershed. OSM staff evaluated a number of possible treatment options and provided a reclamation design to the State in CAD drawings. Project construction began in FY 2005.

Illinois TAB-SIMCO AMD Remediation: Illinois requested technical assistance with design of a remediation plan for the TAB-SIMCO AMD Reclamation Project during FY 2005. OSM staff assisted in evaluating a water sampling plan and conducted a site

investigation. The investigation included drilling six new boreholes, water sampling and design assistance. The mine pool is being monitored to develop remediation plans and to verify the results of reclamation efforts.

h. Applicant/Violator System (AVS)

The Applicant/Violator System (AVS) is a National information database OSM maintains to support many types of research and program efforts, but primarily it supports permit eligibility determinations under section 510(c) of SMCRA. As part of the permit review process, State and Federal regulatory authorities use the information contained in the AVS to evaluate an applicant's mining and violation history in order to determine the applicant's eligibility to engage in surface coal mining operations. OSM responded to 3,655 requests during fiscal year 2004 for these evaluation reports. The AVS is also used to determine the eligibility of potential recipients of AML reclamation contracts and grants under the Small Operator Assistance Program.

AVS Office staff provides services to other customers including the coal industry, citizens groups, and other Federal agencies. Some of the services provided include: providing software and technical assistance for customers wishing to access the AVS from a personal computer; updating information in the AVS for coal companies that mine in more than one State; providing basic and advanced system training; and providing investigative assistance to others on complex ownership and control issues. These and other activities will continue through 2006.

Ownership and Control Rule: OSM published a proposed rulemaking in the Federal Register in December 2004. Publication of the proposed rule represents the agreed settlement of the lawsuit brought by the National Mining Association concerning certain provisions adopted in the 2000 ownership and control final rule.

Transfer, Assignment, or Sale of Permit Rights: During fiscal year 2005, OSM published a proposed rule to revise its requirements for transfer, assignment, or sale of coal mining permit rights.

AVS Redesign Activities: During 2004, OSM initiated a redesign to dramatically improve the usability of the AVS. The redesign involves not only the transformation of the current system to a more user friendly, web-based system but also a rewrite of the business processes and change in program language to allow for ease in future development and modification. The redesign activities will continue through 2005.

Alternative Enforcement Initiative: During fiscal year 2005, the AVS office will continue to assist the Regulatory Authorities with more effective alternative enforcement remedies. The AVS Office provides training classes, investigative services and specific recommendations for sites with outstanding violations or for entities going through bankruptcy.

2. Technical Training

Of the \$3.4 million for Technical Training, \$2.2 million of the funds support OSM's Environmental Protection activities and \$1.2 million support Environmental Restoration activities. Training provided ensures OSM, State, and Tribal staff possess the necessary knowledge and skills to implement the Surface Mining program. This activity supports the Department's Resource Use and Resource Protection goals.

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 serves to update technical expertise and fosters consistent application of standards. Training is provided in each of the disciplines involved in implementation of SMCRA, which include engineering, hydrology, blasting, agronomy, and botany. The program also ensures training is available 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 the other changes in regulatory and associated reclamation activities.

All aspects of the program from identification of needs through course development and presentation are cooperative efforts of State, Tribal, and OSM offices. This joint effort exemplifies Secretary Norton's 4C's of cooperating, communicating, and consulting with local agencies to foster good conservation practices. Of the 28 State and Tribal programs, 20 have fewer than 50 employees and another 5 have fewer than 100 employees. There is an economy of scale achieved by the pooling of State and Federal resources that allows instruction in a wide variety of subjects each year for all State, Tribal, and OSM programs.

In addition to regularly scheduled FY 2004 courses, in response to specific requests, a special session of the NEPA Procedures course focusing on Public Facility Projects was held for the Navajo Nation; several sessions of the Effective Writing Course were held for the State of Montana and the Department of Justice; and Blasting and Inspection were offered internationally and for the Corp of Engineers. Meeting mid-year and emergency requests provides critical support to the States and Tribes and we anticipate meeting this type of request in FY 2006.

In FY 2004, the Program offered 55 sessions of 34 different courses to a total of 916 participants. Also, in FY 2004, a new course, Passive Treatment Systems for Acid-Mine Drainage, was added to course offerings. The purpose of the course is to provide students with highly interactive information and exercises that can be used to evaluate the application of passive treatment in clean streams, abandoned mine lands, and active mining projects; estimation of treatment costs; development of actual treatment designs; and assessment of existing passive treatment projects. The audience for this course is

permitting specialists, inspectors, and Abandoned Mine Land specialists. Another recently developed course, Acid-Forming Materials AML Workshop, which is designed to assist AML students in reclaiming problematic areas was modified for offering in Eastern States. Plans were made for extensively revising the five AML Design Workshops in FY 2005 and 2006 to meet the needs of staff who are being newly trained or crossed trained in AML project work. Significant progress was made on re-designing the Dangerous Openings class, and work is under way on the other four workshops including Dangerous Highwalls, Subsidence, Fires, and Landslides. In FY 2004, the training program conducted three low-cost workshops at the National Association of Abandoned Mine Program (NAAML) conference. We anticipate reaching students through this low cost method in FY 2006. FY 2004 topics included Acid-Forming Materials in Arid Lands; Speaker Presentation Skills; and a mini-course on Drilling and Grouting. The Drilling and Grouting course will be expanded to a full length NTTP offering in FY 2005. Preliminary planning work was also done on a site-investigation and AMLIS class.

Also in FY 2004, in support of the e-Government initiative component of the Administration Management Plan, the training program, in partnership with the U.S. Fish and Wildlife, made solid progress in making GPR follow-up evaluations, course registration, and other administrative processes available through the Internet by participating in the new DOI Learning Management System (LMS). This system will become fully operational in FY 2006. Additionally, we plan to update digital presentation technology.

In conjunction with the States, OSM evaluated proposals for several new hydrology courses including one on quantitative hydrogeology and one on forensic investigation of hydrologic problems. The Quantitative Hydrogeology: Theory and Application course was developed to provide students with an introduction to using quantitative methods to describe ground water flow and transport. This course was piloted in FY 2004 and added to course offerings in FY 2005. A new course, Forensic Hydrology Investigations, which provides additional practical applications will be piloted in late 2005 or early 2006.

Modeling on the success of the State and Tribal 2002 PHC/CHIA benchmarking session, in FY 2004, the training program worked with the Interstate Mining Compact Commission to offer a well attended workshop on Underground Mine Mapping. The session was offered in conjunction with MSHA as a follow up to Que Creek and Martin County incidents. A follow up to the FY 2004 will be held in FY 2005 and work on this critical issue will continue into FY 2006 and beyond. Benchmarking workshops provide the opportunity to share information about State model programs with the goal of adopting or adapting processes to more effectively deliver products and services (e.g. permitting) to customers. OSM anticipates that additional workshops will be held in 2006 in accordance with prioritized needs. Topics for benchmarking sessions are determined by State and OSM participants. Initial interest has been shown in topics such as subsidence control; bonding calculation and methodologies; contemporaneous reclamation; reclamation technology and techniques for active and abandoned mines;

water quality jurisdictional issues, and effective outreach and response to citizens under the Surface Mining Control and Reclamation Act (SMCRA).

In FY 2005, OSM plans to provide training to approximately 950 students. In FY 2006, the program plans to increase attendance to 1200. This includes offering additional course sessions for 140 students, 70 students at course pilots, and 40 participants in benchmarking sessions. The program had increased its program effectiveness rating each of the last several years and is now set at 93% for FY 2006.

b. TIPS Software Application Training

Training of state, tribal, and Office of Surface Mining personnel in the practical application of analytical software is an integral part of the technical assistance function. Instructor-led courses incorporate the reclamation experience of its instructors and students to provide a unique shared training experience. TIPS training during 2004 totaled 456 participants in 36 instructor-led classes. Twelve instructor-led courses were held at customer sites with critical training needs for software use. The training program employed 48 different instructors in 2004; 16 of these were state program experts. The Government Performance and Results Act rating for this training satisfaction for 2004 was 90 percent. The four categories making up this score breakdown as follows: class satisfaction rated at 87 percent, facility at 88 percent, lead instructor at 93 percent, and co-instructor at 92 percent. New courses offered in 2004 included Mobile GIS Computing and ERDAS Remote Sensing. Additional E-training courses were offered to students in 2004. Eighteen new one-hour GIS Workshops were offered in individual sessions in addition to 15 on-line courses through a contract with the Environmental Systems Research Institute Virtual Campus for basic geographic information system training.

TIPS Customer Courses Conducted in FY 2004

COURSES
AMDTreat (AMD cost estimation)
ArcGIS (Geographic Information System)
TerraSync Global Positioning Systems (GPS)
ArcPAD (GIS mobile computing)
ArcView (GIS)
Computer-Aided Design (CAD) Applications
Statgraphics (Statistics software)
Groundwater Vistas (ground water model)
Galena (slope stability)
SurvCADD (landform model)
AquaChem (water quality)
SDPS (subsidence prediction)
Aqtesolv (ground water model)
SedCAD (surface water sedimentation)
GIS Online Courses

During FY 2005, the TIPS training program expects to train 428 students in 35 classes; and for FY 2006, it projects that 425 students will be trained in the same number of classes.

c. Regional/Site Specific Training

OSM has regional training centers, which offer classes on customer requested topics and provide facilities for the national training program to minimize expenses. In FY 2005 and FY 2006, 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 Nation, Hopi, Crow and Northern Cheyenne) in their development of regulations and programs.
 - (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.
 - (3) Courses in the use of TIPS provided software and technology.

Revised Universal Soil Loss Equation Learning Modules: For the fourth consecutive year OSM's Western Region distributed CDs with Guidelines for the Use of the Revised

Universal Soil Loss Equation (RUSLE) on Mined Lands, Construction Sites, and Reclaimed Lands, for the public domain RUSLE Version 1.06, along with the upgraded software now operating in WINDOWS 2000 and XP environments. The guidelines are providing guidance for maximizing the accuracy of soil-loss prediction estimates, recommending procedures ensuring soil-loss estimates calculations that are generally reproducible, and identifying critical areas for future research. In its outreach, OSM has modified the above RUSLE Guidelines to complement the new U.S. Department of Agriculture's RUSLE 1.06c software. In addition, two e-learning modules on the RUSLE model have been added to the RUSLE CD and to the RUSLE information on the web site. Each module consists of a set of PowerPoint slides and a live narrative by the author, walking the user through the slides, the first set being information on creation of the RUSLE model for mined lands, construction sites, and reclaimed lands, and the second one on the use and misuse of RUSLE. In 2005, with cooperation of the USDA, ARS, RUSLE 2.0 full windows version will be deployed to all the state regulatory agencies and OSM customers.

Acid Mine Drainage Workshop: In 2005, OSM sponsored a three-day "Acid Mine Drainage Workshop" in Indiana that included case studies and field trips. Case studies were prepared for both active and passive treatment of AMD with a variety of geologic settings. Participants included 33 State and Federal staff from 8 states, the OSM Mid Continent Regional (MCR) Office and the Appalachian Regional Office. Participant evaluations rated the workshop as excellent with a 93% satisfaction rating. The Illinois Department of Natural Resources has proposed hosting a similar workshop in 2006.

Western Regional Workshops: In FY 2004, OSM sponsored four regional information workshops for new technologies implementation, at the Western primacy States request. All states regulatory agencies are attempting to develop processes for records conversion and document management within the framework of existing budgets, staffing resources, and prioritized needs. In FY 2005 and 2006, two innovative new technologies workshops will be held for the Western primacy states. The feedback from the four FY 2004 workshops indicates that technical presentations are offering new paradigms to state staff on how to work more efficiently, accurately, using new tools in shorter time period.

3. Technology Transfer

Of the \$3.2 million requested, \$1.6 million of the funds for technical transfer support OSM's regulatory program activities and \$1.6 million support OSM's abandoned mine land program. Technical transfer is an integral component of OSM's Restoration and Protection business lines providing national support to State and Tribal programs. Through the development of new technology and experimental practices this activity supports the DOI Resource Protection and Resource Use goal areas.

A sound technical development program ensures that the most current and valid scientific information is available to the industry, States, and Tribes. OSM plans to attain a 92 percent service rate in FY 2004.

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, however, in FY 2005 it proposes to support applied Science projects that address our major environmental issues. Currently, OSM's research needs are coordinated with the regulatory and research programs of the 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; current work includes the 2004 National Map pilot project in Colorado.

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.

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. As a long-term program that has significant monetary and time savings, electronic permitting provides more complete and up-to-date records for those involved in the permitting process. Currently, OSM is assisting primacy States in development and implementation of electronic permitting.

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 2005-2006, OSM plans to continue to coordinate activities with primacy States, tribes and industry and expand Federal/Industry electronic data exchange initiatives. OSM will support electronic permitting initiatives of States by concentrating on their needs in the area of data conversion, acquisition and storage, and interpretation of remote sensing data.

A few examples of electronic permitting achievements include:

- *Alabama* – The Alabama Surface Mining Commission (ASMC) is receiving EP through e-mail and CD submissions. The State has established a GIS for the coalfields and is actively incorporating EP information into the system.
- *Kentucky and Virginia* – Permits are now processed electronically routinely. All permit applications are electronically routed and reviewed from submittal to approval. Permit applications can be delivered electronically or in hard copy, in which case they are scanned into the office network by State personnel.
- *North Dakota* Public Service Commission (PSC) has the nation’s first fully paperless permitting system. Submittals in electronic format are not only for new mine permits, but also for annual hydrology reports, bond release applications, and annual wildlife surveys.
- *Utah* Division of Oil Gas and Mining (DOG M) databases are now linked with their GIS system, allowing staff to publish various use maps, with current and accurate technical information.

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 need of States, Tribes, and industry, OSM plans and presents technical topic forums. OSM partners with the States to develop technology transfer priorities. The OSM national and regional

technology transfer teams evaluate initiatives to encourage networking and information sharing that will result in program improvement or enhancement.

Mountaintop Mining and Valley Fills (MTM/VF):

The final programmatic EIS on MTM/VF and the corresponding Record of Decision are targeted for publication in FY 2006 and 2007. By extension, initiating and implementing the actions to further minimize the adverse environmental effects of MTM/VF, which will be identified within the Record of Decision, could necessitate technical and policy forums with the coal industry, the public, and State and Federal officials in the Appalachian Region.

Reforestation Initiatives: OSM continues its 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 to communicate reforestation information, staff presentations at professional meetings, and publications that transfer state-of-the-art science and technology to mining and reclamation professionals around the world. The environmental and economic benefits of this approach include higher quality reclamation, an increase in the number of sites reclaimed, economic opportunities for local communities, aesthetic and recreational improvements, sale of forest products by landowners, and the opportunity for reporting carbon reductions through sequestration in forests. This activity is of interest to mine operators, utilities, land management companies, mining companies, and environmental organizations. It provides the opportunity to promote ecologically diverse balanced forest ecosystems. Two publications have been produced and distributed by OSM that capture the state of the science on reforestation on mined lands. In addition, an Outreach Packet outlining the benefits of reforestation and designed to attract the attention of potentially interested parties has been published. During FY2004, OSM, in conjunction with Southern Illinois University and Purdue University, completed a study entitled “An Evaluation of Post SMCRA Reforestation Efforts in Indiana”, the results of which have been distributed by the Purdue University Extension Service and through the OSM Reforestation Website. The information will be useful to State reclamation programs and mining companies in guiding future surface mine permitting actions and in achieving more robust reforestation results.

In FY 2004, the Mid-Continent Region conducted a workshop on “Reforestation of Drastically Disturbed Lands”, and in FY 2004 the Appalachian Region launched the Appalachian Regional Reforestation Initiative. The initiative promotes the use of the Forestry Reclamation Approach (FRA) during reclamation of active coal mining operations and abandoned mined lands projects. The goals of these initiatives are three fold. They are to: 1) plant more high-value hardwood trees on reclaimed coal mined lands in Appalachia; 2) increase survival rates of planted trees; and 3) increase growth rates of planted trees. These initiatives encourage partnerships with local, state and Federal government agencies; academia; citizens groups; environmental organizations; and industry to educate, promote, and assist in reforestation efforts.

Coal Combustion By-Products (CCB): OSM has successfully pioneered numerous technology transfer events and products on this topic beginning with its first national technical interactive forum in 1996. In FY 2004, OSM held its fourth Technical Interactive Forum on “State Regulation of Coal Combustion By-Product Placement at Mine Sites” in Pennsylvania. The four sessions covered topics of: use of fluidized bed combustion materials in mine reclamation; state regulation of CCBs with case studies; environmental damage cases; and response to public concerns about CCB placement in Pennsylvania. There were 175 participants at the forum and participant surveys revealed a 95% satisfaction rating. OSM staff participated in other activities during FY2004 including serving on the Department of Energy Combustion By-product Recycling Consortium national steering committee to review research proposals for CCB product development, serving in the American Coal Ash Association/University of Kentucky planning committee for the World of Coal Ash International Coal Ash Symposium, and maintaining the CCB web site at (<http://www.mcrcc.osmre.gov/ccb/>). In FY 2005, OSM’s CCB steering committee is planning to conduct its fifth technical forum on “Reclamation, Risk, and Regulation with CCB’s at Active Mines” in conjunction with the World of Coal Ash conference in Kentucky. The three topics to be examined during the symposium include: Case studies of CCB Mine Placement Design; Implementation and Monitoring (of CCBs at mines); and Regulation of CCB Placement at Mines.

Bat Conservation and Mining : OSM has cosponsored three technical interactive forums related to bat conservation and mining to establish the state of the science. OSM has published and distributed two publications “Proceedings of Bat Conservation and Mining” and “Proceedings of Bat Gate Design.” These publications will serve to educate the mining industry, reclamation professionals, biologists and the general public on the importance of mines to bats and on methods of protecting bats during mining and other land management activities. In recent years, OSM has stepped up its activities in regard to protecting the endangered Indiana bat (*Myotis sodalis*) during Mining and reclamation activities. The endangered Indiana bat is found in more than half of the states with SMCRA regulatory programs. During 2005, OSM lead an effort by Federal and State wildlife agencies, state SMCRA programs and academics and mining industry representatives to develop and conduct a national symposium on Indiana Bats and Mines. Over 150 people attend the symposium. In a participant survey, 91% of respondents indicated that they were either extremely satisfied or very satisfied with the symposium. Proceedings will be produced and distributed during FY2005. OSM is working with the State SMCRA programs and the Fish and Wildlife Service to ensure that these valuable animals receive full protection under the Endangered Species Act with minimal disruption to coal production.

Reports, Forum, and Workshop Proceedings: OSM publishes and co-sponsors the publication of numerous forums 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 for as wide a client audience as possible. During 2005 and 2006, OSM will continue to develop, distribute, and communicate these products.

OSM Technical Library: OSM maintains a technical library to provide access to technical, scientific, and legal information for the agency, States, tribes, industry, citizen groups, and the public through a variety of services, reference assistance, technical research, document delivery, and the dissemination of critical current awareness information. The library staff anticipates that by being on the web, the use of the collection will increase significantly. In addition, it is projected that the library staff will receive approximately 360-400 publication requests in FY 2005 and FY 2006. 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. In order to provide worldwide access to the information resources in the collection, the library catalog is web-accessible to anyone with Internet access.

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 be at least 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, 46 experimental practices have been undertaken and 26 completed. Of the completed projects, 21 were determined to be successful and 5 unsuccessful. Eighteen are currently underway; and 2 were terminated due to regulation change.

e. Educational Outreach

To make the public and students aware of OSM's responsibilities and of its environmental stewardship mission, OSM staff provides educational outreach to 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 phases of surface mining reclamation using an open-pit mine model with reclamation equipment and activities in place, as well as providing educational posters and materials involved in permitting, monitoring and reclaiming a mine site. Additional outreach is provided through publications and distribution of forum proceedings, such as the *Approaching Bond Release: Revegetation, Reclamation Issues, and Surface Mining Applications in the Arid and Semi-Arid West*; the *Boy Scout Mining Information Handbook*; *Wildlife Habitat Construction and Wildlife Use of Reclaimed Lands in the Arid and Semi-Arid West*. Conversion of important

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technical documents into electronic format, such as the *Handbook of Western Reclamation Techniques*, and *Sagebrush Establishment on Mined Lands: Ecology and Research*, and compilations of technical information such as OSM's Mid-Continent Regional Coordinating Center's Comprehensive Technology Transfer CD, further assist with their dissemination. Assisting in the integration of the *Handbook of Western Reclamation Techniques* into university curricula is made easier as the above documents are also made available on OSM website. Outreach efforts will expand and continue in FY 2005 and 2006.

FY 2004 PROGRAM PERFORMANCE ACCOMPLISHMENTS

In 2004, the major accomplishments in the Technology Development and Transfer program activity include:

- The Small Operators Assistance program helped 59 small coal mine operators collect technical data needed for mine permit applications.
- National Technical Training Program (NTTP) offered 55 sessions of 34 different courses.
- The Technical Innovation and Professional Services conducted 36 classes for 456 students.
- Technical library staff responded to more than 350 requests from state regulatory staff, other federal agency staff, citizens, coal industry, consultants, and academics.
- OSM jointly sponsored a Geospatial Conference for 162 attendees from government, academia, industry and the public in Atlanta, GA.
- OSM sponsored 4 innovate new technologies workshops for 144 Western primacy State and OSM staff.
- OSM, in conjunction with Southern Illinois and Purdue Universities, completed a study entitled “An Evaluation of Post SMCRA Reforestation Efforts in Indiana.”

FY 2005 PLANNED PROGRAM PERFORMANCE

- OSM will provide TIPS training for approximately 428 students.
- OSM will continue to participate in the Acid Drainage Technology Initiative collaborative effort among federal agencies, industry, the states, academia, and the National Mine Land Reclamation Center to promote communication and technology enhancement in the field of acid mine drainage.
- In 2005, the AVS Office will continue to redesign the AVS software.
- NTTP will increase its training by 50 students to 950 students.
- OSM will sponsor a technical interactive forum on Regulation, Risk, and Reclamation with CCB's at Mines in conjunction with the World of Coal Ash Conference to an international audience in Lexington, KY.
- OSM will sponsor two innovative new technologies workshops for 80 Western primacy State and OSM staff.
- Meet performance goals as follows:

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	FY 2004 Actual	FY 2005 Plan	FY 2005 Plan versus FY 2004 Actual
Customer satisfaction in the quality and timeliness of AVS provided services. (BUR)	98%	95%	-3% (-3%)
Customer service rate in the quality of technical assistance. (BUR)	100%	94%	-6% (-6%)
Percent satisfaction with scientific and technical products and assistance. (BUR)	97%	92%	-5% (-5%)
Customer effectiveness rate in the quality of technical training – NTTP. (BUR)	97%	93%	-4% (-4%)
Number of students trained – NTTP. (BUR)	916	900	-16 (-8%)
Customer satisfaction rate for TIPS. (BUR)	90%	89%	-1% (-1%)
<p><u>Accomplishment Data:</u> Technical training measures are based on customer surveys and course attendance records. Measures of general technical assistance, technology transfer, and AVS success are also based on customer surveys. BUR = Bureau Measure</p>			

JUSTIFICATION OF 2006 PROGRAM CHANGES

Technology Development and Transfer	FY 2006 Budget Request	Program Changes (+/-)
\$(000)	19,048	957
FTE	136	0

National Technical Training Program (+\$500,000) - OSM’s National Technical Training Program works to ensure that the succession planning goals of State, Tribal, and OSM surface mining agencies are met so that new staff is trained or cross-trained prior to the departure of existing staff. With additional funding in 2006, the program will be able to train 250 additional students and develop critical new classes to meet changes in available technology and in the changing workforce. These new classes will make available to students the latest advances in reclamation technology to effectively implement SMCRA. OSM technical instructors will be trained through a refresher course to incorporate advances in instructional technology. New classes developed will include training in geology, vegetation, hydrology, and engineering courses to address changes in technology, changes in program policy due to regulatory changes or in response to litigation. To meet the needs of Abandoned Mine Land staff, a new course on policy implementation will be developed for program managers and new AML design workshops will be developed to address field needs. These additions will enable us to offer 2 new courses, offer an additional 8 course sessions plus benchmarking to serve an additional 250 students. These additions directly address increasing the knowledge and skill base to meet Resource Protection watershed goals and Resource Use optimal value goals. This program also supports the increase in technical capacity of OSM employees and inspectors as required under the FY 2006 PART.

Technical Innovation and Professional Services (TIPS) (+\$1,000,000) – OSM’s national Technology Innovation and Professional Services (TIPS) Team is requesting \$1million to increase the support provided to States, Tribal and OSM offices for mobile computing, training, remote sensing, specialized hardware, and software licenses. These initiatives will help OSM provide better support for environmental restoration and environmental protection business lines. This Program also supports the increase in technical capacity of OSM employees and inspectors as required under the FY 2006 PART.

This proposal would extend the benefits of mobile computing technology to TIPS customers nationwide; provide for development of two additional web-based training courses in the following TIPS core software: Subsidence Deformation Prediction System (SDPS) and ARCGIS 3-D Analyst; provide remote sensing data acquisition, software, specialized hardware, and thermal cameras; and provide additional TIPS core software licenses to meet demand in growth of the program.

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Applied Sciences (+\$1,000,000) – OSM’s Applied Science Program would work to improve the technologies associated with mining and reclamation. In FY 2006, the program will address those complex issues surrounding environmental restoration and protection as it relates to mining and reclamation, while maximizing human capital. It is anticipated that approximately 10 projects at an average cost of \$100,000 will be possible with the increased funding.

This initiative will also include work on underground mine mapping. Mine maps have been created for centuries by miners, mine engineers and surveyors for use in mine planning and management decisions. Maps can provide information today for use by mine engineers, community planners, developers and regulators when making decisions on land use, development, property purchase, and environmental protection.

Small Operator Assistance Program (-\$1,478,000) - This proposal does not request funding for SOAP. In FY 2005, the program is funded at \$1.478 million (less two rescissions). Operating on a first-come, first-serve basis, some programs are closed to new applications for much of the year after all their funding is expended.

Information Technology (-\$65,000) – Represents overall Bureau savings from FY 2005 to FY 2006 in IT investments.

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FY 2006 TECHNOLOGY DEVELOPMENT AND TRANSFER PERFORMANCE

Resource Protection End Outcome Goal 1.1: Improve Health of Watersheds, Landscapes, and Marine Resources								
Measures:	FY 2003 Actual	FY 2004 Plan	FY 2004 Actual	FY 2005 President's Budget	FY 2005 Revised Plan	FY 2006 Plan	Change in Performance 2005 Plan to 2006	Long-term Target (2008)
Number of land acres reclaimed or mitigated from the effects of degradation from past mining. (Calculated equivalent acres) <u>1/ 3/ 4/ (SP) (PART)</u>	6,539	6,900	6,965	8,200	6,900	8,200	1,300 +19%	8,200
Number of stream-miles for which degradation from past surface coal mining has been improved <u>1/ 2/ 4/ (SP) (PPM)</u>	UNK	150	33	175	35	35	0	35
Number of surface acres of water for which degradation from coal mining has been improved. <u>1/ 2/ 4/ (SP) (PPM)</u>	UNK	150	36	175	35	35	0	35
Number of active partnering and leveraging agreements. <u>1/ 2/ (PPM)</u>	UNK	56	74	56	56	56	0	56
The amount of increased funds derived from active partnering and leveraging agreements. <u>1/ 2/ (PPM)</u>	UNK	70,000	8.179 million	70,000	70,000	70,000	0	70,000
Customer service rate in the quality of technical assistance (applies to both the Environment Protection and Resource Use Goals). (BUR)	100%	94%	100%	94%	94%	94%	0	94%
Percent satisfaction with the scientific and technical products and assistance (applies to both the Environment Protection and Resource Use Goals). (BUR)	93%	92%	97%	92%	92%	92%	0	92%
Customer effectiveness rate in the quality of technical training – NTTP (applies to both the Environment Protection and Resource Use Goals). (BUR)	96%	92%	97%	93%	93%	93%	0	93%
Number of students trained – NTTP (applies to both the Environment Protection and Resource Use Goals). (BUR)	974	900	916	900	950	1,200	250 +26%	1,200
Customer satisfaction rate for TIPS training (applies to both the Environment Protection and Resource Use Goals). (BUR)	91%	89%	90%	89%	89%	89%	0	89%

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Resource Use End Outcome Goal 2.1: Manage or influence resource use, and ensure optimal value								
Percent of active sites that are free of off-site impacts. <u>1/</u> (SP) (PART)	92.3%	93%	93%*	93%	93%	93%	0	93%
Number of acres where reclamation goals are achieved as evidenced by release from Phase III Performance Bonds. <u>1/ 2/</u> (SP) (PART)	48,528	70,000	49,054*	70,000	70,000	70,000	0	70,000
Customer satisfaction in the quality and timeliness of AVS provided services. (BUR)	98%	95%	98%	95%	95%	95%	0	95%
Customer service rate in the quality of technical assistance (applies to both the Environment Protection and Resource Use Goals). (BUR)	100%	94%	100%	94%	94%	94%	0	94%
Percent satisfaction with the scientific and technical products and assistance (applies to both the Environment Protection and Resource Use Goals). (BUR)	93%	92%	97%	92%	92%	92%	0	92%
Customer effectiveness rate in the quality of technical training – NTTP (applies to both the Environment Protection and Resource Use Goals). (BUR)	96%	92%	97%	93%	93%	93%	0	93%
Number of students trained – NTTP (applies to both the Environment Protection and Resource Use Goals). (BUR)	974	900	916	900	950	1,200	250 +26%	1,200
Customer satisfaction rate for TIPS training (applies to both the Environment Protection and Resource Use Goals). (BUR)	91%	89%	90%	89%	89%	89%	0	89%
Serving Communities End Outcome Goal 4.1: Protect lives, resources and property.								
Number of people with reduced exposure potential to safety risks from abandoned mine lands. <u>1/ 2/ 5/</u> (SP) (PART)	UNK	10,000	160,257	11,000	11,000	11,000	0	11,000
Percentage of declared emergencies abated within six months. <u>1/ 2/</u> (PPM)	UNK	92%	98%	95%	95%	95%	0	95%
Number of people directly affected (Emergencies abated). <u>1/ 2/</u> (PPM)	UNK	8,250	11,400	8,250	8,250	8,250	0	8,250
<p><u>1/</u> OSM collects information through various information systems and from various States and Tribes participating in OSM programs. The information is considered reliable for indicating performance trends and being the basis for decision making. <u>2/</u> Baseline data was not available when determining projections. Projections to be revised to reflect actual data. <u>3/</u> For simplifying reporting, reclamation results for each of the hazard types (e.g., number of open shafts, miles of stream, feet of highwall) listed in the inventory are converted to acres. <u>4/</u> Reduction in target for FY 2005 Revised Plan reflects funding request not enacted. <u>5/</u> Information calculated from projects reported completed in AMLIS matched with the number of people residing within one mile radius of project calculated from census tract data.</p> <p>* Estimated data: State regulatory authorities provided data for the time period July 1, 2003, to June 30, 2004, to accommodate the accelerated publishing requirements of the OSM Annual Report. Federal program data submitted for the federal fiscal year. SP = DOI Strategic Plan Measure; PART = Program Assessment Rating Tool Measure; PPM = Proposed PART Measure; BUR = Bureau Measure; UNK = data unavailable</p>								