2006 OSM Fast Facts

1,446
students trained in NTTP courses.

350
students trained in TIPS courses.

Technology

Members of the Hope Tribe use GIS technology to identify permit boundaries.

Technology Development and Transfer

"New capabilities emerge just by virtue of having smart people with access to state-of-the-art technology." ...Robert E. Kahn

Developing new technologies and making them widely available supports OSM's goal to strengthen the capabilities of the States, Tribes, and OSM staff to implement the Surface Mining Act effectively.

Technology Development and Transfer includes a number of successful partnership programs, including technical assistance, training, technology transfer and development — all of which enhance technical skills needed for government agencies to effectively and efficiently meet environmental and safety laws. Cost-effective compliance helps industry remain competitive with other energy sources. Helping industry achieve up-front compliance will reduce the need for additional regulatory resources.

OSM is now focusing on developing tools to improve mining and reclamation technologies nationwide.

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 participates in 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 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.

OSM's Technology Transfer activities bring a new approach to nationwide cooperation and customer service. They encourage the timely and efficient use of our natural resources while protecting the environment.

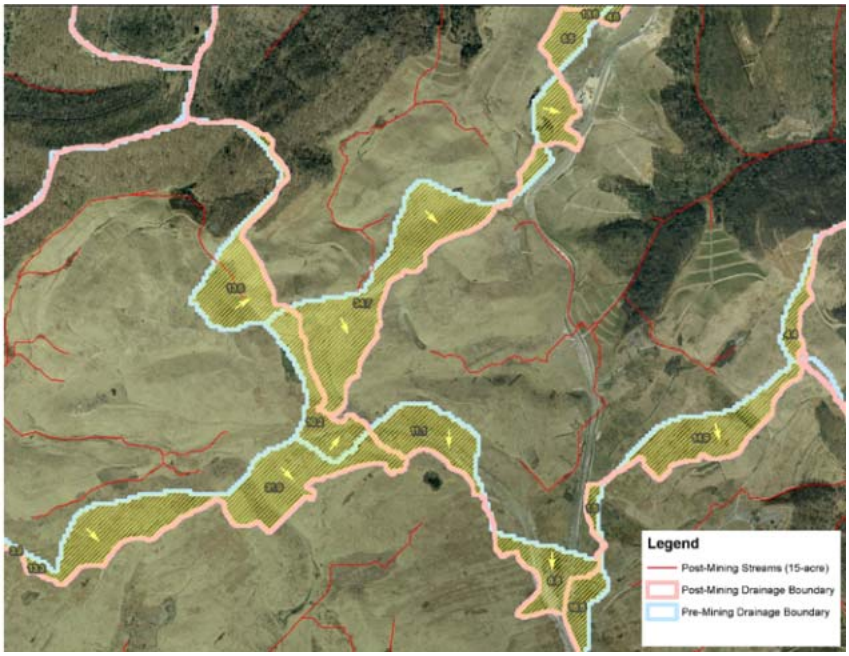
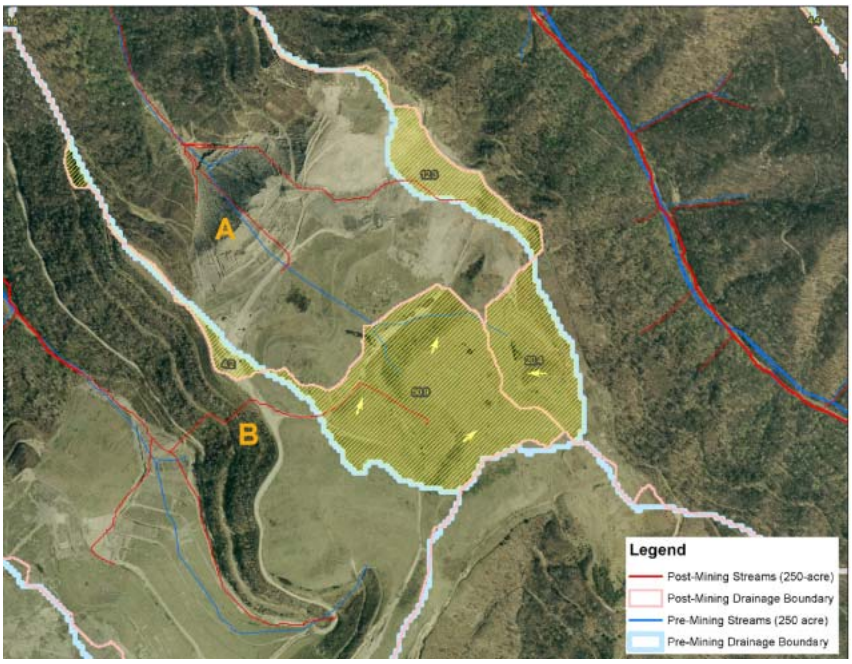


Photo showing shifts in drainage divides due to mining. Arrows indicate the direction of shift; labels indicate polygon areas, in acres.

Software Tracks Drainage Changes

Staff from OSM and the West Virginia Division of Environmental Protection evaluated the capability of Geographical Information Systems technology to characterize changes in drainage patterns due to surface mining activity. The study compared a variety of elevation data sources representing pre and post mining conditions for several test sites. The study also included sites where no mining had occurred as a control. ESRI's ArcInfo software, provided by OSM's Technical Innovation and Professional Services (TIPS), was essential for conducting data preparation and presentation. ESRI's model builder and spatial analyst extensions were used in the analysis of the landform drainage patterns. The software applications were essential in determining shifts in drainage due to mining.



Pre-mining drainage to the stream at point A that has been redirected to B, causing a 50 acre change in drainage area. Arrows indicate the direction of shift; labels indicate polygon areas, in acres.

Congress Directs OSM to Coordinate National Coal Study

In the Consolidated Appropriations Act, P.L. 108-447, Congress directed the Office of Surface Mining to contract the National Research Council of the National Academy of Sciences to carry out a twenty-four month study on coal research, technology, and policy matters.

Congress indicated the need for involvement in the study by OSM, Department of Energy, U.S. Geological Survey, Mine Safety and Health Administration, National Institute for Occupational Safety and Health, Environmental Protection Agency and other Federal and State agencies.

The study is to review the following:

(1) The importance of coal to the U.S. energy mix over the next 25 years, including the role coal plays in an integrated energy and environmental policy in order to develop a more comprehensive, strategic roadmap that builds on economic growth, fuel diversity, energy security, and environmental sustainability.

(2) Coal reserve assessments based on recent trends in the coal sector and examine the current and future role of coal imports and exports.

(3) The full range of local, regional, national, and global issues and challenges that lie ahead for the production and utilization of coal.

(4) The categories of coal research currently being carried out in the U.S. and whether and how technology developments in other fields can be applied to the coal sector.

(5) The priority needs for coal research, including in the areas of exploration, discovery, reserve assessment (including in terms of commercial feasibility for known reserves), extraction, coal preparation, delivery to market, waste disposal, reclamation, health and safety, community impact, environmental practices, education and training, and productivity.

(6) The need for a broad-based, coordinated, multi-agency coal research and development program.

(7) Options for supporting and implementing a broad-based coal research program, including approximate costs, and the relative roles and commitments of the public and private sectors now and into the future.

OSM and the National Academies entered into a cooperative agreement in July 2005. The NRC committee was formed in December 2005 and held five committee meetings during FY 2006 to gather information and prepare the report. The final information gathering meeting of the committee will be held in November 2006.

The committee's report is scheduled for completion in the summer of 2007.

Technology at Work:

Helping a Pennsylvania Community Study Solutions to Water Problems

Berlin, Pennsylvania's municipal water system faces two major problems in trying to boost water supply for the community.

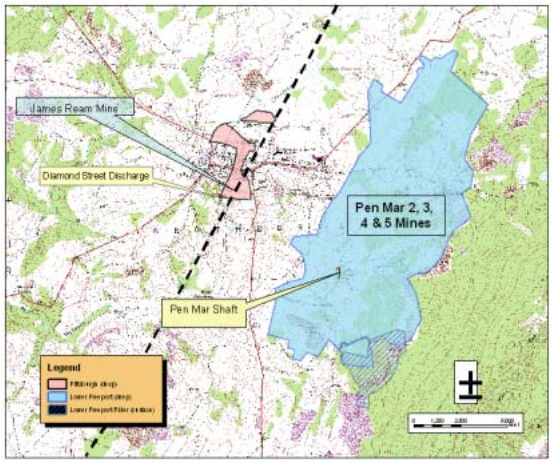
First, Berlin pays 14 cents per thousand gallons of water obtained from the adjacent Susquehanna River Basin. Second, during extreme drought the available supply is barely enough for the combined needs of the Borough and a local business. Snyder, a potato chip manufacturer, uses more than 80,000 gallons per day. This is 18% of Berlin's total supply.

State and local officials asked OSM to evaluate the potential for using the discharge water from two nearby underground mine complexes to supplement the existing water supply. OSM focused on the quantity of water available including low-flow events, water quality and potability.

OSM's study yielded these recommendations:

> The first discharge point, known as Pen Mar Shaft, could provide the quantity of water Berlin needed. However, the water quality of the discharge requires treatment to meet drinking water standards.
>
> The second discharge point, known as Diamond Street, meets primary and secondary drinking water standards. Unfortunately, it supplies a limited amount of water during low flow periods.
>
> The Diamond Street discharge can be a water source for fire fighting, street cleaning, and/or irrigation of nonfood vegetation.
>
> The Pen Mar Shaft discharge requires conventional treatment methods used for mine drainage except for sulfate. Sulfate would require costly reverse osmosis or less expensive dilution with a low-sulfate water source to achieve potability.

OSM has presented its final recommendations to the State, community and company officials.



Pen Mar project map

Pen Mar Shaft discharge

"AMDTreat" Does the Trick

Unique Software Estimates Mine Drainage Treatment Costs

In 2006 government agencies and mine water practitioners got an improved tool when a new version of "AMDTreat" was released.

The innovative software makes it possible to estimate costs to treat acid mine drainage (AMD). OSM partnered with the Pennsylvania and West Virginia Departments of Environmental Protection to release Version 4.0 of the popular program.

AMDTreat provides a variety of treatment options and performs economic analysis of each option. The program provides an effective decision-making tool in the industry.

AMDTreat estimates the cost of constructing and operating passive treatment systems such as vertical flow ponds, anoxic limestone drains, anaerobic and aerobic wetlands, and manganese removal beds.

It can calculate the capital cost of constructing chemical treatment systems for caustic soda, ammonia, pebble quick lime, and soda ash. It can also estimate a number of ancillary capital costs, including building retention ponds, roads, land access and ditching and performs engineering cost analysis.

Annual costs for chemical reagent consumption as well as other sampling, labor, maintenance, pumping and sludge removal costs can all be studied using AMDTreat.

Version 4.0 gives users enhanced financial forecasting and recapitalization tools and the ability to model costs for multiple treatment structures (up to 99 each) of the same type in series or in parallel using different water parameters for sizing each structure.

The new software makes it possible to capture up to 1485 itemized costs (up from 15) and adds cost modules for oxidation chemical, Limestone Bed, and Bio-Reactor treatment.

To learn more, please visit the AMDTreat website (http://amdtreat.osmre.gov).

‘TIPS’ Provides Specialized Computer Support

“Technology made large populations possible; large populations now make technology indispensable.”

John Wood Krutch

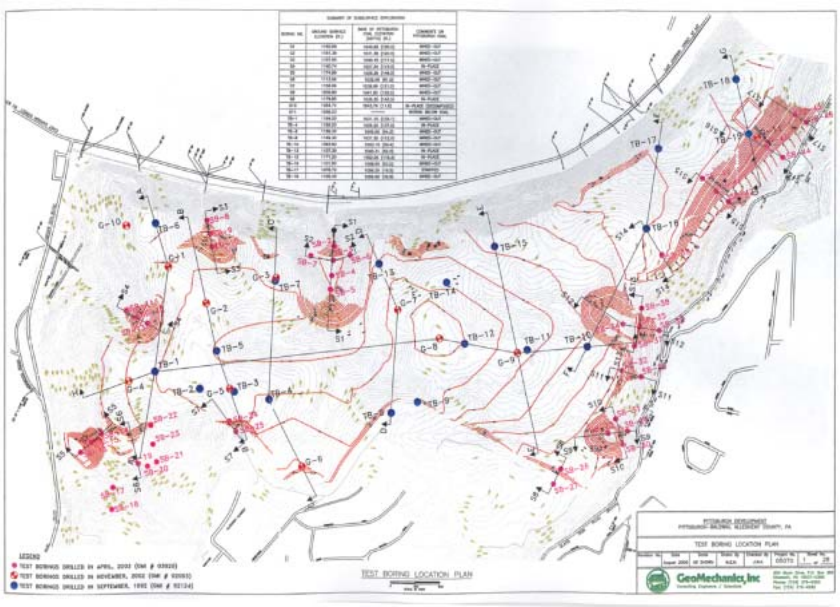
The Technical Innovation and Professional Services (TIPS) component of OSM provides specialized commercial hardware, scientific software, customized software training, and technical assistance to its user community.

TIPS supports and enhances the technical skills that States, Tribes, and OSM offices need to operate their regulatory and reclamation programs, and to effectively implement the Surface Mining Act.

To better address customer needs, TIPS established technology workgroups in the fields of Mobile Computing, Computer Aided Drafting (CAD), Geographic Information Systems (GIS), Remote Sensing, Hydrology, and Technology Training.

TIPS continues to expand its ongoing mobile computing initiative by significantly accelerating delivery of mobile computing technology to users. Recently purchased hand-held GPS/GIS equipment, tablet computers, and sophisticated software and peripherals will enhance the ability of TIPS customers to take geospatial technology and data to the field.

An OSM employee uses the latest mobile computing technology to assess the suitability of a wetland wildlife mitigation site in Missouri.



Site layout for the Heights of South Hills Development Project

Specialized Software Models Slope Stability

In March 2006, the Office of Surface Mining and two Pennsylvania agencies partnered to use TIPS software to review a unique surface mining permit in an urban area near Pittsburgh.

The site had been previously surface and deep mined. The property owner wanted to develop the site into a race track facility and residential community. The site was redesigned for 17 fill areas, including eight large valley fills.

Engineers from OSM worked with geologists from the Pennsylvania Department of Environmental Protection and Bureau of Waterways Engineering Division of Dam Safety. The team evaluated a number of geotechnical aspects of the site including soil and rock properties, soil borings, site layout, and surface drainage controls.

OSM engineers focused on slope stability of the cut and fill areas in the site, employing GALENA® slope stability software to analyze the site. The TIPS team furnishes GALENA® in its suite of software, and provides online and classroom GALENA® training.

GALENA® allows for simulation of geological, groundwater and external force conditions to analyze the stability of a modeled slope. The software easily allows the user to run many different types of analysis in minutes. The program developed tabular and graphical output that OSM engineers used to make recommendations about the slope stability of the valley fills.

Mobile Computing Takes Facts to the Field

Mobile computing devices and software allow inspectors to take maps and permit data to the field for review and verification of mining and permitting activities.

The TIPS CAD Team workgroup includes members from the States and OSM that partner to provide a variety of services to TIPS customers. All members are proficient in the Autodesk and Carson software provided by TIPS and continually review changes and enhancements to the software packages. New software is also evaluated by the team to ensure that TIPS provides the latest advances in technology to its customers.

Team members oversee the distribution and provide installation directions for new or updated software. The team also creates, maintains and updates training materials for six courses in the TIPS Training Program. Other assistance is provided through online learning materials and tech support.

OSM employees presented a paper on “*Take Autodesk Map® to the Field*!” at the annual 2006 Autodesk User Conference. The conference provided learning opportunities on the latest Autodesk engineering tools and applications in a structured format. It also provided important information and tools that the TIPS CAD Team members use for the development and maintenance of TIPS training courses, and support of TIPS software applications.

OSM, States Build Inventory Of Underground Mine Maps

The National Mine Map Repository (NMMR) in Pittsburgh has become the prototype facility for archiving information on abandoned surface and underground mines throughout the United States.

Events like the 2002 Quecreek incident in Pennsylvania, in which miners' lives were endangered, have shown the hazards of failing to have accurate mine maps readily available.

The Repository collection currently contains about 139,000 mine maps. About 82,000 maps have been scanned and stored electronically. The Repository receives both digital and hard-copy maps from all sources and currently scans about 3,000 maps per year.

To meet the increasing need for mine maps, OSM has developed a five-year plan to improve outreach to map owners, improved technical capability for the electronic copying and storage of mine maps, and developing a web-based retrieval system for mine maps to improve access for the public and government agencies. Last year OSM invested more than $400,000 in equipment.

A number of States have also been acquiring, preserving, and processing underground mine maps and developing their own map repositories and archives. Their methods for archiving and distributing maps over the internet serve as models for OSM and other States.

OSM Helps in Topographic Survey

The Missouri Department of Natural Resources, Land Reclamation Program asked OSM staff to help with topographic surveying in a coal mine site left partially unreclaimed due to the bankruptcy of the mining company. The goal was to obtain a topographic survey and at the same time document reclamation features that needed to be addressed. OSM staff successfully detailed the features of interest for completion of the project. OSM continues to work with State and Tribal partners on workshops, field demonstrations and training to increase the use of Mobile computing.

Part of a QuickBird Satellite image of a Centralia, WV, mine taken in 2006.

Satellite images give inspectors an "eye in the sky"

Satellite images of surface mines help mine inspectors plan field visits, provide supporting information for consultations with mine operators and aid in the preparation of maps for inspection reports. OSM's TIPS staff assist OSM regions, Tribes and States acquire high- resolution QuickBird satellite imagery, Light Detection and Ranging (LiDAR) imagery as well as aerial photography. In 2006, TIPS provided imaging and mapping services for all three OSM regions. In support of Surface Mining Act activities on Indian and Federal lands in the western US, imagery was procured for six separate mine sites. QuickBird satellite imagery was acquired for the States of Virginia and Tennessee. Prototype investigations are being conducted by OSM on selected areas in these States to determine the feasibility of using high resolution satellite imagery to identify Abandoned Mine Land sites, including Acid Mine Drainage locations and water quality trends, and land use classification. QuickBird satellite imagery was also purchased for a specific area for the State of Indiana. This imagery will be used by the State of Indiana to inventory Acid Mine Drainage seeps.

Applied Science Effort Supports New Technology

The Office of Surface Mining funded 12 applied science projects in 2006 as part of the agency's goal of fostering new technologies that promote on-the-ground mine land reclamation.

The Applied Science program is geared to meet the needs of State programs as well as serve national interests. Proposals are selected based on their adherence to regional special interest topics, technical merit, technology transfer potential, cost sharing, and overall technical quality. All projects are supported by a State Regulatory or Abandoned Mine Land Agency.

In Appalachia, the selected projects cover a variety of areas including: developing robotic mapping of underground mines; a fast and reliable method to produce data on critical wildlife habitat and natural areas; and rapid geomorphic assessment technique to protect streams from sedimentation in a watershed. Other projects will evaluate the effectiveness of using water quality management controls called "Best Management Practices" in receiving streams; develop cost-effective *in-situ* mine water drainage treatment; and enhance the reforestation effort by evaluating the best soil preparation methods on reclaimed mine land for planting American Chestnut tree seedlings.

In the West, the projects will address the influence of topsoil handling practices and improvement of reestablishing native vegetation; evaluate the placement of native shrubs on reclaimed coal-mined lands; and identify factors that limit the growth and survival of planted aspen trees on surface-mined land.

Three projects from the Mid-Continent Region will develop a soil property based formula to promote productive agricultural soil; demonstrate acid mine drainage water treatment using sulfate-reducing bioreactor cell technology on low-flow, metal-rich acid seeps; and will improve the predictive tests and models to assess the long-term potential for acid generation at mines.

See "Reaching Out to Minority Schools," page 55

People living near mines often complain about ground and air vibrations, and fly rock.

OSM and Partners Work To Reduce Blast Impacts

Explosives are used to break the rock above coal in surface mines. Vibration energy is transferred outside the mine site and may impact adjacent property. Fly rock is also another blasting impact. These adverse effects beyond the permit boundary are the leading source of citizen complaints.

OSM partners with the States to bring new technologies for compliance to the field and to minimize the adverse effects of blasting. OSM partners with professional associations and other Federal agencies on training to improve the blasting performance and to ensure accurate accounting of explosive use.

Blasters at coal mines must be certified in the use of explosives and its adverse effects. OSM redesigned the certification test for use in Federal program areas. OSM and cooperating partners are developing a national tracking system for certified blasters. The database will allow OSM and its partners to track the current status of certifications and the performance of blasters.

OSM partners with the States and industry to train certified blasters in the state-of-the-art blasting and monitoring methodologies. Training topics include remote blasting machines, electronic detonators, GPS, seismographs, video cameras, public relations and forensic investigations.

OSM blasting specialists have been called for assistance when a unique or challenging blasting environment is encountered. These requests may include support in permitting, inspection, enforcement actions, and AML closure projects. Special projects have included ensuring rock slope stability, preventing fly rock in steep slope areas, special studies of vibration impacts on historic structures, evaluation of the impact of vibrations on endangered bats, and site evaluations on the cause of damage to public or private property.

Protecting Species Requires a Plan

OSM and the State regulatory authorities are required under the Endangered Species Act (ESA) to consult with the US Fish and Wildlife Service (FWS) and other State authorities regarding threatened and endangered species.

In 1996, FWS issued a Biological Opinion that concluded that coal mining operations and reclamation activities were not likely to affect the existence of threatened or endangered species. It further stipulated that it would not adversely impact designated or proposed critical habitats.

A requirement of the Biological Opinion was that regulatory authorities develop protective measures for threatened and endangered species that might be affected by surface mining. OSM is working with the States to develop a plan for these species.

Guidelines for the development of protection and enhancement plans for the Indiana bat have been developed and are being implemented in Ohio, Tennessee and West Virginia. Plans are being developed in Indiana and Illinois.

A plan is also being developed in Tennessee for the Blackside Dace, a Federally threatened fish.

Guidelines are being developed in Virginia for the protection of endangered mussels.

(Left) A coal seam fire venting near a highway. (Right) A thermal image of the same area showing surface temperatures associated with the vent.

Thermal Cameras Highlight Hidden Hotspots

OSM has two thermal cameras (ThermaCAM™ E4) for use in locating coal seam fires. ThermaCAM is a hand held device that can also be used from an aircraft. In 2006, the camera was used in the States of Washington, Maryland and Pennsylvania to conduct site characterization on coal seam fires.

OSM staff completed mapping an underground mine fire in the Cougar Mountain Regional Wildland Park in King County, Washington, using the thermal camera and an additional helicopter-mounted thermal infrared camera. There was concern expressed from the Park about noxious gases being emitted from the ground fissures as well as the potential for ignition of a fire. Public safety issues in the park were a concern as there is potential for sudden and unexpected ground collapse in the immediate vicinity of the mine fire fissures.

Thermal mapping was ground referenced to the topography and mine maps, and aerial thermal infrared mapping geo-referenced the thermal images to the topography and the existing mine maps. The mapped areas established a baseline of fire locations and intensity.

OSM staff used the thermal camera in Pennsylvania to locate and record surface temperatures from a coal refuse fire that increased in area and intensity located near Wilkes-Barre, PA. Safety issues have become a concern as the fire threatened a sewer treatment plant and caused severe smoke conditions over a nearby highway.

Use of the thermal camera helps to determine and monitor site conditions and to direct and prioritize fire mitigation efforts.

TIPS Training Program

Technology *With a Purpose*

The TIPS Training Program trains hundreds of students every year in the use of high technology scientific and engineering tools. As part of the TIPS service, the TIPS Training Program is a collaborative effort between OSM, the States, and Tribes. Although the TIPS tools are off-the-shelf applications, the specialized training TIPS provides is tailored to Surface Mining Act application of those tools and represents the most requested and widely supported component of the TIPS service. This kind of tailored training can be found nowhere else.

In 2006 over 350 students attended 33 instructor-led TIPS classes, an increase of 35% students trained over last year. More than half of TIPS instructors are from State programs. A good example of this collaboration is the "Image Analysis for ArcGIS" course jointly developed and presented in 2006 by staff from the States of Oklahoma and Virginia as well as OSM personnel. Also in 2006 a basic GPS course "Introduction to GPS with Garmin eTrexVista C" was developed specifically for field personnel in both State and OSM offices to assist in their everyday field inspections.

Twenty-six instructor led courses incorporate the reclamation experience of its instructors and students to provide a unique shared training experience. Fifty-eight on-line courses provide students with just-in-time-training and prepare the learner for TIPS instructor-led GIS, Remote Sensing, and Mobile Computing classes. TIPS online courses provide students with additional choices and resources to enhance their expertise using TIPS software.

The training is delivered in small computer classrooms where students get personal attention and can apply the software to actual mining cases. The classes occur in specialized training centers located in all three OSM Regional centers. These centers are maintained by TIPS and equipped with state-of-the-art equipment. In 2006 the Western regional training center in Denver, Colorado, recently expanded its computer training room to accommodate 16 students (formerly 12).

Both of OSM's training initiatives, NTTP and TIPS, collaborate on shared training issues and incentives. They share representatives on their respective Steering Committees, coordinate course pre-requisites to best serve one another's classes, and share resources such as instructor succession planning, Continuing Education Units for classroom students, and implementation of the new learning management system, DOI Learn.

In OSM's Coalfield Communications training, students role-play crisis scenarios to develop their skills in communicating with the press and public.

OSM Training Program Focuses on Skills Needed by States and Tribes

OSM established its 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 the Surface Mining Act, which include engineering, hydrology, blasting, agronomy, and botany. The program also ensures training is available to enable OSM and State 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.

All aspects of the program from identification of needs through course development and presentation are cooperative efforts of State, Tribal, and OSM offices. 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.

NTTP Plans Improvements for 2007

NTTP has already received close to 2000 requests for spaces in FY 2007. It is anticipated that 100 requests for special sessions will be received, in addition to 300 requests for workshops, forums, and benchmarking. NTTP expects to exceed the GPRA goal of 1200 students and will work with the NTTP Steering Committee to determine exactly how additional needs will be met.

NTTP is working with the Interstate Mining Compact Commission on a mine mapping benchmarking and a workshop on electronic permitting. A pilot instructor refresher course, Master Instructor Forum, will be offered to improve presentation skills and to assure that instruction incorporates the latest technology. FY 07 will begin with a field-based Orientation Course for new OSM employees.

National Technical Training Program

Training Program Works Toward Helping Partners Achieve Goals

OSM's National Technical Training Program (NTTP) provides courses in a variety of technical fields such as hydrology, historic and archaeological resources that help OSM, State and Tribal personnel contribute to meeting joint Government Performance and Results Act (GPRA) goals. Providing on-the-ground environmental protection during active mining and remediation of abandoned mines is achieved by enhancing the technical skills of staff and increasing their knowledge of technical subjects related to mining.

In 2006, NTTP classes received program effectiveness ratings of 97 percent, exceeding the GPRA goal by 4 percent. OSM's NTTP is a model partnership with State and Tribal regulatory agencies, reclamation agencies, and the mining community. In addition, participating mining operations host field exercises that are critical to understanding on-the-ground operations. This joint effort exemplifies Secretary Kempthorne's 5Cs of *C*ooperating, *C*ommunicating, and *C*onsulting with local agencies for the purpose of fostering good *C*onservation practices in the mining *C*ommunity.

The program exceeded its annual GPRA attendance goal of 1200 students by training a total of 1446 students in 65 sessions of 45 different courses and workshops.

State students accounted for 74 percent of students; Tribal students for 4 percent; OSM students for 17 percent, and 5 percent for other participants.

Nearly 75 percent of students are State and Tribal staff. Regularly scheduled courses were held in 25 locations in 13 States.

Fifty-two regularly-scheduled courses were offered as well as four regional and national benchmarking forums and workshops. Five sessions were held to meet State and Tribal specific needs. Two new courses were developed.

In addition to regularly scheduled courses, in response to specific requests, NTTP offered a number of special course sessions. These included a session of the AML Realty Course for the Pennsylvania Department of Environmental Resources Watershed Academy; an Effective Writing course for OSM staff; AML Reclamation taught by Navajo staff for the Crow, Navajo, and New Mexico; and a Coalfield Communications Course for Virginia.

NTTP training corps offered a session of the AML Drilling and Grouting class in Manchester, England at the request and expense of the Coal Authority of the United Kingdom This class enables students to evaluate when the commitment of expenditures to drilling and grouting is the appropriate response to subsidence events.

New course offerings include the highly requested Coalfield Communications - *How to Get it Right*. The course consists of four modules*: Managing Media; Extending the Reach: Effective Outreach; Designing Effective Public Meetings; and Building Trust through Effective Communication*. Another new course was *Geology and Geochemistry of Acid-Forming Materials*.

Some training needs are best met in benchmarking forums and workshops where there are free-flowing discussions of unresolved issues and best practices and exchanges that promote transfer of new technologies and development of shared solutions. Some great benchmarking sessions include: *Underground Mine Mapping Workshop*, a special hands-on workshop hosted by Kentucky to demonstrate technology and practices used to acquire, digitize, store, and manage maps. Another workshop will be held in West Virginia in Fall 2007; *Abandoned Mine Land Inventory System (AMLIS) Workshop* that assists with the implementation of the Surface Mining Act programs to promote technology transfer; *Underground Mine Injection Workshop; Inspectors Workshop*; *Geomorphic Reclamation Workshop* that addressed geomorphic principles for landscape reconstruction and mined land reclamation; and *Keeping Current With Technology Workshop* that ensures that students receive the latest technical information.

NTTP COURSES AND ENROLLMENT

COURSE NAME	SESSIONS	Students
Acid-forming Materials AML Workshop	1	11
Acid-forming Materials: Fundamentals	1	29
Advanced Blasting	1	16
AML Design Workshop: Dangerous Highwalls	1	13
AML Design Workshop: Dangerous Openings	1	14
AML Design Workshop: Drilling and Grouting	2	33
AML Design Workshop: Fires	0	0
AML Design Workshop: Landslides	1	9
AML Design Workshop: Subsidence	0	0
AML Partnering Workshop	1	30
AML Realty: Special Session for PA	1	38
AML Reclamation and Health Physics	1	17
AML Reclamation Projects	1	13
AML Workshop: Subsidence	1	10
AMLIS: Entering and Retrieving Information	3	36
Appalachian Regional Field Issues Workshop	1	35
Applied Engineering Principles	2	34
Blasting and Inspection	1	37
Bonding Workshop: Cost Estimation	1	28
Coalfield Communications	4	122
Coalfield Communications Workshop	1	25
Effective Writing	3	60
Enforcement Procedures	1	19
Enforcement Tools and Applications	2	34
Erosion and Sediment Control	2	22
Evidence Preparation and Testimony	1	18
Expert Witness	1	14
Forensic Hydrologic Investigation	2	43
Geofluvial Workshop	1	119
Geology and Geochem of AFM	2	48
Geomophology Inspectors' Workshop	1	19
Historic and Archeological Resources	2	31
Hydrology Workshop (MCR)	1	28
Instructor Training	1	15
NEPA Procedures	1	24
Passive Treatment	1	24
Permitting Hydrology	1	17
Principles of Inspection	1	30
Quantitative Hydrology	1	23
Roundtable on Financial Assurance (IMCC)	1	43
SMCRA and the ESA	1	14
Soils and Revegetation	2	45
Subsidence	2	33
Surface and Groundwater Hydrology	2	33
Underground Injection Workshop	1	48
Underground Mine Mapping Workshop	1	24
Underground Mining Technology	2	36
Wetlands Awareness	2	32
TOTAL	65	1,446

Continuous Improvement is Trademark

Continuing Education Units: NTTP reviewed a number of mechanisms to offer Continuing Education Units (CEUs) to students. George Mason University (GMU) was selected as the best vehicle. Students can obtain certificates of completion from the University for a nominal fee.

Instructor Advisory Council (IAC): Instructors formed a council to enhance the quality of instruction. The (IAC) was formed in June 2006 and will advise NTTP and TIPS training programs on issues like developing a succession plan since 40% of instructors will retire within 3-5 years. The IAC began a review of courses in all Career Series (e.g., Inspection, AML, GPS, Physical Sciences) to assure that students receive the best possible curriculum.

OSM Committed to Drafting Rules on Placement of Coal Combustion By-Products

OSM is committed to drafting regulations on the use of Coal Combustion By-Products in reclaiming mines now that a review of the subject by the National Academy of Sciences (NAS) has been completed.

In early 2004, Congress directed the Environmental Protection Agency to fund a study by the NAS to examine the health, safety, and environmental risks associated with using CCBs in the reclamation of active, abandoned, surface, and underground coal mines.

Coal Combustion By-Products (CCBs) include the non-combustible portion of coal and residues from various air pollution control technologies that remain when coal is burned to produce electricity. The amount of CCBs produced annually is currently more than 120 million tons.

Some CCBs can be used commercially in engineering applications or products like cement or wallboard. The remainder must be placed in landfills, surface impoundments, or mines. CCB mine placement can assist in meeting reclamation goals at active coal mines and enhance the reclamation of abandoned mine lands.
Such placement is currently regulated under either or both the Surface Mining Control and Reclamation Act of 1977 administered by OSM, and the Resource Conservation and Recovery Act of 1976. The solid waste rules under RCRA were written by the Environmental Protection Agency (EPA) but are administered by State Solid Waste Programs.

OSM has taken an active role in promoting technological advances and research related to the placement of CCBs into mines. In doing so it has worked with the EPA, the Interstate Mining Compact Commission (IMCC), the Department of Energy and university researchers.

The NAS study mandated by Congress examined the health, safety, and environmental risks associated with using CCBs for reclamation in all major coal basins. The study was released in March 2006. Among the findings of the report are that OSM and the States that implement the Surface Mining Act should take the lead in addressing the report's recommendations.

Following the release of the National Academies' report, OSM reviewed the committee's findings in order to plan its next actions. OSM also met with EPA and the IMCC as well as other State regulatory and AML programs to develop detailed plans including any necessary regulatory or oversight proposals.

Underground Injection Pipeline, West Virginia

Underground Injection Workshop

OSM's Appalachia Technology Transfer Team conducted a workshop in July 2006 to discuss injection of impoundment slurry into mine voids. Participants included State and Federal permit reviewers and managers, and experts who described the environmental transport and fate of injected slurry. Presentation topics included regulatory requirements, chemical composition, classification, and groundwater monitoring and disposal methods. There are over 600 impoundments under the jurisdiction of the Mine Safety and Heath Administration. The impoundments have inherent environmental and safety concerns. OSM's efforts will continue to evaluate alternative disposal methods.

Information, Please

Last year OSM's Technical Library responded to more than 600 requests from State regulatory agency staff, other Federal agency staff, citizens, coal industry, consultants, and academia in addition to filling 200 requests from OSM staff. The library's collection has been enhanced with more than 200 new books and more than 1600 current issues of journals and periodicals.

Group Working to Standardize Geospatial Mapping

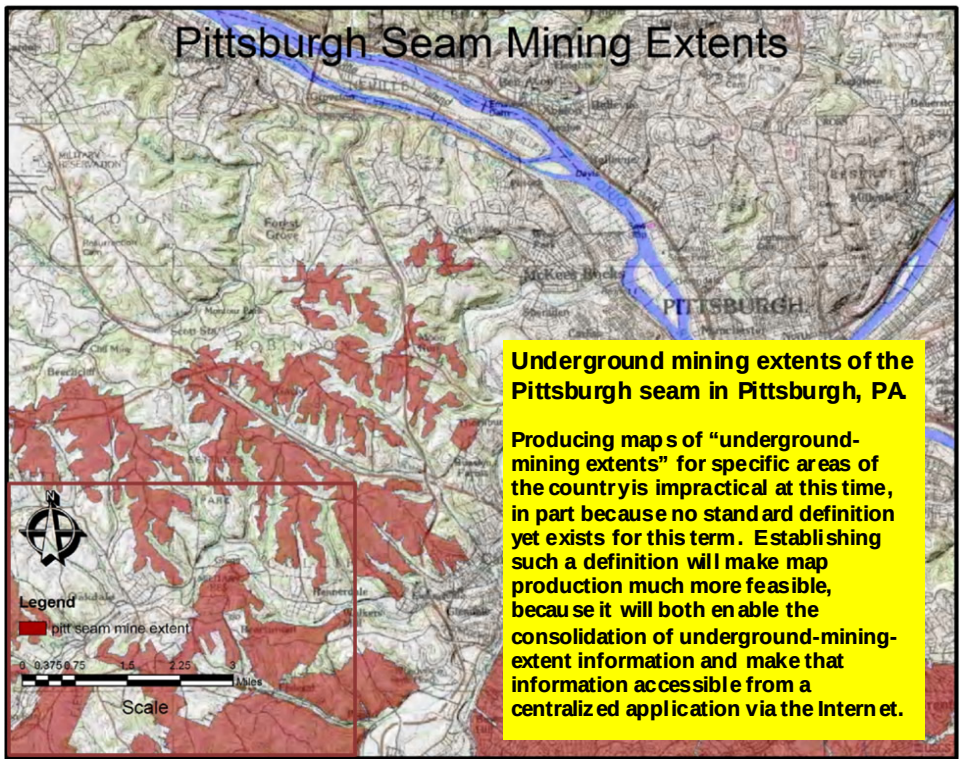
Data Exchange Could Reduce Environmental Impacts, Speed Rescues

OSM has established a task group to develop standards for exchanging geospatial data about coal mines.

Standardizing the way geospatial data is exchanged will result in better enforcement of mining laws, faster response to mining-related emergencies and improve protection of the environment and public from the impacts of coal mining.

Geospatial data is used to pinpoint the location of natural or man-made features on, below or even above the earth's surface. In particular, the boundaries of surface and underground coal mines can be mapped precisely in three dimensions and expressed as data. Standardizing the way such geospatial data is expressed will enable the data to be exchanged quickly and accurately between agencies using different computer software.

Standards developed by the task group could ultimately help different enforcement agencies cooperate to reduce environmental impacts outside of mine boundaries or guide the efforts of rescue workers trying to reach miners trapped in an underground mine.

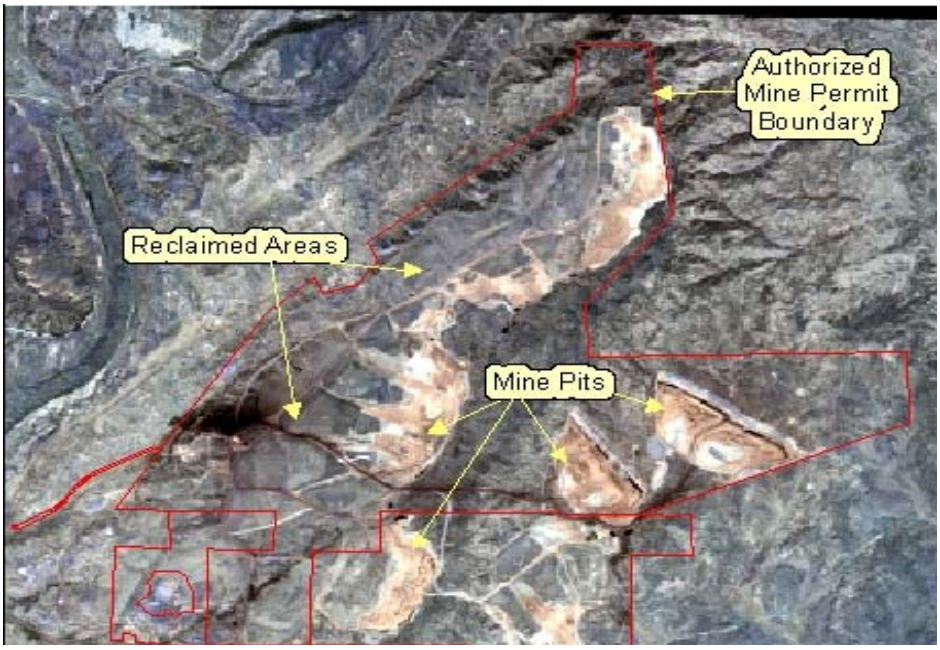


Underground mining extents of the Pittsburgh seam in Pittsburgh, PA.

Producing maps of "underground-mining extents" for specific areas of the country is impractical at this time, in part because no standard definition yet exists for this term. Establishing such a definition will make map production much more feasible, because it will both enable the consolidation of underground-mining-extent information and make that information accessible from a centralized application via the Internet.

The Coal-Mining Spatial Data Standards ASTM Task Group will develop voluntary standards for the exchange of coal-mining spatial data among State, tribal, and OSM offices, as well as the coal-mining industry and the public. Standards will be developed in line with procedures of the American Society of Testing Materials (ASTM) International, an organization which develops and provides voluntary consensus standards for a great many technical applications.

Members of the group are volunteer representatives of State coal-mining regulatory programs, OSM offices, the Mine Safety and Health Administration, the coal-mining industry and the general public. The group will be supported by OSM's Technical Innovation and Professional Services (TIPS) program, which provides advanced engineering and scientific software to States, Tribes and OSM staff involved in regulating coal mines and reclaiming land disturbed by mining.



Geospatial permit boundary overlaid on a satellite image, McKinley mine, western NM. Once geospatial data standards are established, OSM will be able to meld together mining-boundary data from Federal, State, and tribal sources. With this data set, applications can be developed that will allow any interested party to create maps, by means of an interactive web interface, like the one shown here.

"Establishing agreement among all our business partners concerning the coal-mining geospatial data we create, use, and exchange is fundamental to improving our understanding," according to Billie Clark, Jr., chief of OSM's Technology Management Division. "It will help us better address and resolve a variety of problems associated with coal-mining and reclamation operations. To establish coal-mining geospatial data standards that are recognized by both ASTM International and the Federal Geographic Data Committee will indeed be to have accomplished a first."

The ASTM standards-development process is transparent and open to all who would like to participate in it. The task group is seeking to identify public-interest groups and industry representatives that want to contribute to standards development specific to coal-mining geospatial data.

More information is available at www.astm.org.