V. Technology Development and Transfer

The Office of Surface Mining provides states, Indian tribes, federal agencies, and the coal industry with the technical information and tools they need to carry out their responsibilities under the Surface Mining Law. These activities include: a) providing direct technical assistance to address specific mining and reclamation problems, b) maintaining automated systems and databases used by others in making decisions under the Law, and c) transferring technical capability to others through training, consultations, forums, and conferences. The goal is to help them develop the skills needed for solving problems on their own. In recent years, the Office of Surface Mining has been supplementing its traditional oversight presence with an increased emphasis on providing technical assistance and support to states and tribes.

While the focus of the Office of Surface Mining is to help state and tribal partners do their jobs, the ultimate goal is to improve the health, safety, and the environment for our primary customers—the people who live and work in coalfield communities. The Office of Surface Mining provides information to citizens to help them better understand their rights and responsibilities under the Surface Mining Law.

Technical Information Processing System

The Office of Surface Mining organized the Technical Information Processing System in 1988 to provide state and Office of Surface Mining regulators with a comprehensive set of analytical tools to aid in technical decision-making related to the Surface Mining Law. The system is comprised of off-the-shelf computer hardware and software supported by the Office of Surface Mining in partnership with the states and tribes. The system has grown from a few applications available on a single special designed shared workstation, to a suite of software that is easily accessible using the Internet on each user's desktop computer.

Shrubs are an important part of many natural plant communities and have particular value as food and cover for wildlife. At this reclaimed Colorado surface mine large deer and elk herds inhabiting the surrounding countryside have quickly returned to the area and made extensive use of this natural vegetation.

The Technical Information Processing System services include: providing a comprehensive training program in core software for users; providing core software at the users desktop; conducting the necessary research and development that ensures that core software is the state-of-the-art; and providing technical assistance. Customers include states, tribes and Office of Surface Mining offices across the country. In cooperation with customers, the Technical Information Processing System Steering Committee was established to help guide the efforts. The Steering Committee is composed of members from state and Office of Surface Mining offices.

Currently the Technical Information Processing System consists of Windows-based computers at state, tribal, and Office of Surface Mining offices with access to the system license servers via the Internet and the Office of Surface Mining Wide Area Network. 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 regulation of active coal mining and reclamation of Abandoned Mine Lands. There are 18 commercially available software applications covering geospatial, hydrology, engineering, and

statistical topics. This software helps in the technical decision-making associated with review 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 lands projects, and providing the scientific basis for environmental evaluations.

During 2001, the deployment of software to 700 user desktops in 70 state, tribal, and Office of Surface Mining offices throughout the country was completed and newly released upgrades to the software were delivered to system users.

Remote Sensing Technology

A remote sensing program was initiated in 2001. The Office of Surface Mining purchased air-photo imagery of a federally regulated mine in New Mexico and remote sensing photogrammetry software and hardware to process air and satellite imagery into highly accurate orthophotos. These orthophotos make it possible to generate topographic contour lines from stereo orthophoto pairs. Office of Surface Mining staff have also acquired and processed stereo 1-meter satellite imagery of four federally regulated western coal mines and two eastern coal mining areas. Eight briefings on results with this technology have been presented to the Office of Surface Mining, the Department of the Interior, the private sector, the Interstate Mining Compact Commission, the Society of Mining Engineers, and other groups. The success of this new technology make it a tool that will be provided to customers in the coming year.

Mobile Computing

During 2001, the Technical Information Processing System procured and began testing mobile computing devices and software. Geographic Information System software was installed on hand held mobile computers and was used with existing Global Positioning System equipment to successfully field-verify elevations on western reclaimed mine slopes. Hand held mobile computer ruggedness and weather-resistance were issues that surfaced during testing, and alternative devices were researched for on-going field tests.

Technical Information System Training

Training of state, tribal, and Office of Surface Mining personnel in the practical application of the system is done on a continuing basis and is an integral part of the operation. Training during 2001 increased to 370 students in 42 classes, compared to 2000 levels of 325 students in 31 classes. The composite Government Performance and Results Act rating for Technical Information Processing System training satisfaction is 88%. The four categories making up this score break down as follows: class satisfaction 89%, facility 88%, lead instructor 94%, and co-instructor 81%. Course offerings in 2001 included geographic information system use, global positioning system use, three-dimensional spatial geologic and toxic-material modeling, and automated drafting and site-design.

Acid Drainage Technology Initiative

The Acid Drainage Technology Initiative is a partnership which the Office of Surface Mining has joined with industry, states, academic, other governmental agencies, and groups to identify, evaluate and develop “best science” practices to prevent new acid mine drainage and eliminate existing sources.

The National Mine Land Reclamation Center at the West Virginia University serves as the central location for the initiative. The Eastern Mine Drainage Federal Consortium, a group of federal agencies working in the Appalachian region, helps coordinate federal participation. The Interstate Mining Compact Commission, representing eastern coal producing states, and the National Mining Association, representing the U.S. coal industry, also participate.

While the focus was initially on the coalfields of Appalachia, the initiative’s scope was expanded when the Metal Mining Sector Work Group was formed in 1999. This year a handbook titled, *Review of Mine Drainage Prediction Methods* was published. This handbook covers overburden testing, sampling, and field validation.

The Office of Surface Mining has been funding this initiative at about $200,000 per year. In 2001, Office of Surface Mining funding was used for work related to field verification of acid mine drainage prediction, the printing of additional

handbooks, and the initial stages of work on standard acid drainage technology initiative kinetic testing protocols to be used in evaluating acid mine drainage potential.

International Activities

In many countries, mining continues in an age-old fashion with little regulation or noticeable care for the environment. The successful implementation of the Surface Mining Law in the United States is a model for nations challenged with protecting the environment while maintaining the often significant economic and employment benefits of mining. In 2001, the Office of Surface Mining and state government staff made presentations, participated in mine tours, and assisted mining professionals from several countries including China and Czechoslovakia. Most visiting delegations expressed particular interest in the state/federal partnership we use to implement the Surface Mining Law's regulatory program.

With proper reclamation, mined land can be returned to its pre-mining use or to a valuable new use. Since this surface coal mine began in 1983, approximately 6,000 acres of land have been successfully reclaimed, mostly for spring wheat production and a lesser amount returned to native prairie that is used for livestock grazing or hay production. A primary goal at this mining operation is to minimize the time land is taken out of crop production and to have reclaimed land producing sustained high yields as quickly as possible. Almost all reclaimed lands are back into production in less than three years after coal removal, and many are reclaimed the same year. Coal mining was a very temporary use and the land was quickly integrated back into the local agricultural economy and rural North Dakota landscape. This is reclamation as envisioned by the architects of the Surface Mining Law.

Mining Policy Reform in Indonesia

Responding to recent political changes and new legislative directions, Indonesia's Ministry of Energy and Mineral Resources is proceeding to restructure its approach to regulating mining. The Ministry has completed work on a draft of a new mining law, which would delegate significant authority to local and regional governments who will become responsible for regulating most aspects of mining operations. Ministry officials drew upon the state/federal partnership approach outlined in the U.S. Surface Mining Law as a model when drafting the new law. The Ministry requested Office of Surface Mining technical advice and assistance so they could develop a completely new way of doing business. The United States Agency for International Development provided the Office of Surface Mining with 100 percent funding to support the Ministry's request.

This latest cooperation between the Office of Surface Mining and Indonesia follows two highly successful technical assistance agreements. The first was a 3-year project from 1995 to 1998 in which the Office of Surface Mining provided technical assistance to improve Indonesia's capacity to regulate the surface coal mining industry and reclaim mined lands in an economical and environmentally sound manner. The World Bank funded the project and fully reimbursed all costs. Under the second project, the Office of Surface Mining is providing training in fighting forest fires sparked by dozens of burning outcrops of exposed coal and peat that dot the mountainous regions of Indonesia. The coal fire-suppression project has been entirely funded by the State Department's Southeast Asia Environmental Initiative.

The Office of Surface Mining's third assistance project in Indonesia involves using the state/federal partnership under the Surface Mining Law as a model for decentralizing the regulatory responsibilities of Indonesia's Ministry of Energy and Mineral Resources. To demonstrate the value and effectiveness of the partnership developed over the past 23 years, the Office of Surface Mining has included State Regulatory Authority experts on Office of Surface Mining teams to provide

advice and assistance on approaches Indonesia might use during decentralization and to develop a Central/Regional Government cooperative program. Ministry of Energy and Mineral Resources officials have visited the United States to see firsthand how the state/federal partnership works and examples of the results that can be achieved. The Office of Surface Mining and State Regulatory Authority professionals worked with professional staffs from Indonesia's central and local government agencies to improve their capability for mine inspection and enforcement. In a novel "mine inspection intern program," Indonesian professionals were paired with Office of Surface Mining and state inspectors in Colorado, Kentucky, Maryland, Ohio and Pennsylvania to learn firsthand how mine inspections were conducted and how federal and state agencies worked together to accomplish mutual objectives. Office of Surface Mining and state personnel then worked with the interns to develop and present a Principles of Inspection course to local mining agency staff in East Kalimantan, Indonesia. The course was very favorably received by local officials, and the project plans to offer the course again during the coming year.

Technical Training Program

The Office of Surface Mining continued its emphasis on providing technical assistance to the states and tribes by enhancing the technical skills of regulatory and reclamation staff through the National Technical Training Program. In 2001, the program offered 45 sessions of 31 different courses (Figure 5). In addition to regularly scheduled courses, in response to specific requests, special sessions of Blasting and Inspection were held for Kentucky, and a session of the Evidence Preparation and Testimony class was arranged for Mine Safety and Health Administration inspectors to meet an urgent need. A new course, Subsidence, was piloted to enhance scientific knowledge and technical skills in predicting subsidence, and identifying methods to protect and/or minimize damages caused by subsidence impacts of longwall and room and pillar mining. The Subsidence course will assist inspectors and technical staff in implementing requirements of the Energy Policy Act. Course development began on a new offering, Advanced Blasting: Investigation and Analysis of Blasting Effects. This course will enhance student skills in gathering and analyzing blast-related information. This will assist in resolving citizen complaints from ground vibrations, air blasts, fumes, and flyrock. Another new course under development is an Orientation Course for new personnel. This course will familiarize students with the missions of the Department of Interior and the Office of Surface Mining. Students will be provided with an overview of all Office of Surface Mining programs and with a wide variety of information on personnel issues.

All aspects of the National Technical Training program from identification of training needs through course development and presentation are cooperative efforts of state, tribal, and Office of Surface Mining staff. In 2001, there were 163 instructors--47 percent from 17 Office of Surface Mining offices, 44 percent from 17 States, 5 percent from the Interior Department's Solicitor's Office, and 4 percent from other sources. The 45 sessions, which reached 908 students, were presented in 24 locations in 14 states. State and tribal students accounted for 80 percent of students, Office of Surface Mining students for 17 percent, and 3 percent for other participants. The program's Government Performance and Results Act attendance goal of 900 students was met and the customer satisfaction rating of 95 percent exceeded the goal of 90 percent by 5 percent.

Figure 5

Course Name	Sessions	Students
Acid-forming Materials: Fundamentals	1	29
Acid-forming Materials: Principles & Processes	1	27
Acid-forming Materials for Program Staff	1	15
Administration of Reclamation Projects	1	26
AML Design Workshop: Dangerous Openings	1	12
AML Design Workshop: Fires	1	12
AML Design Workshop: Landslides	1	9
Aml Design Workshop: Subsidence	1	12
Applied Engineering	1	17
Basic Inspection Workbook	0	Note 1
Blasting and Inspection (Modules 1-3)	2	31
Blasting and Inspection (Modules 1-2)	2	72
Bonding Workshop: Cost-Estimation	1	20
Bonding Workshop: Legal & Admin. Aspects	1	19
Effective Writing	3	75
Enforcement Procedures	1	17
Enforcement Tools and Applications	1	11
Erosion and Sediment Control	2	34
Evidence Preparation and Testimony	3	67
Expert Witness	1	12
Historic and Archeological Resources	2	43
Instructor Training	1	23
NEPA Procedures	1	27
Permit Findings Workshop	4	68
Permitting Hydrology	1	23
Principles of Inspection	1	29
Soils and Revegetation	1	19
Spoil Handling and Disposal	1	28
Subsidence	2	37
Surface and Groundwater Hydrology	2	36
Underground Mining Technology	2	35
Wetlands Awareness	1	23
TOTAL	**45**	**908**

1. 32 books distributed

Applicant/Violator System

One of the underlying principles in the Surface Mining Law is that those who benefit from mining are responsible for returning the land and water to productive use. Section 510(c) of the Law prohibits the issuance of new permits to applicants who own or control unabated or uncorrected violations. Determining whether an applicant owns or controls operations with violations is often difficult, largely due to the complexities of corporate relationships and inconsistencies in interpreting the applicable regulations.

The primary purpose of the Applicant/Violator System is to provide state regulatory authorities with a centrally-maintained database of application, permit, ownership and control, and violation information. Federal and state officials review system data when evaluating an applicant's eligibility for new permits. The system is also used to determine the eligibility of potential recipients of Abandoned Mine Land reclamation contracts and for inspection and oversight purposes.

During 2001, the Office of Surface Mining responded with quality reviews for 3,202 requests for Applicant/Violator System data evaluations from state and federal regulatory authorities and state abandoned mine land program officials. The Office of Surface Mining collected and/or settled payments of civil penalties and reclamation fees in the amount of $1,255,543 due, in part, to violation information in the system.

Since much of the pre-mining land in the East is forest, it is important to reestablish forests on reclaimed coal mine land. At this reclaimed Indiana mine site the land use is a fish and wildlife habitat and included areas of forest, crops, and open water/wetlands. More than 250,000 trees and shrubs were planted on the 1,200 acre site and included oak, pine, tulip poplar, walnut, ash, persimmon, hickory, crab apple, chestnut, dogwood, and hawthorn. The trees were planted in scattered blocks of varying sizes which resulted in an effective distribution of open and forested land for wildlife. Initially herbicides and mowing were used to control competition from herbaceous vegetation; however, once the woody plants became established they grew quickly and no longer require care.

This successful reclamation has created a unique resource that will benefit citizens of the local community for years to come.

Access to the System is available to the public, coalfield citizens, coal companies, and industry representatives via the Internet. The Applicant/Violator System Office in Lexington, Kentucky, distributes customized communication software, free of charge. Upon request, system training is provided users on how to access and interpret information as well as system demonstrations. Instruction is tailored to meet the needs of the target audience (i.e., inspectors, auditors, investigators, coal industry representatives, citizens are provided training to meet their specific needs).

During the past year, the Office of Surface Mining completed outreach meetings with federal and state representatives to discuss how to implement the new ownership and control regulations published on December 19, 2000, in the *Federal Register*. In addition to beginning the redesign of system software to reflect the requirements in the new regulations, web page information was posted from regulatory notices as required by the new rules.

The Applicant/Violator System Office continued to record extremely high customer satisfaction ratings as

reflected in quarterly customer surveys. During 2001, the Applicant/Violator System Office received customer satisfaction ratings that averaged 97 percent -- the same rating the Office achieved in 2000. In recognition of this sustained level of customer service, the Applicant/Violator System Office received the Office of Surface Mining's Customer Service Excellence Award in September 2001. General information about the System, including access information, instructions for downloading access software, and how to obtain customer assistance, can be found at www.avs.osmre.gov.

Permanent impoundments are frequently constructed on reclamation sites. They often enhance wildlife habitats by providing excellent cover and a water environment that increases the potential for wildlife to quickly become established on the sites. The water impoundments at this Indiana site cover over 10 percent of the reclaimed mine land. Six ponds were originally designed and built as sediment control structures and range in size from one to four acres. Other impoundments were created in final mining pits or were the result of selective spoil grading and range in size from one to 45 acres in size. The variation in impoundment size, shape, and depth have created a wide range of aquatic habitats and support a large population of largemouth bass, redear sunfish, bluegill, channel catfish, and black crappie. Wetland areas adjacent to the impoundments improve water quality and recreational opportunities, encourage greater biological diversity and wildlife habitat, and further reduce storm and flood damage.

Slurry Impoundments

Since 1996, there have been four major breakthroughs from coal preparation plant slurry impoundments into underground mines, three in Virginia and one on October 11, 2000, in Martin County, Kentucky. As a result of the Martin County incident, which adversely impacted several municipal water supply systems and 75 miles of stream, Congress directed the National Research Council of the National Academies of Science to conduct a study on preventing coal waste impoundment failures and breakthroughs. The report from that study was released on October 12, 2001, and includes several recommendations for joint work by the Office of Surface Mining and the Labor Department's Mine Safety and Health Administration to minimize the potential for future breakthroughs. The Office of Surface Mining and Mine Safety and Health Administration have been working together since the Martin County incident to focus on impoundment issues.

In a separate effort, the Office of Surface Mining formed its own technical team to identify factors contributing to the Martin County failure. A report from this committee is currently undergoing internal review and editing. With the participation of representatives from Kentucky, Virginia, and West Virginia, the committee also developed criteria for use in evaluating the breakthrough potential of both proposed and existing high-risk impoundments. After being approved by the Department of the Interior, these criteria were distributed in July 2001.

The Office of Surface Mining also worked with the Mine Safety and Health Administration and the Appalachian states to develop an inventory of all existing coal mining-related impoundments with 20 acre-feet or more of storage capacity and located within 500 feet of an underground mine. The states are currently in the process of reviewing the breakthrough potential of these impoundments.

Mountaintop Mining

As part of a 1998 settlement agreement in West Virginia Federal District Court, the Office of Surface Mining continued several activities related to mountaintop mining during 2001:

Technical Assistance to West Virginia:
Joint Office of Surface Mining/West Virginia Department of Environmental Protection permit reviews have continued for applications proposing to construct large valley fills. Five of the applications receiving a joint review were approved during 2001 and 11 remain in various stages of review. Five of the remaining applications also have applied for Clean Water Act, Section 404 Individual Permits with the Corps of Engineers. Environmental Impact Statements or Environmental Assessments are being prepared for these individual permit applications. The Office of Surface Mining is a cooperating agency in the review of the Clean Water Act environmental documents and continued to work closely with the Corps of Engineers and other Federal agencies during the review of the applications. Activities arising from the reviews of Surface Mining Law and Clean Water Act applications continue to be reported monthly to the West Virginia Congressional Delegation and the public (see www.osmre.gov/mtindex.htm for a complete listing of down-loadable copies).

An unusual revegetation technique used at this reclaimed Colorado coal mine eliminates planting by cutting existing vegetation, including trees, into a thick mulch, followed immediately by removal and redistribution of the topsoil mixed with the mulch. Small pieces of the woody vegetation sprout and rapidly become established. The woody vegetation on this reclaimed slope illustrates the success of this revegetation technique. A native plant community containing many hard-to-establish species such as big sagebrush, snowberry, aspen, rose, silver sagebrush, and currant was successfully established. This reclaimed shrub-covered land is similar to the surrounding unmined landscape and supports a healthy wildlife community.

Preparation of an Environmental Impact Statement:
The Office of Surface Mining worked with the Environmental Protection Agency, U.S. Army Corps of Engineers, Fish and Wildlife Service, and West Virginia Department of Environmental Protection in the development of an Environmental Impact Statement on mountaintop mining and valley fills. During 2001, the agencies completed a wide range of technical studies on aquatic and terrestrial impacts, valley fill stability, flooding, blasting dust and fumes, future mining, soils and forest productivity, seasonal stream flow, aquatic ecosystem enhancement, and fill hydrology. Economic, fisheries, postmining land use, and cumulative impact studies are underway and should be finalized early in 2002. Several stakeholder meetings to discuss the results of technical studies were held throughout 2001. The agencies are also evaluating possible recommendations to changes (e.g., new guidelines, policies, or rules) in the regulatory programs of the Surface Mining Law and Clean Water Act that would further minimize impacts from mountaintop mining and valley fills. A draft Environmental Impact Statement is planned for publication in late 2002 or early 2003.

Interactive Forum

An Interactive Forum entitled "Approaching Bond Release: Wildlife Habitat Construction and Wildlife Use of Reclaimed Lands in the Arid and Semi-Arid West" was held in Gillette, Wyoming in 2001 (the fifth in a series of six planned annual

forums on bond release topics in the arid and semiarid west). Wildlife topics included: regulatory obstacles to reclaiming wildlife habitat, trends in bird use of reclaimed habitat, the wildlife use of reclamation and its implications for bond release, habitat restoration plans, and how to assess the adequacy of wildlife success. The forum provided an opportunity for industry, their consultants, and the regulators to openly discuss wildlife habitat issues by sharing information and interacting with all the parties in the coal mining community. The three-day forum was supplemented by two workshops: Geographic Information Systems Integration Capabilities for Habitat Measurement and Population Comparisons and Hydrology and Reclamation Tool for Mining Applications. The eighty-three forum participants from 13 states and two Tribes attended the forum, mine field trips and the two workshops. One more interactive forum on Bond Release for postmining land use in the arid and semiarid west is planned for August 2002 in Bismarck, North Dakota.

Revised Universal Soil Loss Equation

For the second consecutive year, a CD-ROM containing Guidelines for the Use of the *Revised Universal Soil Loss Equation on Mined Lands, Construction Sites, and Reclaimed Lands*, with Version 1.06 of the public-domain software was distributed. With the addition of new weather station data and extension of existing databases, the equation is now a more powerful tool that can be used to estimate soil loss under a wide variety of site-specific conditions. The Office of Surface Mining is funding the conversion of the Guidelines to a Windows environment to complement the new Revised Universal Soil Loss Equation. In addition, the U.S. Department of Agriculture is incorporating the Office of Surface Mining guidelines into their Web-version of the equation for agricultural purposes. In 2002, the upgraded software will be made available on the Office of Surface Mining's web site.

Coal Combustion By-Products

Office of Surface Mining staff serve on the National Steering Committee for the Emission Control By-Products Consortium that is attempting to develop technologies for use by the coal utilities and their suppliers that will be useful in solving problems related to the handling of by-products from their clean coal processes. The main strategy of the consortium is to: (1) characterize product streams from flue gas desulfurization materials and low nitrous oxide burners; (2) develop a list of potential market opportunities and disposal options; and (3) develop and implement research and demonstration programs around identified priority topics.

During 2001 proceedings were published for the technical interactive forum on "The Use and Disposal of Coal Combustion By-Products at Coal Mines" and are available in printed or electronic (CD-ROM) format. The proceedings include 24 presentations on the basics of coal combustion by-products, regulatory perspectives, beneficial uses at the mine site, and hydrologic long term monitoring. For additional coal combustion by-product information see www.mcrcc.osmre.gov/ccb.

The Bat Conservation and Mining Technical Interactive Forum

Over the past several years the Office of Surface Mining has become more aware of the significant, but complex relationship between bats and mining. According to the U.S. Fish and Wildlife Service, many of North America's largest remaining bat populations roost in abandoned mines. These include a majority of the 45 bat species living in the continental United States and some of the largest populations of endangered bats. More than half of these bat populations are already listed as endangered or species of concern. Closure of abandoned mines without first conducting biological surveys could endanger these and other species. Given the key ecological role of bats as primary predators of night-flying insects, which cost American farmers and foresters billions of dollars annually, additional threats to bat survival are cause for concern. Closure or other alteration of old mines without a biological assessment can eliminate some of America's largest remaining bat populations.

In December of 1998, the Office of Surface Mining signed a Memorandum of Understanding with Bat Conservation International, Inc. in order to establish a framework for cooperative efforts between the two organizations to maintain and increase the conservation of bats and their habitats.

In November 2000, the Office of Surface Mining hosted an interactive forum on Bat Conservation and Mining, which was initiated by a multi-agency, multi-interest group, steering committee. There were 118 participants at the forum, representing

federal, state, and private organizations from 29 states. The forum marked a major step toward increased cooperation between concerned federal and state agencies and conservation groups interested in protecting these important species. Proceedings of that forum are available at www.mcrcc.osmre.gov/bats.

Due to the success of the November 2000 Forum, the Office of Surface Mining will cosponsor another forum in partnership with the U.S. Fish and Wildlife Service and Bat Conservation International during 2002. This will be a technical interactive forum on bat gate designs. The objective is to develop a manual for reclamation professionals on how to best protect bat inhabited underground mines through the use of gates and other bat friendly closure devices.

A description of the importance abandoned mines have in the survival of bats and other related information can be found at www.osmre.gov/bats.htm.

Prime farmland topsoil and subsoil is handled with special care by using spreading techniques that minimize compaction that would hinder root penetration and water absorption by new seedlings. At this active Indiana coal mine the topsoil and subsoil were removed using hydraulic shovels and haul trucks. The segregated soil is immediately hauled back to the reclamation area, dumped, and graded. This equipment, combined with direct haul-back method, reduces compaction, a serious problem in valuable prime farmland soil.

The success of this soil handling method can be measured by the land's crop productivity. Crops grown on this reclaimed farmland have consistently been above the required yields and the land is indistinguishable from the surrounding Southern Indiana landscape.

Reforestation

Through the Reforestation Initiative, the Office of Surface Mining has sponsored outreach and technology transfer events to promote a market-based approach to reclaiming mined lands and increasing carbon storage through reforestation. The environmental and economic benefits of this approach include higher quality reclamation, an increase in the number of sites reclaimed, economic opportunities including employment for local communities, aesthetic and recreational improvements, sale of forest products by landowners or lessee, and the opportunity for reporting carbon reductions though sequestration in forests. This activity is of interest to mine operators, utilities, land management companies, mining companies, environmental organizations, and provides the opportunity to promote ecologically diverse balanced forest ecosystems.

In May 2001, the Office of Surface Mining joined with the Department of Energy, Office of Fossil Energy, and Allegheny Energy to dedicate the Limestone Run Revegetation Project in Pennsylvania that is the first pilot project under this initiative. Allegheny Energy planted more than 7,000 red and white pine seedlings and two acres of warm season, native grasses on a 20-acre plot which had previously been mined and reclaimed. In August 2001, the Office of Surface Mining began working with the Department of Energy, National Energy Technology Laboratory and the Electric Power Research Institute to develop an outreach package that will highlight the benefits of eco-asset management on mined lands.

Bonding Technical Assistance

An on-site bonding workshop was conducted in Anchorage, Alaska for the Alaska Department of Natural Resources. The workshop included surety and collateral bonding, self-bonding, surety fraud, bond program administration, bond forfeiture requirements specific to coal mining, minerals mining, and minerals leasing in Alaska. In 2001, 93 technical assistance requests from state regulatory authority staff on various bonding topics were completed. This technical assistance provided the tools state regulatory staff members needed to resolve complex bonding problems and avert loss of bond monies.

Technical Library Resource Center

The Office of Surface Mining Technical Library reached a milestone in 2001 when its holdings, as recorded in the on-line catalogue, were made web accessible. This accomplishment makes the catalogue available for anyone with Internet access, regardless of their geographical locations, to search for information related to surface mining, reclamation, and other technical subjects related to mining and environmental protection. The books and reports, along with a growing electronic media library, on-line searches, and interlibrary loans enabled the library staff to respond to more than 300 requests from state regulatory agencies, other federal agencies, citizens, coal industry, consultants, and academics in addition to fulfilling more than 250 Office of Surface Mining requests for information. The technical library plays a large role in technology transfer and assisting with the dissemination of electronic information and publications to Office of Surface Mining's constituents.

Evaluation of Technical Assistance Performance

The 2001 performance goal was to attain a 90 percent customer satisfaction rating in technical assistance and technology transfer activities. Results from a customer survey gave a 99.6 percent satisfaction rating for technical assistance and 96.8 percent satisfaction rating for technology transfer. This rating compares favorably with 2000, rising from 93.3 percent to 99.6 percent for technical assistance. There was a decline in the rating for technology transfer from 98.5 percent to 96.8 percent; however, this may be based on the difference in the type of transfer activities completed and the difference in survey response rate. In both cases the goal was exceeded based on 109 responses received from 129 surveys sent for technical assistance (84.5 percent response rate) and on 268 responses received from 438 surveys for technology transfer activities (61.2 percent response rate). For 2002 the goal will be to attain a 92 percent customer satisfaction rating.

Topsoil removal and handling are especially critical in the Midwest where prime farmland must be restored to its former productivity level. After the final grading of spoil, the topsoil at this site was hauled to the reclamation area and is being spread evenly over the land by bulldozers. This mining company replaced all the soil to prime farmland depths (48 inches), even though much of the acreage was classified non-prime farmland where soil could have been replaced at the 12-inch depth required for non-prime farmland. However, the operator's commitment to extra soil replacement has restored the land to a level capable of supporting a wide variety of current and future agricultural uses.