Missouri Department of Natural Resources
Land Reclamation Program

2006 and 2007 Biennial Report

The cover photo is where Capital Sand Company operated and reclaimed an open pit sand mine that is viewable from the north side of I-44 in Phelps County.

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Abandoned Mine Lands

Missouri Department of Natural Resources

Larry P. Coen, Director
Land Reclamation Commission

Introduction

Mining activity in Missouri began as early as the 1740s, for mineral commodities such as lead, iron, limestone, sand and gravel. Coal mining, however, began in Missouri in the 1840s. With no legislation or regulation of these operations, there were as many as 67,000 acres left unreclaimed by coal-mining operations. An estimated 40,000 acres were left abandoned from the mining of other commodities.

Missouri was left with a legacy of acid-mine drainage, dangerous highwalls, toxic mine spoils, dangerous mine shaft openings, unvegetated and barren soils, soil erosion and stream sedimentation. The Missouri Department of Natural Resources' Land Reclamation Program was established in 1974 to regulate present mining operations and to reduce or eliminate the issues caused by coal mining operations prior to laws regulating such operations were enacted. The Land Reclamation Program works to ensure that today's mining industry remains in compliance with Missouri Law Chapter 444 (Rights and Duties of Miners and Mine Owners).

The law includes several chapters that are enforced by separate units within the Land Reclamation Program. The Industrial Minerals and Metallic Minerals Unit is responsible

Land Reclamation Commission

Public Members

Jim DiPardo, Chairman
St. James

Dr. Gregory Haddock,
Associate Professor of Geography
Northwest Missouri State University

Nick Matherly, Cabool

Col. John Riffle, Pleasant Hill

Statutory Members

John Hoskins, Director
Missouri Department of Conservation

Mimi Garstang, State Geologist
Division of Geology and Land Survey Director
Missouri Department of Natural Resources

Ed Galbraith, Director
Clean Water Commission

Land Reclamation Mission:

To assure beneficial restoration of mined lands and to protect public health, safety and the environment from the adverse effects of mining within the state of Missouri.

for sections *Metallic Minerals Waste Management* RsMo. Chap. 444.350-444.380" and the *Land Reclamation Act*" RsMo. Chap. 444.760-444.790. The Projects and Inspection Unit and the Permits, Contracts and Design Unit are responsible for the *Surface Coal Mining Law* RsMo Chap 444.800-444.970.

The state regulations further define these laws. Citizens can find these laws in their entirely in the *Rules of Department of Natural Resources Division 40 - Land Reclamation Commission Chapters 1 through 10* for coal and industrial minerals. Metallic Minerals regulations is found at *Rules of Department of Natural Resources Division 45 - Metallic Minerals Waste Management Chapters 1 through 8*.

The ultimate responsibility of the program is to ensure mine sites in Missouri are returned to a suitable land use and the adverse effects from active mining operations are minimized. When properly reclaimed, these areas can once again be used as farm lands or wildlife areas. Wildlife habitat remains a primary concern of the Land Reclamation Program. Whenever possible, abandoned mines are reclaimed with wetlands, native prairie grasses and trees that are part of Missouri's history.

Declining coal production in no way decreases the responsibilities of the Land Reclamation Program. Monthly inspections of each mine continue to be performed long after the last ton of coal is removed. Revisions to permits and reclamation changes continue to be submitted for review and approval, as operators fine-tune their post-mining land use plans. Bond release requests increase in number and in size as more ground is reclaimed to acceptable standards. In effect, reclamation activities consume a far larger percentage of time and effort that the actual mining of coal itself.

This biennial report provides information and statistical summaries concerning the activities and business accomplishments of the Land Reclamation Program and its efforts to reclaim mined land during the fiscal years of 2006 and 2007.

For more information, contact the department's Land Reclamation Program at 800-361-4827 or 573-751-4041.

Land Reclamation Program and Administration

Organization

The Land Reclamation Program was originally established in the *Omnibus State Reorganization Act of 1974.* This act created the Department of Natural Resources and placed the Land Reclamation Commission (created by Missouri Statutes Chapter 444) under its auspices. The Land Reclamation Commission directs the staffing and operations of the program within the Missouri Department of Natural Resources' Division of Environmental Quality.

The seven-member commission includes three statutory members - the state geologist, the director of the Missouri Department of Conservation and the staff director of the Clean Water Commission. The governor, with Senate approval, selects four public members. Of these four, only two may be of the same political party. Only one member of the commission may have a direct link with the mining industry.

The Land Reclamation Program consists of the Administrative, Abandoned Mines Lands, Coal and Non-Coal units. A total of 22 full time staff members are divided between the four units. Together they are responsible for reclaiming abandoned mine lands and conducting inspections at all active mining operations in Missouri.

Industrial Mineral Mining

Legislative and Rule Changes

The Land Reclamation Act and the regulations governing tar sands and barite mining remained essentially unchanged during the evolution of the *coal mining standards. In 1990, the passage of House Bill 1584* amended *The Land Reclamation Act* to encompass all non-coal surface mining activity. This includes limestone, sand, gravel, clay, tar sands and barite mining. Sandstone, granite and traprock quarries also became subject to the 1990 mining regulations.

The revisions require a much more thorough description of the method of operation and reclamation. The public was also included in the permitting process for the first time, through a public notice and comment procedure. In addition, the right of anyone affected by noncompliance at an operation could request a hearing before the Land Reclamation Commission.

Time frames requiring operators to complete reclamation in a timely manner were established. Bonding fees were significantly increased to ensure the state could complete reclamation if a permit is revoked. Grading to a traversable topography, as well as replacing 12 inches of topsoil is also a requirement. Following these amendments, rules and regulations became effective Feb. 6, 1992.

Owensville Quarry

Fees and Blasting

Changes to the 2007 edition of *The Land Reclamation Act* became effective on Aug. 28, 2007. It included a fee increase for operations that mine more than 5,000 tons of sand and gravel per year or any other commodity. The fee is based on an annual permit, bonded acreage and site fee calculation. The rate increase includes an $800 permit fee, a $200/$400 site fee depending if the site is mined more than six months and a $10 acreage fee for each bonded acre. A total permit fee will not exceed $3,000.

The fee of $300 for operators that mine less than 5,000 tons of sand and gravel per year has not change since 2002. Fees became effective on Aug. 28, 2007 and remain in effect until Dec. 31, 2013.

There is also a new geologic resources fee that will be administered by the department's Division of Geology and Land Survey. This fee includes a $50 permit fee, a $50 site fee and a $6 acreage fee for each bonded acre. The department will use this new geologic resources fee to provide assistance to the industrial minerals industry in identifying the quantity and quality of natural resources. The department will work closely with the newly created Industrial Minerals Advisory Council to establish initiatives and goals for the program.

Missouri Blasting Safety Act

Although the department's Land Reclamation Program does not have any authority concerning blasting related activity, detonations of explosives at quarries is one of the top complaints received by the program. Because of this, the Missouri Legislature introduced the *Missouri Blasting Safety Act (House Bill 298).*

Winter Brothers Material Co. - Hageman site

The governor signed the *Missouri Blasting Safety Act* on July 13, 2007. The State Fire Marshall's office implements this act. *The Blasting Safety Act* requires individuals using explosives to have or be supervised by a person with a blaster's license, with some exceptions. The act directs the Division of Fire Safety to create a blaster's licensing program. The act lays out qualifications for license applicants, which include completing an approved blaster's training course and passing a licensing examination. Licenses are valid for three years and may be renewed upon the applicant meeting renewal requirements as specified in the act. Blaster's licenses shall be required within 180 days of the division publishing licensing rules.

Contact the Division of Fire Safety at 573-751-2930 to learn more about these requirements.

Mining versus Development

Amendments made in 2005 to *The Land Reclamation Act* provides further clarification to land development. Land development sites sometimes have excess material due to excavation activities. In some cases, industrial minerals make up the majority of excavated material. *The Land Reclamation Act* provides permit exemptions for construction excavations to protect land development sites from being labeled as a mine site. These constructions sites must have engineering plans and specifications prepared by an architect, professional engineer or landscape architect. Excavation for construction performed under a written contract that requires excavation of minerals or fill dirt shall be considered construction and exempt from Land Reclamation permitting requirements.

Sand and Gravel Rules

On Sept. 15, 2001 the Land Reclamation Commission published proposed rules in the Missouri Register, which were intended to mirror the Water Protection Program's gravel removal guidelines. During the period that followed, the Land Reclamation Program received many comments concerning these proposed rules. The commission decided to hold four public meetings around the state in an effort to publicize the reason for the rules and explain the department's interpretation of them. These meetings were held in December 2001, followed by a public hearing on Jan. 24, 2002. After deliberation, the commission decided to form a workgroup to review and possibly revise the proposed rules. The workgroup included members from industry, landowners, anglers, hydrologists, environmental groups, government agencies and others with an interest in streams and gravel mining. The workgroup was mandated to come up with suggestions for rules that would be acceptable to all interested parties. The rules for in-stream sand and gravel mining operations became effective in May 2005.

Land Reclamation Commission's public meeting tour of site.

Public Participation

When applying for a new site, transferring an exiting site or applying for an expansion, an operator is required to send a notice of intent to operate a surface mine. The operator is required to send the notice by certified mail to all landowners considered adjacent or contiguous, and to the governing body of the counties or cities where the proposed mine area is located. The operator is also required to publish a public notice of intent in a newspaper that is qualified to run public notices and is located in the county where the proposed mine is located. The public notice must be printed once a week for four consecutive weeks. The public notice requirement also allows the public an opportunity to provide comments or request a public meeting. The public comment period lasts for 45 days. Operators have the right to respectfully decline a public meeting if they desire. Operators are also holding their own version of a public meeting or "open house" neighborhood gatherings to discuss mine plans when proposing a new site with great success.

Since Aug. 28, 2001, 12 public meetings have been held based on the 2001 edition of The Land Reclamation Act. Attendance figures at the public meeting ranged from a group of five to a crowd of nearly 80 people. Six of the public meetings resolved the concerns expressed by the public and did not go as a hearing before the Land Reclamation Commission. Public meetings provide a forum for the public to better understand or resolve issues related to a proposed mine site. They also provide a starting point for a company to reveal the proposed mine plan and provide responses to the public's concerns.

Some of the topics covered at the public meetings involve impacts to air quality, water quality, permitting issues, blasting related issues and livelihood issues. The communication at the meetings allows everyone the opportunity to share and understand the potential impacts a proposed surface mine may present.

Following a public meeting, The Land Reclamation Act at Section 444.773.3, RSMo, requires the staff director to make a formal recommendation regarding the issuance or denial of an applicant's permit. The director's recommendation is based on several specific items:

- The application's compliance with submitting a complete application.
- The application's compliance with fulfilling the requirements of a complete application.
- Consideration of any written comments received.
- Whether the operator has had a permit revoked or a bond forfeited.
- If a petition is filed and a hearing is held, the commission shall make the decision.

The industrial minerals permitting program continues to look for ways to improve its methods of helping the public to understand the industrial minerals permitting procedures. Each year, citizens living near proposed mines request six to 10 public hearings about the issuance of permits.

The Land Reclamation Commission granted four hearings since the 2001 edition of *The Land Reclamation Act*. Requests for hearings require a tremendous amount of staff time to address and will become increasingly common as mining companies look to open sites near heavily populated areas. In two cases, the operator was issued a certificate to operate a surface mine. One of the cases involved the operator withdrawing their application. On Sept. 27, 2007, the commission granted a hearing for a Lake Ozark Quarry application. A hearing date had not been set by the time this report went to publication. New sites and expansions to existing sites are needed to provide building commodities to meet the needs and demands of on-going and new construction. It is likely that sometime in the future, changes may need to be implemented to associated statutes, rules or internal policies for the Land Reclamation Program to better respond to the needs of the environment, the unregulated community and companies that mine industrial minerals.

Routinely, the concerns brought to the commission involve issues outside the regulatory authority provided in *The Land Reclamation Act*. These issues include concerns about blasting, safety on public roads and the mine's effect on property values. Even so, the commission has encouraged all citizens who have requested hearings under the proper circumstances to personally appear at regularly scheduled commission meetings. The request for a public hearing process has brought an acute awareness to the commission about what is most troubling to the citizens. In return, the public has an opportunity to learn more about the reclamation requirements under *The Land Reclamation Act*. Continued contact will help pave the way for the citizens to resolve their concerns about mining.

2001 Fees

In 2001, fees for mining more than 5,000 tons of sand and gravel or any other commodity was based on an annual permit, bonded acreage and site fee calculation. In 2001, the annual permit fees included a $500 permit fee, a $150 or $300 site fee (depending if the site is mined more than six months) and a $5 acreage fee for each acre bonded. In any case, a total permit fee per application did not exceed $2,500. Operators who mine less than 5,000 tons of sand and gravel per year paid an annual permit fee of $300. Because the law required a statute change, the fees did not go into effect until 2002.

Permitting

Industrial mineral mining permit certificates are issued for a one-year period. The industrial mineral permits must be continually renewed until the Land Reclamation Commission or staff director deems all mined land covered by the permit is fully reclaimed. Approximately 700 new or renewed permits were issued in the past two years. Since some permits contain multiple sites, the number of permitted sites is substantially higher. In addition to the new and renewed permits, staff spent a considerable amount of time reviewing other permit actions, including permit transfers, expansions, amendments and consultations with the Missouri Department of Conservation. Fees collected from industrial mineral permits are used to conduct necessary regulatory functions.

Inspections

Before 2007, the state was historically separated into at least four geographic area inspection units. Now, the state is divided into two geographic area inspection units with at least two inspectors assigned to each unit. Each unit contains about 57 counties. Not all counties have an industrial mineral site. When staff wanted the state divided into two regions, it was noted that some areas become more active at times when compared to others. Before the change, one staff member had to investigate a lot of complaints in the southwest portion of the state while the inspection staff assigned to the northeast portion of the state had a relatively normal schedule. Now, two inspection staff members share an assigned area to help maintain a relatively normal workload.

Operators who have been in the business for more than five years have undoubtedly seen changes in inspection staff. Many operators prefer the same inspector each year for the purpose of consistency. The program will accommodate their request as often as possible.

Inspectors are limited to the amount of on-site inspections they can perform in a given year, as they conduct permitting and other actions as well. Mine operations range in size from 1 acre gravel bars to

Active clay pit mining operation

more than 300 acre limestone quarries. In 2006, there were 874 permitted industrial mineral sites, with 100 inspections conducted and 216 inspections were conducted in 2007. These total numbers are a reduction from the number of inspections conducted during 2004, with 294 inspections and 2005 with 163 inspections. This reduction is related to:

- Vacant positions.
- Increased manpower needed in permit reviews for industrial minerals.
- Training staff to conduct inspections on their own as there has been a 100 percent turnover in inspection staff.

The Industrial Mineral Unit projects to have a total of 350 inspections in 2008 due to a full inspection staff and certified inspectors to conduct investigations. Each of the five inspectors will need to conduct 70 inspections. If accomplished, it would be the most annual site inspections completed in the past 10 years!

Types of Inspections

An average of 205 site inspections are conducted each year. Inspections typically fit into three categories:

Regular Inspections

Regular inspections are conducted to determine if an operator is in compliance with the approved permit and the applicable performance requirements. Performance requirements checked by inspectors include timeliness of reclamation, safety barriers, lateral support, erosion and siltation control, grading, topsoil handling and revegetation. Inspectors also evaluate each mine site to ensure all mining disturbance is confined to the permitted and bonded area and the approved post-mining land uses are being established.

In-stream sand and gravel inspections now involve performance standards. Inspectors evaluate the mined area on the gravel bar to make sure the material being excavated is unconsolidated. Inspectors also look to make sure there is no mining below the waterline, no relocation of stream channels, no sorting or washing of gravel on the gravel bar and an undisturbed buffer of 10 feet from the flowing water.

Complaint Inspections

Complaint inspections are conducted after the program receives notification an industrial mineral operation may be in violation of *The Land Reclamation Act*. Complaints filed may involve blasting, noise, truck traffic, water pollution, digging in flowing water, erosion or siltation. Following an investigation, the inspector and operator are often successful in resolving a citizen's complaint in a timely manner. However, many complaints related to mining operations, such as blasting and noise, are not regulated by the Land Reclamation Program and are referred to the appropriate regulatory authority.

The department requires a complaint be investigated within 30 days. The goal is to respond within 14 days of receiving them. However, an investigation is usually conducted within seven work days. There were 42 complaints in 2006 and 45 in 2007.

Bond Release Inspections

Bond release inspections are conducted at the operator's request when reclamation has been completed. The mining company will also send the landowner a letter announcing the intent to seek a release of the land. The landowner may request a hearing if they feel the land is not properly reclaimed.

The focus of the bond release inspection is to determine if the mine site has been reclaimed in accordance with the reclamation plan. The inspector must evaluate if the operator has established the designated post mining land uses. Post mining land uses may be designated as wildlife habitat, agricultural, development or water impoundment. The staff director is allowed to determine if the bond, or any portion thereof, should be released. When mined land is properly reclaimed a recommendation for bond release is made to the Land Reclamation Commission or staff director. If either the Land Reclamation Commission or staff director approves the request for approval of reclaimed land, the reclamation performance bond is released back to the operator. The commission or staff director approved the release of 954 acres of reclaimed mine land in 2006 and 511 acres in 2007.

The department and program are also conducting other specialty type of inspections. Environmental Assistance Visits are for new operators. Typically, the department allows an operator to conduct operations for a few months before conducting an initial inspection. Inspectors will typically let a new operator conduct operations for a two-month period and then see what changes the operator may need to make to stay in compliance with applicable mining laws. Assistance visits are another type of specialty inspection. If an operator requests an inspection to see how to conform to the mining laws, then an inspector will provide that type of assistance inspection. The latest assistance inspection involved a company that wanted to know what type of activities could be conducted in a pre-law area, sink-hole field and did not want to move topsoil twice. Inspection staff was charged in March 2007 to inspect every site that is in either an outstanding state or national resource watershed. As of December 2007, inspection staff completed the requirement to visit each mine site within an outstanding state or national resource watershed.

Enforcement

Enforcement powers of the Land Reclamation Commission were enhanced in two significant ways by revisions made in 1990 to *The Land Reclamation Act*. The commission may impose administrative penalties when notices of violation are issued and they have the option to refer civil actions to the Cole County Court rather than the county the violation occurred. These revisions have resulted in more prompt and vigorous action by the operators to eliminate violations. Often, violations observed during an inspection are eliminated through the use of conference, conciliation and persuasion. This process encourages the operator to correct a noncompliance through voluntary action and is used normally in cases of relatively minor noncompliance. If attempts to correct a violation through conference, conciliation and persuasion are not successful, a notice of violation is issued to the operator.

Five notices of violation were issued during 2006 and 2007. Two were administrative in nature and three were operational violations of the performance requirements. Administrative violations often involve mining without a valid permit or mining outside of the permitted area. Notices of violations related to operational violations include the failure to control off-site sedimentation, erosion, improper topsoil handling and the failure to meet safety barrier requirements. A reduction in the number of site inspections at industrial minerals operations typically carries the potential for a decrease in enforcement activity during a specific time frame. Since the Land Reclamation Program started conducting Environmental Assistance Visits, the department has noticed mining operators are now more informed about the rules and regulations and are less likely to be in a noncompliance situation. Potential enforcement actions are avoided or minimized through close coordination with the department's Land Reclamation Program staff.

Complaint Investigation: gravel pushed against the banks is an illegal activity

Sediment leaving a permitted area

Bond Releases

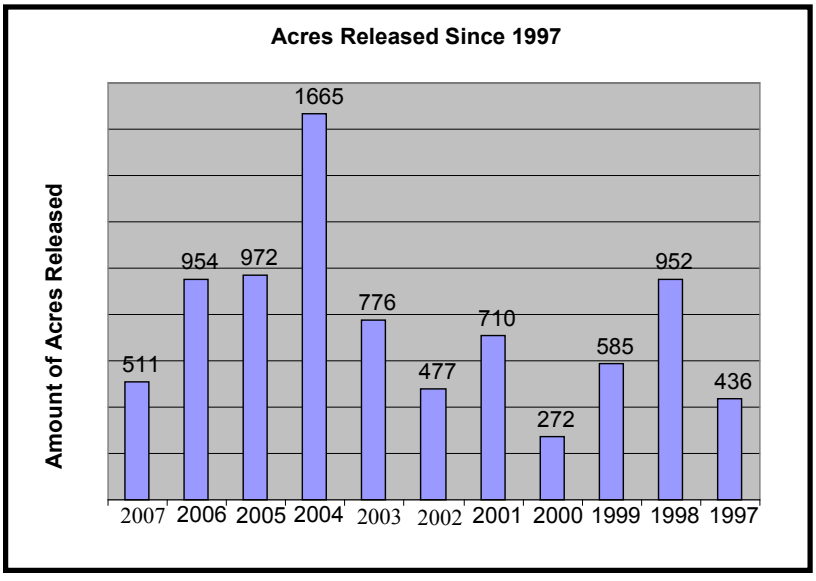
Bond and reclamation liability release is an important part of the mine closure process. An operator initiates the process by completing a *Request for Approval of Reclaimed Land* and submitting this document along with a map that clearly shows the proposed release area. The operator must also mail a completed copy of the *Request for Approval of Reclaimed Land* form and map with a cover letter to the landowner of the requested release area.

Land Reclamation Program staff must inspect conditions at the site and make a recommendation to the staff director or Land Reclamation Commission, which will rule on the bond release request. At least two growing seasons must pass after an area has been planted before the success of revegetation can be judged. Land never affected by mining, but is under permit and bond, may be released as unaffected.

To obtain a *Request for Approval of Reclaimed Land* form, contact the Department's Land Reclamation Program by telephone at 573-751-4041. The form is also available on the department's Web site at www.dnr.mo.gov/forms/index.html#LandReclamation.

Bonding

Open-pit sand and gravel operations mining 5,000 tons per year or less must be bonded at a rate of $500 per acre before a permit is issued. For all other operations, the minimum bond required on 8 acres or less is $8,000; every acre over 8 acres requires bond at $500 per acre. The rules allow for a $4,500 per acre topsoil bond when there is a failure to salvage topsoil for those acres. Typically, in-stream sites are not subject to bonding requirements due to the lack of reclamation responsibility. However, upon inspection if an in-stream site is determined to have created a reclamation responsibility, bonding requirements of $500 per acre will be imposed.



The state will use the bond to complete reclamation if the permittee, for whatever reason, is unable or unwilling to fulfill the legal obligation to reclaim the disturbance to the land surface they caused. An operator may secure bond through a surety bond, certificate of deposit, or an irrevocable letter of credit. All bonds must be submitted on forms provided by the Land Reclamation Program.

If an operator elects to use a Certificate of Deposit to secure bond, the Certificate of Deposit must be accompanied by a "Personal Bond Secured by A Certificate Of Deposit". The Certificate of Deposit must also be assigned to the State of Missouri and the issuing bank must acknowledge this action using the *Assignment of Certificate Of Deposit*. The assignment must be irrevocable and conditioned on the release of the bond by the Land Reclamation Commission. A certificate not assigned to the state must be made payable solely to the State of Missouri. In either case, the interest earned on a Certificate of Deposit must be made payable to the depositor.

Applicants who wish to increase the number of acres under permit must post additional bond. A surety bond may be increased through a rider with an attached power of attorney. Bonds may be replaced, dollar for dollar, at any time. The old bond cannot be returned until the replacement bond has been submitted and accepted by the Land Reclamation Program staff director. Surprisingly, there is $17.2 million in bond money for all industrial mineral sites.

Bond Forfeiture

The Land Reclamation Act went into effect Jan. 1, 1972, and permitted and regulated the mining of limestone, clay, barite, tar sands along with sand and gravel in Missouri. As part of regulation, the companies and individuals participating were obligated to put up a reclamation performance bond in the amount of $500 per acre for every permitted acre. If an individual or company fails to perform the required reclamation, the bonds would then be forfeited and the state would complete the reclamation.

The bonding amount was subsequently found to be inadequate to cover reclamation costs as well as other inadequacies in the act. Therefore, the act was amended effective Aug. 28, 1990. The amendment

added granite, traprock, sandstone, oil shale and shale to those already regulated and increased the reclamation bonding to a minimum bond of $8,000 for the first 8 acres and $500 for every acre permitted thereafter. Between 1972 and 1990, 26 sites operated by 14 different companies became bond forfeiture sites and proper reclamation became responsibility of the department's Land Reclamation Program.

In 2003, National Refractories left reclamation responsibilities to the state when they went bankrupt. Due to negotiations with the surety company, a settlement was not reached until October 2006. The surety provided $85,250 in bond monies to reclaim 25 clay pits for a total of 162.5 acres. After an initial inspection, the department's Land Reclamation Program quickly learned there was not enough bond to properly reclaim the sites in accordance with *The Land Reclamation Act.* Two sites in particular have a cost estimate of $200,000 for proper reclamation. The program continues to work with landowners to reclaim these sites. No mining companies have left a reclamation responsibility to the state in 2006 or 2007.

In-Stream Sand and Gravel Mining

In-stream sand and gravel mining is one of the most prevalent types of mining in Missouri, as far as the number of sites. This type of mining isn't just seeing a piece of excavating machinery in the flowing portion of the stream, it is more of a bar skimming mining operation.

Bar skimming is limited to the exposed portion of the gravel bar above the water line, between the ordinary high banks of a stream. Bar skimming is recommended as a means for advancing stream resource conservation while maintaining a viable extraction industry. This type of gravel removal operation lowers the risk of forward erosion of the stream channel upstream and sedimentation downstream. In addition, the practice of removing gravel at periods of low water flow will aid in protecting wildlife near the stream environment. Some of the new rules include, staying an adequate distance from the stream bank, use of existing crossing areas, leaving an undisturbed buffer of 10 feet from the flowing water line and no mining below the water line unless the operator has applied for and received a variance.

Bond forfeiture clay pit

Sediment leaving the permit area to the county road.

In fiscal year 2007, there were 372 permitted in-stream sites; only one site less than the total number of limestone sites. Although the total number of sites involving in-stream extraction is about equal compared to limestone, the total number of acres involved at limestone operations is approximately 85 percent greater compared to the total number of acres involved with in-stream operations. Numerous operators across the state excavate sand and gravel deposits, commonly known as gravel bars, as a source of aggregate material.

During the 1990s this activity underwent several changes in regulatory control within Missouri. In the early 1990s, the department's Land Reclamation Program was the permitting and enforcement authority that both issued permits for this type of mining activity and also oversaw the proper removal of sand and gravel from Missouri's streams. In the mid 1990s, the regulation of this activity was taken up by the Army Corps of Engineers who took over the entire process of permitting and inspecting these mining facilities. The Army Corps of Engineers lost their jurisdiction over this activity in late 1998 due to a ruling by the U.S. District Court of Appeals. The court found that "de-minimus" or incidental fall back of sand and gravel into the stream from which it was being excavated did not constitute the placement of fill by the mining operation. Hence, the court ruled the Army Corps of Engineers had exceeded its authority in requiring a permit for this activity.

In January 1999, the Land Reclamation Program resumed the former position of the regulatory authority over this type of mining activity and bases this authority upon the provision of the state's Land Reclamation Act. Approximately 150 permits were re-issued to the mining industry during the early months of 1999 by the Land Reclamation Program to take the place of the existing Army Corps of Engineer's permits. This responsibility continues to the present day on the part of the Land Reclamation Program involving 372 individual permitted sites.

Example of a buffer zone of adequate width between the area of excavation and base of the high bank

Spotlight on the Ozarks: Sand and Gravel Mining

Sand and gravel mining operators in the Ozarks face challenges that operators in other regions of Missouri do not experience. The greatest regulatory challenge for sand and gravel operators is conducting mining and processing operations within the watershed of an Outstanding National or State Resource Waters. Outstanding resource waters are defined by the Missouri Department of Natural Resources' Water Protection Program as state or national waters:

- Outstanding state resource waters are high quality waters with a significant aesthetic, recreational or scientific value, specifically designated as such by the Clean Water Commission.
- Outstanding national resource waters are waters that have outstanding national recreational and ecological significance. These waters shall receive special protection against any degradation in quality. Congressionally designated rivers, including those in the Ozark national scenic riverways and the wild and scenic rivers system, are so designated.

The Ozark counties of Phelps, Crawford, Dent, Shannon, Reynolds, Texas, Carter, Douglas and Howell contain a majority of the either state or national outstanding resource waters. There are some smaller designated areas present in a few other counties scattered about the state. In-stream sand and gravel operations are prohibited from those waters listed as outstanding national resource waters. Clean water laws require mining operations within national outstanding resource watersheds to have a no discharge system. Discharges at sites in outstanding state resource watersheds shall not cause the current water quality in the streams to be lowered. Because of this regulation, the department's Land Reclamation Program issues a letter of six extra conditions along with a certificate to operate a surface mine to operators in these watersheds. Five of the conditions are applicable to all other operators as part of their standard sand and gravel excavation plan. The one condition that is not required of all other operators is that the mined gravel bar is left nearly level at the end of the day. This is accomplished by back dragging any ledge or ridge created by the excavation. Most operators do this already and it does not present a financial burden to their operation. The mine site is not the only portion of the operation subject to the Water Protection Program's no-discharge requirements.

Permitted Gravel in Texas County.

A no discharge system is also required for washing and other processing areas along with all other types of businesses that operate in an outstanding resource watershed. It is possible to operate a no-discharge sand and gravel wash plant. Spring Creek Materials currently operates mine sites and wash plants in compliance with the no discharge requirements. Owner Travis Morrison reports the only other alternative is to have sand and gravel shipped in from more than 150 miles away from the Missouri River. Shipping doubles the price of that material for every 35 miles of travel. In this case, sand could cost up to $85 per ton, not a viable option as it would be reflected in construction costs. Currently, there is an adequate supply of sand and gravel to meet growth demands in the outstanding resource watersheds of the Ozarks as this region is not experiencing the economic growth demands when compared to Branson, St. Louis or Kansas City.

Mining and economic development projects in the watersheds of outstanding resource waters are subject to either no discharge requirements or shall not cause the current water quality in the streams to be lowered. These mine sites or development projects are not any different than the ones; however, the water protection standards have stricter requirements compared to other portions of the state. Operators in the Ozarks want universal and fair treatment for all mine operators in the state. Operators inform the department to keep in mind the impacts the water quality standards have on economic development as these decisions affect day to day operations. Ozark operators are managing their business on a thin line and believe extra conditions imposed on their operation are unfair circumstances.

There are also some Ozark operators whose in-stream sites are not being replenished with a new load of sand and gravel due to a lack of significant flood events. Flood events typically move gravel from one area to a depositional site, which is typically mined. Gary Peterson, operator of Peterson Gravel & Ready Mix Inc. suggests that from 1972 to 2001 more hurricanes made landfall in Texas, which created significant rain events in the Ozarks. The rain events have not occurred as frequently since 2001. Now these operators are using different tools to locate gravel bars. Peterson reports that the University of Missouri's CARES Web site provides aerial photographs from 2007, allowing operators to locate isolated gravel bars. Inspectors also use this Web site to measure disturbed acreage at quarry operations. To view a site from the air, visit the Web site at www.cares.missouri.edu.

Metallic Minerals

Introduction and Purpose

The *Metallic Minerals Waste Management Act*, enacted into law in 1989, gives regulatory authority to the director of the Department of Natural Resources to have and exercise all powers provided in sections 444.352 – 444.380 of this act. The *Metallic Minerals Waste Management Act* regulates disposal of waste from metallic minerals mining, beneficiation and processing. Some of the director's duties are to secure appropriate staff, coordinate existing environmental programs, issue permits, make inspections, manage fees, maintain records of management practices, seek additional funds, publish rules and pursue appropriate enforcement actions. The minerals covered by the *Metallic Minerals Waste Management Act* are those minerals or ores containing lead, iron, zinc, copper, gold and silver.

A *Metallic Minerals Waste Management Permit* was required no later than six months after Aug. 28, 1989 for any active metallic minerals waste management areas operating under a National Pollutant Discharge Elimination System permit, or dam safety registration, or both, or within 90 days after filing an application for an National Pollutant Discharge Elimination System construction permit or dam safety construction permit, whichever is applied for first. The operator applied to the director for a metallic minerals waste management area permit. Today, operator applications contain but are not limited to, a schedule and plan for closure and inspection-maintenance of the waste management area. Operators will implement the plan when the useful operating life of the waste management area is complete or when there is permanent cessation of the operation.

Upland Wings - Dam inslope covering

Permitting

In 1991, the department issued 11 permits to operators under the *Metallic Minerals Waste Management Act.* The Land Reclamation Program reviews the metallic minerals waste management permits. Metallic minerals waste management permit applications consist of financial assurance information and detailed waste management area closure and inspection-maintenance plans. The plans establish and explain the technical steps proposed to accomplish and maintain closure after mining and waste disposal is completed. Issues addressed in the plans include:

- Design and construction of waste control structures and tailings dams.
- Characterization of waste products.
- Methods of control and protection of surface water.
- Methods for protection of groundwater and aquifers.
- Geology and seismicity of the area.
- Potential of subsidence.
- Reuse and off-site removal of wastes.
- Surface reclamation of waste management areas.

During the on-going permit application review, the Land Reclamation Program coordinates with other Department of Natural Resources programs involved with the metallic minerals waste management areas. These include the Air Pollution Control Program, Solid Waste Management Program, Hazardous Waste Program, the Water Protection Program and Public Drinking Water Program and the Division of Geology and Land Survey. The coordination process allows the other programs to review and comment on the technical aspects of the plans so that all departmental issues may be incorporated into the permit.

Inspections

Typically, inspections are performed semiannually on the 11 metallic minerals waste management permit areas within Missouri. During the course of these inspections all aspects of each company's permits are evaluated. The focus of these inspections is to assess the company's compliance with virtually every environmental law that is administered by the Department of Natural Resources. The Land Reclamation Program is entrusted as the coordinating program within the department for all active metallic mineral producers currently operating in Missouri. There are also several metallic mineral waste management permits for areas that are not currently active. It is the program's responsibility to act as the liaison the other programs within the department and each metal producer to ensure continuing compliance with all applicable state environmental laws.

Actual on-the-ground reclamation does not begin at most of these sites until mineral production is stopped and mine closure begins. However, the Doe Run Company has started some seeding and reclamation work at their Sweetwater mine and Glover smelter locations.

Only one lead producer in Missouri is in active closure at the present time. Teck-Cominco American's Magmont Mine ceased production on May 31, 1994 and began the actual reclamation of the surface effects of almost 30 years of lead mining and processing.

There are three other facilities that have ceased production. The Upland Wings Inc., Pea Ridge mine is not an active mine, operations are currently ongoing to get an approved closure plan for the *Metallic Minerals Waste Management Permit* with the Land Reclamation Program. The Doe Run Company's Viburnum mine and Glover smelter are also not active at this time. The Doe Run Company's Glover smelter is still in the process of receiving approval from the department for a partial closure of an old slag pile at the facility. One area of slag has been covered and vegetation planted to meet closure requirements. The closure and inspection-maintenance plans for these mines and smelters are either being reviewed by the department at this time or the department is waiting for submittal of revised closure plans for review and approval.

The Doe Run Company's Buick Resource Recycling Division is currently working with the department's Hazardous Waste Program to develop a permit for a hazardous waste landfill on-site. If approved, the landfill site would encompass the current metallic mineral waste management area permitted by the Land Reclamation Program. Approval of the landfill permit would likely mean the metallic mineral waste management permit would be released as the Hazardous Waste Program's permit would be more restrictive and call for a much more significant clay cap over the old slag pile. This would mean much better environmental protection; due in part to the fact the site must meet post closure requirements for 30 years after closure date. The Hazardous Waste Permit looks to be approved around the end of December 2008.

The Land Reclamation Program was involved with the department wide inspection and surveillance activities performed at The Doe Run Company's Herculaneum smelter. In May 2001, the department, the Environmental Protection Agency and The Doe Run Company signed a voluntary Administrative Order on Consent. The order requires the company

Teck-Cominco during an inspection in June 2007.

to conduct certain response actions to abate an imminent and substantial endangerment to the public health, welfare and environment. The Land Reclamation Program has been monitoring the construction of a containment berm around the perimeter of the current slag pile, which was required in the order. Construction of the berm has been underway since spring 2007, and is scheduled to be completed by April 2008.

Construction of the containment berm around the Herculaneum slag pile, June 2007.

Enforcement

In the previous biennial report, four enforcement actions were identified as being issued under the provisions of the *Metallic Minerals Waste Management Act* by the Land Reclamation Program.

Enforcement actions at two smelters and two mines were initiated during the previous reporting period and none have occurred in the current reporting period. The actions included violations for construction of a waste management control structure prior to department approval, the failure of two facilities to contain metallic mineral wastes within their approved waste management areas and the failure of a now bankrupt facility to submit annual permit fees. All of the enforcement actions brought against metallic producers have been terminated.

Enforcement under this law is significantly different from enforcement under either the coal or industrial minerals units of the program. When it becomes necessary to issue a citation to any of the metal producers, the authority to do so rests solely with the director of the Department of Natural Resources. Enforcement is only authorized by law after attempts to eliminate the violation through conference, conciliation and persuasion have been exercised and exhausted.

Bonding

Under Metallic Minerals Waste Management Act, Section 444.368, before a permit can be issued, the operator shall file a demonstration of financial assurance in the form of a bond, certificate of deposit, letter of credit, insurance, company guarantee, escrow agreement or other form of financial assurance as approved by the director. Any financial assurance instrument shall be in such form as the director prescribes, to the benefit of the State of Missouri, conditioned that the operator shall faithfully perform all terms of the permit and the requirements of sections 444.352 to 444.380. Upon completion of the terms of the permit and closure and inspection-maintenance requirements in sections 444.352 to 444.380, the financial assurance instrument may then be released from the benefit of the State of Missouri, back to the operator.

The financial assurance instrument shall be signed by the operator and shall be in the penal sum of $1,000 for each acre or fraction of an acre of the metallic minerals waste management area, but not less than $20,000 for each permit. No financial assurance instrument shall be cancelled or terminated by the operator except after no less than 90 days' notice and substitution by some other financial assurance approved by the director. In the event a company guarantee is furnished, it shall be in the form of a letter, duly executed by an officer of the company, guaranteeing the required amount of financial assurance, accompanied by a financial test statement demonstrating ownership of real property or mining rights in Missouri of an assessed valuation of at least three times the amount of required financial assurance.

Coal Mining

2006 and 2007 Highlights

On Feb. 1, 2006, Missouri regained primacy to administer the coal regulatory program from the Office of Surface Mining. Missouri lost primacy in 2003 due to funding restrictions. The responsibility for enforcing the law rested with the Office of Surface Mining during the period July 1, 2003 to Jan. 31, 2006. Following Missouri's successful demonstration to properly and adequately administer the coal regulatory program, this responsibility was once again awarded to the state from the Office of Surface Mining. This was the first time a state has lost primacy to enforce the surface coal mining law within its borders and then successfully regained primacy.

Considerable progress has been made during the past two years with regard to Missouri's bond forfeiture program. The Land Reclamation Program released reclamation liability on 13 permits covering more than 2,200 acres at bond forfeiture sites during fiscal year 2006. The Land Reclamation Program continued to focus on completing forfeiture reclamation in fiscal year 2007. During fiscal year 2007, reclamation liability was released on 1,278.68 acres covering four permanent program permits. The Missouri Land Reclamation Program's dedication to completion of reclamation at forfeiture sites is best exemplified by comparing the work accomplished in fiscal year 2006 and fiscal year 2007 with that done in the previous five fiscal years. For the period fiscal year 2001 through fiscal year 2005, forfeiture reclamation liability release was achieved on only 825 acres covered by only six permits.

Introduction and Purpose

Through growing national concern over the environmental degradation caused by coal mining, Public Law 95-87 was passed in 1977 by the U.S. Congress. This law, also known as the *Surface Mining Control and Reclamation Act* dictated specific requirements for the reclamation of coal mined land, and also established state regulatory authorities for the enforcement and monitoring of surface mine reclamation activities. The act also established programs and funding for reclaiming coal mine lands mined prior to May 2, 1977.

On May 3, 1978, the legislature amended Missouri's Strip Mine Law establishing Chapter 444.535 RSMo, commonly referred to as the Interim Program Law. Requirements of this law include:

- Topsoil must be removed and replaced to a minimum 6 inch depth.
- All prime farmland soils must be removed and replaced to 40 inch depth.

Active surface coal mine in Bates County.

- All mined land must be reclaimed to an equal or better land-use capability.
- Mined land must be backfilled and graded to approximate original contour.
- Coal waste and other acid-or toxic-forming material must be covered with a minimum of 4 feet of non-toxic material.
- A permanent vegetative cover compatible with the pre-mining land use must be established.

On May 17, 1982, the Missouri legislature passed the Surface Coal Mining Law (Chapters 444.800 - 444.970) to match federal standards established in the Surface Mining Control and Reclamation Act. The law made changes to the permitting process and granted the Land Reclamation Commission the authority to administer the abandoned mine land program. Coal companies were now required to submit baseline information on the hydrology, geology, soils, fish and wildlife and cultural resources of the proposed mining area along with a detailed description of the proposed operation and reclamation plan. The most significant change to the reclamation requirements was that prime farmland soils must be removed and replaced to a 48 inch depth. These requirements, known as the Permanent Program Law, continue in effect to the present day.

Surface Coal Mining Permit Actions
State Fiscal Year 2006 and 2007

	FY2006	FY2007
New surface minining permit applications received.	1	0
New surface mining permit applications approved.	0	1
New exploration permit applications received.	0	0
Renewed exploration permit applications approved.	2	2
Permit amendments received (permit revisions, permit renewals, permit transfers)	72	72
Permit Amendments finalized (approved, withdrawn, denied.	72	72

Over recent years, Missouri coal production has declined from 4.2 million tons in 1987 to approximately one-half million tons during 2006. This decline is largely due to industry demands for low-sulfur, western coal needed by power plants to reduce air pollution and meet emission standards required by the federal Clean Air Act. Most of Missouri's coal reserves contain relatively high sulfur content, ranging from 2 to 7 percent by weight. However, Missouri coal has a relatively high British Thermal Unit, or BTU, compared to western coal. In recent years, some power plants have opted to mix Missouri's coal with lower BTU western coal to increase energy production without exceeding sulfur emissions.

Over the last two fiscal years, coal mining has been concentrated in an area in southwestern Missouri where, in places, coal seams contain lower levels of sulfur. During this time period, the Land Reclamation Program issued one coal mining permit, which expanded an existing mine by 350 acres. This active mine site is located in Bates County. At the end of fiscal year 2007, two companies holding Missouri surface coal mine permits were still producing coal. The remaining mines in Missouri were in various stages of reclaiming the land to regulatory standards.

Land Reclamation Program staff closely monitors coal mining operations, including both coal removal and reclamation activities. Monthly inspections of each mine continue to be performed after the last ton of coal is removed.

Permitting

Staff members are responsible for reviewing permit revisions and new permit applications. Land Reclamation Program staff are professionally trained in specific technical areas and are responsible for reviewing technical plans with respect to their area(s) of expertise. Technical areas that must be reviewed include engineering, blasting, soil science, geology, hydrology, revegetation, land use plans, fish and wildlife protection, cultural and historical resources and reclamation technology. Staff members review all coal permit applications for adequacy and recommend approval or denial to the Land Reclamation Program staff director. Staff conducts regular evaluations of existing permits and also provides technical assistance to the mining industry and the public.

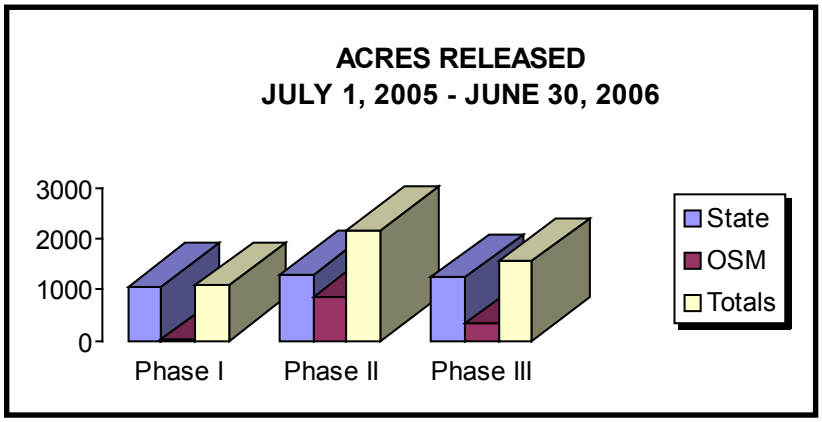
A thorough review of surface coal mining permit applications, permit revisions and other permit-related actions is necessary to ensure all requirements of the law and regulations are met.

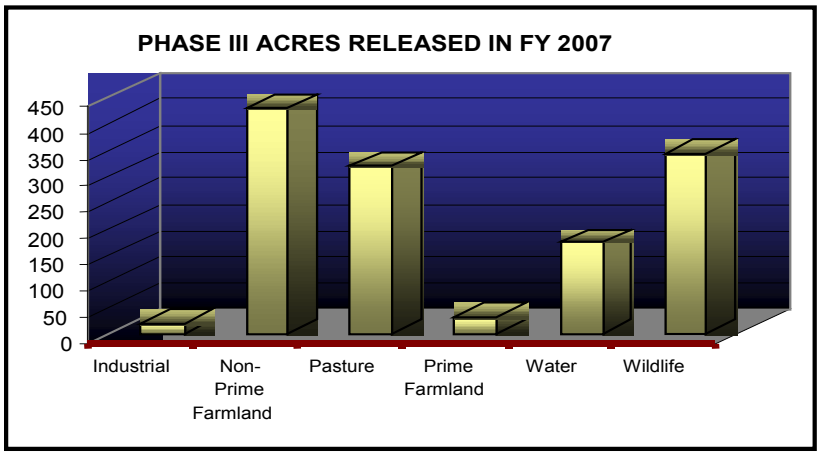
This includes determining all applications, as well as the review process itself; meet all legal and administrative requirements. The permitting requirements for coal mining are extensive, requiring careful evaluation of diverse and comprehensive environmental topics such as soil characteristics, surface and subsurface water quality controls, fish and wildlife information, cultural resources and land use planning. Reviews also focus on specific details such as engineering designs for sedimentation ponds and water diversions, blasting plans and hydrogeologic data to determine the probable hydrologic consequences of mining. Other permitting responsibilities include evaluating each applicant's legal compliance history with past mining activities and ensuring all public review requirements are fulfilled. Staff members also coordinate with other regulatory agencies to ensure the company proposing to conduct the mining activity has obtained other necessary environmental permits.

Bond Releases

Reclamation begins immediately after coal is removed from a strip mine pit. Regulations dictate a pit must be completely backfilled and graded no later than 180 days after coal removal. Topsoil must then be redistributed within an additional 270 days. The area must then be seeded during the first available growing season, with specific vegetation sufficiently established to control erosion by the end of the second year. Sediment ponds, diversions, explosive storage areas and maintenance pads also are subject to reclamation requirements once they become inactive or are no longer needed as part of the mining operation. Only when these requirements are met can an operator obtain a release of reclamation bonds.

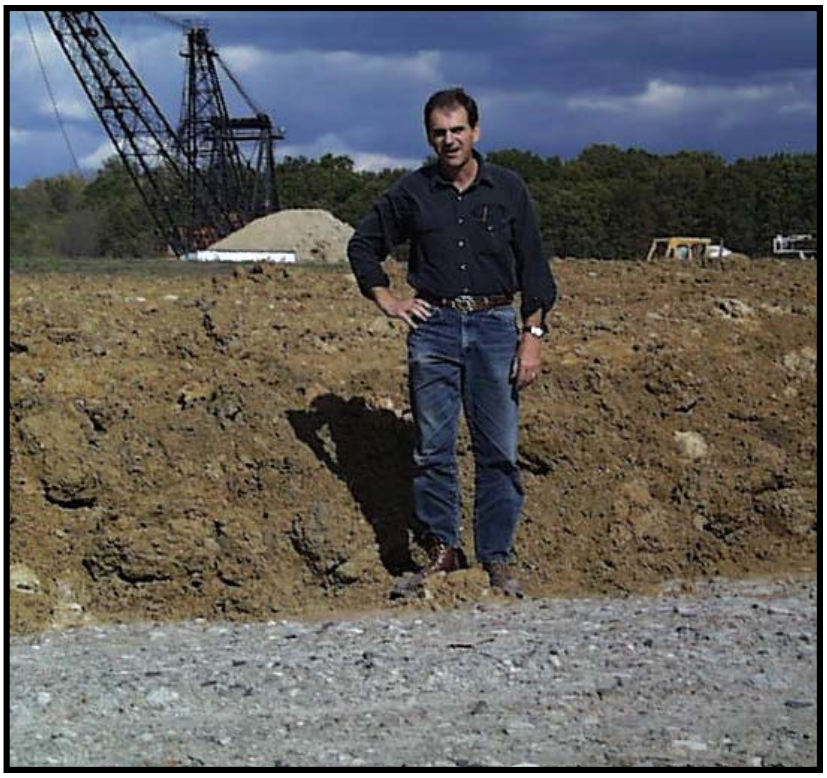
During the past two fiscal years Missouri worked to change the bonding requirements for surface coal mines from one of a bond pool, with a flat bonding rate for all areas, to one of full cost bonding. Full cost bonding requires an engineering evaluation take place of a specific area to be mined to determine what the worst case scenario would be in terms of cost to reclaim should the company, for whatever reason, be unable to complete full reclamation. This bond amount is determined by the Land Reclamation Program and is then posted by the company before a permit to mine coal is approved and issued. The bond is held in escrow by the Land Reclamation Program until such time as reclamation is completed and approved by the staff director of the program. Bonds are generally released in phases as certain reclamation milestones are met.





The Office of Surface Mining held the responsibility for processing bond release requests from July 1, 2005 through Jan. 31, 2006. This period of time was when the coal regulatory program was being restarted and Missouri's Land Reclamation Program was involved with reorganizing itself to reassume primacy. From Feb. 1, 2006 through June 30, 2006, the Land Reclamation Program held the responsibility for processing bond release requests. The combined total of bonds released during fiscal year 2006 by phases in Missouri by both Office of Surface Mining and the program was 1,079.9 acres of Phase I; 2,172.9 acres of Phase II and 1,565.3 acres of Phase III or final release. In fiscal year 2007 the program processed all bond release requests submitted. The total of bonds released during fiscal year 2007 by phases was 1,277.36 acres of Phase III or final release.

Two release requests from sureties conducting reclamation in lieu of forfeiture of the posted bond were also processed by the program during fiscal years 2006 and 2007. One release request was for a final release of 35 acres and was approved by the Land Reclamation Commission during fiscal year 2007. The second request was for a Phase I and complete (undisturbed land) release. The Phase I



A Land Reclamation Program inspector checks replacement thickness for prime farmland soils during an inspection of a surface coal mine.

release for 371.5 acres and complete release on 10.5 acres was approved by the Land Reclamation Commission during fiscal year 2006.

In fiscal year 2006, Associated Electric Cooperative Inc. obtained final bond release for its BeeVeer Mine located in Randolph County. The Land Reclamation Program recognized the company's outstanding effort in reclaiming this mine by nominating the Associated Electric Cooperative Inc. for two national awards; one from the Interstate Mining Compact Commission and one from the Office of Surface Mining. Associated Electric Cooperative Inc. won awards from both of these organizations for its premier effort in reclaiming a difficult and challenging portion of the overall areas mined by Associated Electric Cooperative Inc. during the 1980s and 1990s. While the program recognizes all coal mining companies presently operating in the state do a fine job of reclamation once mining is completed, Associated Electric Cooperative Inc. is to be commended for its outstanding effort at the former BeeVeer Mine site.

Inspection

Reclamation activities are closely monitored to ensure the required performance standards are met and the reclamation plans approved in the company's mining permits are followed. Coal mine inspections are performed monthly. On-site inspections serve three primary functions:

- Ensure an operation is functioning in a manner consistent with applicable state laws.
- Ensure an operation is fully complying with the conditions of the permit.
- Provide a public record on the status of mining and reclamation at a site.

Two styles of inspections are done, termed a complete and partial. Complete inspections are required once per calendar quarter. They involve a complete review of an operator's compliance with all permit conditions and state statutes. As the name implies, partial inspections are a review of an operator's compliance with some of the permit conditions and state statutes.

Many aspects of a mining operation are evaluated during an inspection to ensure the following:

- Mining occurs within the confines of the permit.
- Topsoil is being salvaged and stockpiled.
- All storm water runoff from mined areas enters sedimentation ponds.
- Pits and other areas of mine disturbance are promptly backfilled and graded.
- Topsoil is replaced to the required thickness.
- Vegetation is quickly reestablished in order to control erosion.

Monthly inspections continue after an operation ceases mining coal. Continued monitoring ensures reclamation continues in an expedient manner and all conditions of the reclamation plan are followed. Only when an operator gains approval for a Phase II release (vegetation sufficient to control erosion) does the inspection frequency decrease from monthly to quarterly.

Enforcement

Notices of Violation may be issued when an operator is out of compliance with the conditions of the permit or with state regulations. These are only issued after efforts to correct noncompliance through the process of conference, conciliation and persuasion prove ineffective. In general, if a notice of violation is issued, a monetary penalty will also be issued. Because inspections are conducted each month, it is rare that a serious noncompliance would exist. Well trained inspectors are able to

identify when a mining or reclamation process is getting off-track in time to rectify the situation with the company before the need to issue formal enforcement occurs.

Cessation orders are an elevated form of a notice of violation and are a more serious form of enforcement. The department will issue an order when a condition or practice at the mine site constitutes imminent danger to the health and safety of the public or imminent environmental harm to land, water or air resources. Orders may require the immediate cessation of mining until the problem is corrected. Cessation orders, because of their seriousness, require immediate abatement by the operator. Failure to do so may lead to a revocation of the mining permit. Cessation orders may also be issued for a failure to abate a notice of violation within the required time frame.

If Cessation orders are not abated in a timely manner through the appropriate action on the part of the mining company, the next level of enforcement action is a Show-Cause Order. This means the operator is ordered to show why their permit should not be revoked and the reclamation bond forfeited. Show-Cause Orders may also be issued for other reasons such as for patterns of violations and uncorrected delinquent reclamation.

The current practice of the Land Reclamation Program is to work closely with the active mining industry through monthly inspections and regular communication. This is done to identify any potential problems before they become serious enough to warrant the issuance of formal enforcement action. During the past two fiscal years this approach has proven itself to be so effective that there has been no sound reason for the program to issue any type of formal enforcement. At the same time, mining and reclamation have proceeded hand in hand with excellent results for both the industry and for the environment.

Bonding

Missouri's Surface Coal Mining Law (Chapters 444.800 - 444.970) was amended in 2006 to address changes mandated by the federal Office of Surface Mining. A condition of Missouri's reaquisition of primacy was to change the bonding system in Missouri from one of a bond pool to one of full cost bonding. The necessary regulation changes were made prior to full return of primacy to the state on Feb. 1, 2006 through emergency rulemaking. These rules remained in effect until such time as the normal rulemaking process was completed.

The former bond pool approach relied on a set amount of money per acre being posted by the permit applicant prior to receiving a permit to engage in surface mining of coal and this set amount was supplemented by payments into a bond pool from all companies based upon yearly coal production. The present full cost bond approach requires the applicant to provide an estimate of the cost to reclaim a surface mine given the worst case scenario of the mining operation. That estimate is reviewed by program engineers and, when verified, that dollar amount is the amount of bonding required to be posted prior to the issuance of any surface mining permit for coal.

Bond Forfeiture Reclamation

Each permitted coal company in Missouri is required to provide financial assurances to ensure reclamation of the site after coal removal. Upon completion of reclamation to applicable standards, the coal company receives a release from the Land Reclamation Program. Should a coal company fail to provide reclamation to applicable standards the bonds are forfeited to the Land Reclamation Program and these bonds are used by the program to provide reclamation to the site mined by the coal company.

For several years preceding fiscal year 2006, a large backlog of reclamation existed that needed to be accomplished at bond forfeiture sites in Missouri. In order to address this situation, the program established a coal bond forfeiture release schedule at the beginning of fiscal year 2006 to prioritize the forfeiture reclamation work. The schedule was very aggressive, outlining work to be performed at 17 sites on over 30 permit areas. Since then

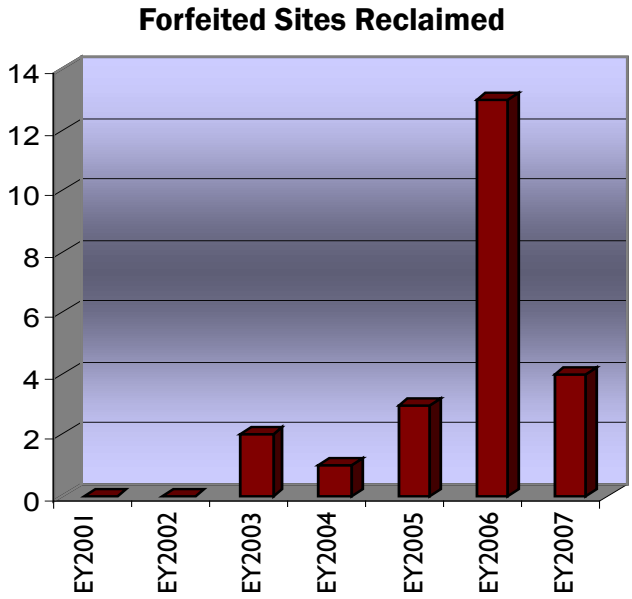
A view at Associated Electric Cooperative's Prairie Hill Mine in Randolph county. Reclaimed mine in foreground supplied coal to the power plant during the 1980's and 1990's.

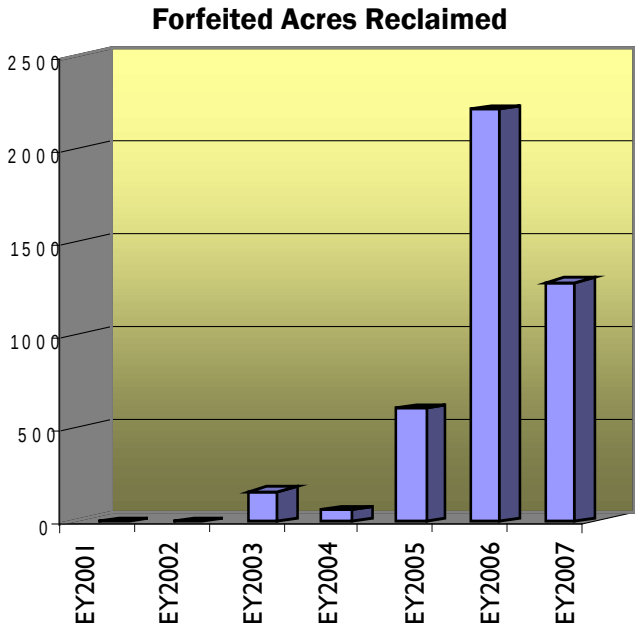
the program's forfeiture reclamation efforts have closely followed the schedule. As a result, the program released reclamation liability on 13 permits covering more than 2,000 acres at bond forfeiture sites during fiscal year 2006. The State of Missouri continued to focus on completing forfeiture reclamation in fiscal year 2007. During fiscal year 2007, reclamation liability was released on 1,278.68 acres allowing for removal of four permanent program permits.

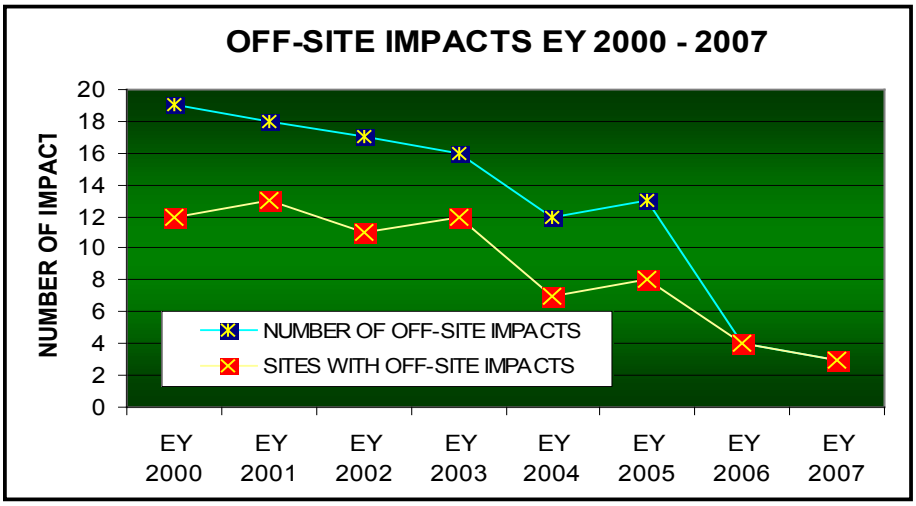
Off-Site Impacts

An off-site impact is defined as anything resulting from a surface coal mining and reclamation activity or operation that causes a negative effect on resources, such as people, land, water, structures, etc. The program must regulate or control the mining or reclamation activity or result of the activity causing an off-site impact. In addition, the impact on the resource must be substantiated as being related to a mining and reclamation activity and must be outside the area authorized by the permit for conducting mining and reclamation activities.

At the beginning of fiscal year 2006 the department had identified 13 off-site impacts at eight former mine sites. There were no off-site impacts at any of the active mines. The program worked to clean up these problems during both fiscal years 2006 and 2007. Consequently, at the end of fiscal year 2007 there were only three off-site impacts at three former mine sites. The following chart illustrates the program's efforts over the past several years to eliminate these problem areas and reduce any impacts to land and water resources adjacent to former coal mining operations.







Abandoned Mine Lands

Activities

Since the early 1840s, coal mining has at times been a major industry in the north central and southwest portions of Missouri. Up to 6 million tons of coal was mined annually in the first three decades of the 20th century. Because mining companies gave little or no thought to the post-mining value of the land, some 67,000 acres were left abandoned prior to passage of Missouri's first strip-mine legislation in 1971.

Although nature has adequately reclaimed much of this land over the years, more than 10,000 acres have been identified that require at least some amount of reclamation work to correct problems. These problems include safety hazards such as steep and unstable highwalls and embankments, open mine shafts, abandoned mining equipment and facilities, dangerous impoundments and unsanitary trash dumps. Acid mine drainage and sedimentation from exposed coal waste and mine spoils also pollute and clog streams. Subsidence, caused when old underground mines collapse, may damage overlying buildings.

Black Smith Site - after

Black Smith Site - before

Abandoned mine land reclamation took a giant step forward when the U.S. Congress enacted *Public Law 95-87*, the *Surface Mining Control and Reclamation Act of 1977*. The act outlined specific requirements for the reclamation of lands mined after May 2, 1977 and established programs and funding for reclaiming abandoned mine lands. In January 1982, Missouri received approval from the federal Office of Surface Mining to operate the Abandoned Mine Land program and conduct reclamation work in the state.

Reclamation Funding

The abandoned mine land activities of Land Reclamation Program are funded by the U.S. Department of Interior's Office of Surface Mining Reclamation and Enforcement Abandoned Mine Land Reclamation fund. All of the money in the fund is collected from active coal mining companies through fees charged on the tonnage of coal mined since passage of Surface Mining Control and Reclamation

J.W. Evans - before

Act. The Office of Surface Mining Reclamation and Enforcement distributes the funds to the eligible states and American Indian tribes. To date, Missouri has received $70.5 million in grants and cooperative agreements to conduct reclamation. Missouri has an excellent record for obligating the funds received. Through state fiscal year 2007, 99 percent of all grants received are under contract for completion of reclamation projects.

Because of steadily declining coal production since the late 1980s, Missouri and other Midwestern states have received decreasing allocations. In 1987, the U.S. Congress established an annual minimum base funding level in the amount of $2 million to allow states with significant abandoned coal mine problems, but limited coal production, to continue their abandoned mine land programs. However, the minimum base amount has been reduced to $1.5 million through the federal appropriations process.

The U.S. Office of Surface Mining ruled a state cannot operate an abandoned mine land program if it does not have a regulatory program to enforce reclamation laws upon active coal mines. Missouri lost its coal regulatory authority in 2003 because of state budget shortfalls. This authority was not returned to Missouri until February 2006, after state matching funds for the coal regulatory grant had been restored. During this period, Missouri permanently forfeited more than $3 million of federal Abandoned Mine Land funds.

In December 2006, the federal *Surface Mining Reclamation and Control Act* was amended to reauthorize abandoned mine land fee collections for an additional 15 years. This reauthorization allows for an increase in the minimum base funding level and names Missouri as a recipient of Abandoned Mine Land funding, even if does not have a coal regulatory program.

Reauthorization

The Abandoned Mine Land reauthorization was signed into law by President George W. Bush on Dec. 20, 2006. Nearly four years were spent debating Abandoned Mine reauthorization in congress before it was passed as part of the *Tax Relief and Health Care Act of 2006*. This new bill represents years of work by states, tribes, federal government and other supporters to address the future of the Abandoned Mine Land program. Once implemented, the new changes will result in substantial increases in funding to states and tribes and focus on projects that benefit public health and safety.

The Abandoned Mine Land reauthorization, which amends the *1977 Surface Mining Control Act*, is a significant windfall that will provide many benefits to Missouri's Abandoned Mine Land program. It extends federal Abandoned Mine Land fee collection authority and funding until the year 2021. The new changes will double the amount of Abandoned Mine Land funds Missouri and other minimum base states receive for completing reclamation projects. In addition, Missouri is designated as a recipient of Abandoned Mine Land funds, even if it cannot continue to operate the coal regulatory program. Other notable changes made by the 2006 amendments include:

- Abandoned Mine Land fees reduced by 20 percent over the duration of the extension.
- Unappropriated state share balances paid out to states and tribes over a 7-year period.
- Abandoned Mine Land allocation formula modified to direct more funds to areas with most historic coal-related problems.
- Abandoned Mine Land funds distributed annually outside congressional appropriation process.
- Lien Provisions streamlined.
- Redefines priorities for Abandoned Mine Land funding.

These changes will result in dramatic and far-reaching effects to the Abandoned Mine Land program. The states, tribes and federal Office of Surface Mining are working cooperatively to ensure a smooth implementation of the 2006 amendments in a way that benefits citizens of the nation's coalfields.

Inventory and Ranking

Public Law 95-87 requires the highest priority abandoned coal mine sites be reclaimed before problems created by mining other commodities are addressed. The order in which abandoned mine land is reclaimed is initially determined by classifying the problem sites into three broad priority categories.

- Priority I and II problem sites are reclaimed first, since they pose a threat to the public health and safety.
- As a Priority III problem sites adversely affect the environment and may be addressed after all priority I and II sites are reclaimed.

Public Law 95-87 also provides that, at the request of the governor of the state or head of the tribal body, certain Priority I non-coal reclamation projects may be undertaken on a case-by-case basis before the priorities related to past coal mining have been fulfilled. The Land Reclamation Program has been closing extremely dangerous non-coal mine shafts under this provision since 2001. The information pertaining to Missouri's abandoned mine lands is contained in the *Abandoned Mine Land Inventory.* This database currently contains 246 abandoned mine land problem sites. It is continually updated as existing site conditions change or new sites are identified.

On an annual basis, the unfunded high priority (Priority I and II) problem sites are ranked and selected for future reclamation work according to the severity of existing problems. To date, nearly $84 million in Priority I and II abandoned mine land problems have been inventoried in Missouri. Of this total, $41 million remains unfunded.

Accomplishments

The Land Reclamation Program has made progress toward reclaiming Missouri's most severe abandoned coal mine problems. Since 1980, there have been 127 reclamation projects totaling 4,184 acres that have been completed. These formerly barren and acidic wastelands are being reclaimed to productive uses such as recreation, pasture, forage and wildlife habitat. Acid mine drainage is being mitigated, returning streams and lakes to productive uses and restoring aquatic biota. A total of 224 dangerous coal and non-coal mine openings have been closed, protecting Missouri citizens and property. Despite these significant accomplishments, an additional 6,000 acres of abandoned coal mine lands and possibly hundreds of extremely dangerous non-coal mine openings remain to be reclaimed as grant funding becomes available.

Accomplishments during fiscal years 2006 and 2007 were somewhat limited due to the Abandoned Mine Lands funding constraints. Missouri permanently forfeited more than $3 million of federal Abandoned Mine Lands funds when it temporarily lost authority to operate the coal regulatory program from 2003 to 2006.

Upon restoration of the coal regulatory program in February 2006, Missouri once again began receiving federal Abandoned Mine Lands grant funds for construction activities. The 40 acre Rocky Fork Project in northern Boone County was Missouri's first major reclamation project since resuming the abandoned mine lands activities. It is nearing completion. Engineering designs are currently being prepared for four additional projects covering approximately 200 acres.

Missouri's Emergency Program

The Land Reclamation Program is responsible for investigating all emergency complaints in Missouri and conducting reclamation work when emergencies are declared. An abandoned mine land emergency is a sudden event related to past coal mining that has a high probability of causing substantial harm.

There must also be a need to suppress the emergency situation more quickly than would be possible under normal Abandoned Mine Land

J.W. Evans - after

The trackhoe is placing agricultural limestone to neutralize acidic coal wastes prior to grading the gob pile. This preventative treatment measure was taken because ravines like these often act as conduits for acid water seeps, even after the site is graded.

The gob pile is being graded to gentle slopes that minimize erosion and prevent the redevelopment of gullies. The sub-grade coal waste was then treated with ag-lime and covered with 2 to 3 ft. of good quality glacial-till soil.

In early October 2007, the reclaimed areas were planted with the first temporary cover crop. This photo, taken on Oct. 9, 2007, shows the vegetation coming up nicely on the reclaimed gob pile. The project site will later be planted with warm-season native grasses and trees to provide wildlife habitat.

program operations. Sometimes an emergency complaint constitutes an eligible coal mine problem, but the situation does not meet the emergency criteria. In this case, reclamation work could still be undertaken by the program under the normal Abandoned Mine Land program. The proposed reclamation project, however, would be subject to the project ranking and selection process and would have to compete for available grant funds along with other Priority I and II problem sites.

During fiscal years 2006 and 2007, the Land Reclamation Program conducted 24 emergency investigations. All of which involved foundation settlement problems at private residences located in areas of past underground mining. All of the complaints came from the south St. Louis area except for one, which came from north central Missouri.

The program conducted on-site investigations, ruling out coal mine subsidence in all but one of the complaints. In that instance, exploratory drilling was conducted to determine if mine voids were present. The drilling results revealed foundation settlement problems were unrelated to mine subsidence.

Abandoned Mine Land Spotlight: Rocky Fork

In March 2007, the Missouri Land Reclamation Program began construction work on the Rocky Fork Abandoned Mine Land Reclamation Project. The project was completed in October 2007.

The Rocky Fork project site was a 27-acre eroding coal waste pile and a 35-acre coal slurry pond that posed a threat to public safety and to water quality in Rocky Fork Creek. This site is located in the Missouri Department of Conservation's Rocky Fork Lakes Conservation Area in Boone County, approximately 10 miles north of Columbia (population 84,531).

The project site is located within a 3,500-acre area that was strip-mined by the Peabody Coal Company from the late 1950s until 1972. Over the years, erosion has cut deep ravines in the coal waste pile, which is located in a highly visited public use area. The 15- to 20-foot deep ravines were very unstable, creating significant danger to visitors using public lands. The slurry pond dam was broken in several locations. If the dam had become completely breached, thousands of tons of coal slurry could have entered Rocky Fork and Perche Creeks. These creeks are located in a rapidly developing area in Boone County including parts of Columbia.

The completed reclamation project regraded approximately 27 acres of exposed mine waste and gob material at the old tipple site and loadout facility to a gentle slope. The mine wastes were extremely acidic, so large quantities of agricultural lime were applied and incorporated into the graded area. Following lime application, the area was covered with 2 to 3 feet of good quality glacial-till overburden borrowed from a nearby 9-acre mine spoil ridge. Additionally, a 5-acre eroding portion of the slurry pond was reclaimed by grading, using the same process. Limestone armored drop-down structures were installed to control erosion and improve the long-term stability of the slurry pond. All affected areas were revegetated. Three acid wetland areas, totaling one acre, were reconstructed or enhanced. The wetlands were surface treated with calcium carbonate in the form of agricultural lime and covered with organic matter obtained from the city of Columbia's compost facility. Two small acid ponds, not directly associated with the earthmoving activities, were also neutralized under this project.

C. L. Richardson Construction Co. of Ashland performed the construction work. The Rocky Fork Project is a relatively long-term cooperative effort between Land Reclamation Program and the Missouri Department of Conservation. The program was responsible for seeing the project through construction and will be responsible for subsequent green manure plantings. Missouri Department of Conservation will be responsible for selecting the permanent warm-season grass mixture and assisting with tree planting recommendations. The Land Reclamation Program will complete the final seeding activities.

Non-Coal Shaft Closures

The federal money designated to reclaim abandoned coal mines may also be used to reclaim non-coal vertical mineshaft openings if they meet Priority I problem criteria. These non-coal problems are allowed to be corrected if requested by the governor.

Between July 1, 2005 and June 30, 2007, five dangerous non-coal shafts were closed in the Joplin area. Three were known of and closure plans were developed and implemented. During the scheduled closure project, another open shaft was discovered and was backfilled by the Joplin Special Road District at no cost to the program. The fifth shaft was an emergency situation. A mineshaft opened up in the driveway of a Joplin resident. This emergency was addressed and resolved within two days.

Mine shaft collapse near Joplin.

Shaft backfilled and closed two days later.

Occasionally a dangerous mineshaft may be closed by backfilling with rock or soil material, but is often not the best choice. Most of the time, a more costly, yet more permanent closure method is preferred. This method consists of excavating the loose soil material around the hole down to the bedrock and placing a 4 foot thick layer of polyurethane foam over the shaft. A wedge-shaped steel-reinforced concrete is then poured on top and back-filled with soil. A closure of this type typically ranges from around $10,000 to $15,000 per shaft but can vary upon the specific conditions of each shaft.

Nine dangerous non-coal mineshaft closure projects are being designed including five around Aurora and four in the Joplin area. Although these projects will address all of the open mine shafts the department is aware of, it is suspected many more will be discovered and will need to be investigated and closed to protect the public, especially in the tri-state lead and zinc mining district.

Information on the Internet

Missouri Department of Natural Resources

Department Home Page	www.dnr.mo.gov
Land Reclamation Program	www.dnr.mo.gov/env/lrp/index.html
The Complete Missouri Mining Law	www.moga.mo.gov/statutes/c444.htm

U.S. Department of Interior Office of Surface Mining

Office of Surface Mining, Washington D.C.	www.osmre.gov/osm.htm
Office of Surface Mining - Mid-Continent Regional Coordinating Center, Alton, IL	www.mcrcc.osmre.gov

Other Mining and Reclamation Organizations

National Association of Abandoned Mine Land Programs	www.onenet.net/~naamlp/
Interstate Mining Compact Commission	www.imcc.isa.us
National Association of State Land Reclamationists	www.siu.edu./~coalctr/naslr.htm

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