

2016-2017

LAND RECLAMATION PROGRAM

BIENNIAL REPORT



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Missouri Geological Survey

Cover: Teck American Incorporated, Magmont Mine. Reclaimed lead tailings storage facility released by Missouri Department of Natural Resources in December 2017. More about this release is documented in this report.

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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 when 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 and Metallic Minerals Mining Unit is responsible for sections "The Metallic Minerals Waste Management Act," RSMo. Chapter 444.350-444.380, and "The Land Reclamation Act," RSMo. Chapter 444.760-444.790. The Projects and Inspection Unit and the Abandoned Mine Land and Permit Unit are responsible for "The Surface Coal Mining Law," RSMo. Chapter 444.800-444.970.

The state regulations further define these laws. Citizens can find these laws in their entirety in "Rules of Department of Natural Resources Division 40 – Missouri Mining Commission" Chapters -10 for coal and industrial minerals. Metallic Minerals regulations are found in "Rules of Department of Natural Resources Division 45 – Metallic Minerals Waste Management" Chapters 1-8.

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. In no way does declining coal production decrease 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 than 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 calendar years of 2016 and 2017.

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

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dnr.mo.gov/geology/lrp/mineralsandmining.htm

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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 Missouri Department of Natural Resources and placed the Land Reclamation Commission (created by Missouri Statutes Chapter 444) under its auspices. The Land Reclamation Commission underwent a name change in 2014 to the Missouri Mining Commission which has the responsibility of directing staff and operations of the program within the department's Missouri Geological Survey.

The 8-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 five public members. Of these five, three may be of the same political party. Two members of the commission may have a direct link with the mining industry with one member having surface mining experience and the other having subsurface mining experience. There are two vacancies on the commission, one representative for the mining industry and one with experience in underground mining.

The Land Reclamation Program consists of the Administrative, Abandoned Mines Lands, Coal and Industrial and Metallic Mineral Mining units. A total of 18 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.

2016 and 2017 Highlights

At the start of fiscal year 2016, Missouri had 3,951 acres bonded for 11 permitted sites. By the end of fiscal year 2017, there are 3,940 acres permitted

and bonded for 11 permitted sites. The demand for high sulfur coal in Missouri has reduced to 174,000 tons as reported in 2016. By the end of fiscal year 2017, production in Missouri slightly increased to 184,000 tons. The production amounts are presented as reported by the U.S. Energy Information Administration.

INDUSTRIAL and METALLIC MINERALS

Industrial and Metallic Minerals Mining Unit noteworthy events for 2016 and 2017 are listed below.

Teck American Incorporated, Magmont Mine, Bond Release

Magmont Operations was a metallic mining and milling facility located in southeast Missouri, operated by Teck American Incorporated (TAI), a wholly-owned subsidiary of Teck Resources Limited and owned as a joint venture between TAI and Halliburton Energy Services Inc. (Halliburton). Magmont Operations operated under Permit Number MM-006 and is located south of Bixby, in Iron County.

Production of lead, zinc and copper concentrates at the Magmont site began in 1968. Mill capacity and production was 1 million tons per year, with the mill operating at or above capacity after 1971. 26 million tons of ore were mined between 1968 and 1994 utilizing the room and pillar trackless method of mining. The extracted ore was beneficiated in the Magmont mill where separate lead, zinc and copper concentrates were produced.

Teck American Incorporated, Magmont Mine waste management area before reclamation.



During operation, approximately 940,000 tons of waste material (tailings) was produced annually and the tailings generated by the milling process were deposited in the on-site waste management area. The waste management area dam is 135 feet high, with a reservoir storage volume of 12,500 acre-feet of tailings and water. The tailings were separated into fine and coarse fractions by a cyclone, with the coarse fraction distributed along the down-gradient edge of the dam, and the fine fraction discharged farther back in the reservoir. The downstream dam face was covered with a layer of soil and vegetated.

Closure activities began before cessation of mining, which occurred May 26, 1994. After production ended, the mine was closed and sealed, and pumping of mine water to the waste management area was discontinued in May 1995. Between 1992 and 1999, the tailings material was capped with local soil material obtained from adjacent hillsides and seeded.

Erosion of the tailings at the waste management area is possible due to effects from water, wind and gravity. However, reclamation activities including capping and revegetating the tailings effectively stabilized the area and only minor erosion control activities have been required throughout the closure process. To minimize erosion, the tailings were covered with 2-6 feet of clay material borrowed from hills surrounding the site or from other local borrow sources.

The residual permeability of these soils when placed as cover allows for both water retention and infiltration into the covered tailings, further minimizing runoff. Following placement of the soil, the surface of the waste management area was graded to establish positive drainage.

Once positive drainage was developed, the area was disked, seeded and fertilized. Due to the location of the waste management area in the extreme upper portion of the watershed, storm runoff is unlikely to generate significant erosion.

The metallic minerals permit involves evaluations of site erosion control and stabilization as well as groundwater monitoring as part of the annual inspection program through the Land Reclamation Program.

Activities completed to date toward accomplishing the objectives of the Closure Plan include: closure and sale of the mine facility, removal and closure of two solid waste areas, erosion control and stabilization activities, revegetation activities, an amphibian survey, analysis of spillway and dam stability, monitoring surface water controls,



Teck American Incorporated, downstream dam face, Terry Perkins (TAI) and Beth Aubuchon (formerly with the department).



Milton Bradley (Teck American Incorporated) at Magmont Mine.



Magmont Mine reclaimed lead tailings facility.

installation of a groundwater monitoring network, and assessment of groundwater occurrence and condition.

Overall, the revegetation efforts at the Magmont Operations site have resulted in diverse vegetation communities associated with open water and aquatic habitat, wetland areas in isolated pockets and along the lake edges, old field and grassland habitat, and woodland. The revegetation efforts successfully stabilized the waste management area and established habitat for a variety of wildlife species, with its open grassland and scattered open water components located within an Ozark forest.

On December 27, 2017, Carol Comer, Missouri Department of Natural Resources Director, released a total of 265 acres of the waste management storage area. The remaining 53 acres are located upstream of the main tailings dam. The Magmont facility also was the first stop on the June 16, 2017, Lead Mine Tour with Director Comer and other department dignitaries. This is a true reclamation success story.

This partial release of bond and reclamation responsibility at Magmont Mine is the result of more than 20 years of work and collaboration among a variety of mine inspectors, contractors, and the untiring commitment of TAI.

Hearings

During 2016 and 2017, two Industrial Mineral permit application hearings were requested to the Administrative Hearing Commission.

Meramec Aggregates

On April 1, 2016, the department's Land Reclamation Program received from Meramec Aggregates Inc., a new site permit expansion application to mine sand and gravel in Franklin County. This open pit mine site is located in the floodplain of Meramec River. A public meeting was held May 26, 2016, as part of the public notice process.

Having reviewed and considered the administrative record related to the new site permit expansion application, including public comments and compliance history, the staff director made a decision to issue the permit pursuant to Section 444.773 RSMo. of The Land Reclamation Act.

This decision was appealed to the Administrative Hearing Commission as provided by 621.250.3



Terry Perkins (Teck American Incorporated) at Magmont Mine.



Carol Comer, Department of Natural Resources Director and Teck American Incorporated crew at Magmont Mine.

RSMo. Furthermore, the petitioners requested a Federal Court hearing concerning endangered bat species.

On September 28, 2016, a stay hearing was held by the Administrative Hearing Commission. Great Rivers Environmental represented a citizens group. The appeal challenges (1) the company's legal right to mine; and (2) impacts to health, safety, and livelihood. On October 5, 2016, the Administrative Hearing Commission ruled in favor of the department and issued an order denying the motion for the stay hearing. On October 7, 2016, the petitioners filed a Notice of Stipulated Dismissal. On October 7, 2016, the Administrative Hearing Commission acknowledged the Notice of Stipulated Dismissal and canceled a hearing that was scheduled for October 20, 2016.

The petitioners also withdrew their Federal Court Action involving an endangered species of bats.

Manna Properties LLC

On May 25, 2016, the department's Land Reclamation Program received from Manna Properties LLC, a new permit application to mine sand in Texas and Dent counties. As authorized by section 444.772.10(2) RSMo.: "... comments may be made by any person with a direct, personal interest in one or more of the factors the director may consider in issuing a permit ...". A public meeting was held August 3, 2016, as part of the public notice process. The staff director may address environmental issues within the jurisdiction of the department such as air and water pollution concerns produced at the mine site.

The staff director does not have jurisdiction to address public concerns commonly raised during the review of an application for industrial mineral mining activity such as road traffic, road conditions, or noise created by the mining operation. The staff director shall consider any public comments in making a decision to issue or deny the permit as required by 444.773.1 RSMo.

Having reviewed and considered the administrative record related to the new permit application, including public comments, the staff director made a decision to issue the permit pursuant to Section 444.773 RSMo. of The Land Reclamation Act.

On October 12, 2016, Ms. Georgia Merrick filed an appeal to the Administrative Hearing Commission. A Stay Hearing was held October 31, 2016. On November 16, 2016, the Administrative Hearing Commission denied Merrick's Motion for Stay. Issues brought up at the Stay Hearing involved environmental impact concerns, groundwater contamination, air pollution of silica sand, and Pigeon Ford Creek near the open pit sand mine (which drains to Montauk State Park).

On January 10, 2017, a hearing was held at the Administrative Hearing Commission's main office in Jefferson City. Merrick pled in her appeal the

following regarding the permit, which, according to Merrick's appeal, is under the mining services of Ray Goodson. a) that Merrick had "two serious concerns that the mining project and the company ... can adversely affect myself and our small community. First, Goodson's business passed "bad checks for under and over the amounts of \$500;" Goodson was recently "issued a warrant for his arrest for nonappearance and on one account was given a suspension of incarceration;" and "it is also questionable the recent termination of his Elite Quartz Inc. 001368280 cooperation." Second, the environmental effects that the mining may have on the community, which are: i) contamination of well water and livestock due to silica sand removal; ii) "leaching from the mining area will cause economic hardship for each individual household" in that they will have to purchase water filtration devices for their well water; iii) the land is "derogated in this process and will not be put back like it was as according to Elite Quartz"; iv) silica sand creates air pollution and "can increase lung disease and cancers not only in humans but livestock alike"; and v) the "surrounding areas economical foundation could be ruined."

During the hearing, Merrick presented no admissible evidence. Merrick attempted to provide the Administrative Hearing Commission with information she felt relevant to the issue of her environmental concerns, but the department raised valid objections, which the Administrative Hearing Commission sustained.

On February 2, 2017, the Administrative Hearing Commission recommended the Missouri Mining Commission uphold the permit issued to Manna to engage in the surface mining of sand. On March 30, 2017, the Missouri Mining Commission voted unanimously to uphold the permit to engage in surface mining to Manna Properties LLC.

COAL MINING

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 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.
- 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 - 444.980) 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 about 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 date.

Missouri coal production declined from 4.2 million tons in 1987 to approximately 216 thousand tons by the end of fiscal year 2017. 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 (BTU), compared to western coal. Some power plants and some cement kilns have opted to mix Missouri’s coal with lower BTU western coal to increase energy production without exceeding sulfur emissions.

During the last two fiscal years, coal mining was 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 and expansion for Foster South mine for 45 acres located in Bates County. At the end of fiscal year 2017, one surface coal mine was producing coal in Missouri. The remaining 10 permitted sites were in various stages of reclamation.

Land Reclamation Program staff closely monitor the coal mining operation, including both coal removal and reclamation activities. Monthly inspections of each permit site are performed to ensure reclamation requirements are adhered to and continue until the reclamation liability release proving hydrologic balance of surface and groundwater, soil stability and vegetative production for a minimum of five years after final grading and seeding.

Permitting

Staff members are responsible for reviewing permit revisions and new permit applications. Land Reclamation Program staff personnel 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 also conduct regular evaluations of existing permits and provide 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 are necessary to ensure all requirements of the law and regulations are met.

Reviewing permit processes 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 clearances and 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.

In 2006, bonding requirements were changed for surface coal mines from a bond pool, with a flat bonding rate for all areas, to full cost bonding. Full cost bonding requires an engineering evaluation of the area to be mined to determine the worst case scenario in terms of cost to reclaim should the company, for whatever reason, be unable to complete full reclamation. The 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 released in phases as regulated reclamation milestones are met.

Two reclamation liability releases were approved for Associated Electric Cooperative Inc. (AECI),

Prairie Hill Mine. The first release was for 26 acres accounting for two complete releases for permits 1984-24 for 2 acres, 1986-08 for 3.5 acres, and partial release of permit 1981-02 for 20.5 acres. The second was an administrative release to more accurately reflect the acres represented by permit and bonding maps reducing the acreage for the following permits: 1981-02 for 9.1 acres, 1982-15 for 1.6 acres, and 1983-24 for 0.8 acres. This left a total permitted and bonded acreage for AECI of 795.8 acres.

Alternate Fuels Incorporated (AFI) Permits

As noted in the 2008-2009, report mentioned here for background information: In accordance with the legal consent agreement entered into with Continental Insurance and Beachner Construction an over bonded amount of \$144,000.00 was released after the sureties mobilized for reclamation. The release was to the sureties for a portion of a permit associated with AFI. Shortly after the surety's mobilization one of the landowners filed suit against Missouri for the reclamation plan that had been approved. Several months following the filing of the lawsuit AFI received a multi-million dollar court settlement from the state of Missouri for interfering in a business deal. The company filed bankruptcy as there more financial claims against the company than available funds. Since the company does have the financial resources to perform the reclamation the sureties have suspended any further work until it is legally clear what reclamation plan will be followed and if the company will be required to complete the reclamation.

As noted in the 2010-2011 report, Christopher J. Redmond with Husch Blackwell LLP, was assigned as the bankruptcy trustee for AFI. A reclamation plan was approved for permit #1990-01 as prepared by TRIAD Environmental Services and work began shortly afterwards. Permit revisions were approved by the Land Reclamation staff director for Permits 1991-02 and 1996-01. Two of the three landowners associated with permit 1991-02 appealed to the Administrative Hearing Commission as being adversely affected by this decision. Since reclamation is proceeding AFI was moved from annual inspections to monthly inspections starting in June 2011.

As noted in the 2012-2013 report, the bankruptcy trustee has successfully completed the initial reclamation on permit #1990-01 and the Phase I reclamation liability release was approved by the staff director in July 2012 with a bond release of sureties for that permitted acreage released in December 2012. Reclamation work continues on

permit #1996-01. The litigation by the landowners of two of the three properties on permit #1991-02 continues with only minimum reclamation activities continuing where possible on property that is not part of the litigation.

As noted in the 2014-2015 report, all vegetative productivity requirements were met on permit #1990-01. Litigation on the land use change revision for permit #1991-02 ended with the judgment, by the Southern District Appellate Court, reversing the Commission's approval of the revision. During this period, there has only been reclamation on properties that were not part of the litigation. The reclamation on permit #1996-01 was completed and vegetative productivity studies were started.

During this period of 2016-2017, permit 1996-01 has not successfully passed the prime farmland productivity. The bankruptcy trustee remains deadlocked with two of three landowners not being able to complete reclamation on permit 1991-02 and has not proceeded with any release application for 1990-01.

Inspections

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 stormwater 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 re-established 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 also will 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 also may 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.

There were no violations issued during this period.

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 reacquisition 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. As of August 2012, there are no remaining funds left in the A Bond Pool and as of June 2014, there are no remaining funds left in the B Bond Pool.

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.

There were no bond forfeitures during this period or remaining bond forfeiture sites.

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.

There were three minor off-site impacts identified during this period as a result of an exceedance of the National Pollution Discharge Elimination System at the Foster South mine.

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. As much as 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 of land 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, nearly 11,000 acres have been identified that require at least some amount of reclamation work to correct a wide range of public health, safety and environmental 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.

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 (SMCRA). 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 (AML) activities of Land Reclamation Program are funded by the U.S. Department of Interior's Office of Surface Mining Reclamation and Enforcement AML 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 Act. The Office of Surface Mining Reclamation and Enforcement distributes the fund to the eligible states and American Indian tribes. To date, Missouri has received \$96.8 million in AML grants and cooperative agreements from the fund to conduct reclamation work in Missouri. Missouri has an excellent record for obligating the funds received. Through state fiscal year 2017, 95 percent of all grants received have been contractually obligated toward the completion of reclamation projects.

Because of steadily declining coal production since the late 1980s, Missouri and other Midwestern states have received decreasing allocations of funding. 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 AML programs. However, the \$2 million minimum base amount was consistently being reduced to \$1.5 million in the federal appropriations process. As part of the 2006 amendments to SMCRA, the minimum base funding to states was incrementally increased over five years to the current maximum of \$3 million per year. Furthermore, these funds are administered as mandatory grant funds that no longer go through the federal appropriation process.

Reauthorization

The AML reauthorization was signed into law by President George W. Bush December 20, 2006. Following a 3½ year-long legislative debate in Congress over AML reauthorization, the comprehensive legislation was passed as part of the Tax Relief and Health Care Act of 2006. This bill represented the culmination of more than 10 years of work by the states, tribes, federal government and other supporters to address the future of the AML program. These new changes in federal law have resulted in substantial increases in AML funding to states and tribes and allowed the program to focus AML reclamation on projects that benefit public health and safety.

The AML reauthorization, which amended the 1977 Surface Mining Control Act, was a significant windfall that provides many benefits to the Missouri AML Program. It extended federal AML fee collection authority and funding of the AML program for an additional 15 years until the year 2021. The changes doubled the amount of AML funds Missouri and the other minimum base states receive for completing reclamation projects that benefit public health and safety. In addition, the state of Missouri is designated as a recipient of AML funds, even if it cannot continue to operate the coal regulatory program.

Because the AML fee collection is set to sunset in year 2021, the National Association of Abandoned Mine Land Programs member states are once again actively seeking to extend the program through reauthorization of funding. An extension of the fee collection and program would require an additional amendment to SMCRA be signed into federal law.

Other notable changes made by the 2006 Amendments include:

- AML fees were reduced by 20 percent over the duration of the extension.
- Previously unappropriated state share balances will be paid to states and tribes over a seven-year period.
- AML allocation formula was modified to direct more funds to areas with most historic coal-related problems.
- AML funds are distributed annually outside of congressional appropriation process.
- Lien provisions were streamlined.
- Priorities for AML funding were redefined.

Inventory and Ranking

Public Law 95-87 requires that 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 categories of priority. Priority I and II problem sites are reclaimed first since they pose a threat to the public health and safety. Priority III problem sites that adversely affect the environment may be addressed simultaneously if they are located adjacent or are contiguous to priority I and II problems. Otherwise, stand-alone priority III features may not be reclaimed until all priority I and II sites have been reclaimed. P.L. 95-87 also provides that, at the request of the governor, 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 AML Inventory. This database currently contains 277 AML 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, an estimated \$160 million in Priority I, Priority II, and adjacent/contiguous Priority III AML problems have been inventoried in Missouri. Of this total, \$105 million remain unfunded.

Missouri's Abandoned Mine Land Emergency Program

The Land Reclamation Program is responsible for investigating all AML emergency concerns in Missouri and conducting reclamation work when emergencies are declared. An AML emergency is a sudden event related to past coal mining that has a high probability of causing substantial harm. There also must be a need to abate the emergency situation more quickly than would be possible under normal AML 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 Land Reclamation Program under the normal AML 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 2016 and 2017, no coal emergencies were completed.

Abandoned Mine Land Featured Projects

Germantown L-Pit AML Reclamation Project

In December 2015, the Land Reclamation Program began construction work on the Germantown L-Pit Abandoned Mine Land Reclamation Project.

The project site is located immediately east of Germantown and northwest of Montrose, in Henry County. The reclamation project consisted of approximately 60 acres of abandoned mine lands. These areas were largely barren and eroding, with poor quality vegetation, if any. Steep piles and embankments of mine spoil covered much of the area. Hundreds of feet of sheer highwalls left from the final mining cut remained dangerously close to public roads. Acid seeps within the area contributed to high sulfate levels and acidity in tributaries affecting Horn Branch and Deepwater Creek.

Reclamation activities at the site eliminated the health and safety hazards associated with 815 feet of highwall as well as the 265-foot endwall located immediately adjacent to the county road. Other activities included: partial backfilling to move a hazardous water impoundment further away from the road; re-establishing the flow of Horn Branch to more typical pre-mine condition; grading and re-contouring the areas of disturbance; and

revegetating the site with warm season grasses and forbs to reduce erosion and to enhance wildlife habitat. The mine wastes in much of the site are extremely acidic, so large quantities of agricultural lime were applied and incorporated into the graded area. Rip rap was installed around all water control structures to guard against erosion. Mulch and lime were incorporated into the disturbed areas to build organic matter and bring the soil pH to a hospitable level. All affected areas were revegetated with a diverse warm season grass mix.

The AML unit and the Missouri Office of Administration's Division of Facilities Management, Design and Construction contracted Midwest Environmental Consultants as the primary design consultant to develop the Germantown L-Pit Abandoned Mine Land Reclamation Project. The project was awarded to Double S Dirtwork, located in Liberal. Construction activities started the first week of December 2015 and were deemed substantially complete on May 24, 2016. Final construction contract amount was \$996,486.78.



Steep piles of mine spoil and coal waste are highly erodible and support little to no vegetation.

Acid seeps were found between spoil piles.





A steep highwall lies at the edge of the field by this farm house.

Previously rough spoil ridges are now gentle slopes with good vegetative cover.



This OLA (organic, limestone, alkaline) passive water treatment system captures water from acid seeps.

Drakes Chapel Reclamation Project

In the summer of 2016, the AML unit completed the Drakes Chapel Abandoned Mine Land Reclamation Project. The site reclaimed a section of dangerous highwall along a well-traveled county road and addressed hazardous water bodies with endwall features. The Drakes Chapel Project is located on privately owned land bordered by County Road NE480, Northeast of Clinton, in Henry County.

The Drakes Chapel project reclaimed approximately 11 acres and eliminated the health and safety hazards associated with a 400-foot-long highwall, which

was situated immediately adjacent to the county road. Other activities included: partial backfilling to move two hazardous water bodies with endwall features farther away from the road; construction of a replacement water body, construction of a shallow water fish habitat area; and grading and re-contouring the areas of disturbance to achieve gentle slopes.

The project was awarded to Tri-Smith Construction LLC., located in Carrolton. Construction activities started on May 24, 2016 and were deemed substantially complete July 22, 2016, with a final cost of \$173,024.96.



Photo shows the proximity of the county road to the dangerous endwall and hazardous water body associated with the Drakes Chapel site.



Post-construction photo of the Drakes Chapel site. Backfilling of the dangerous endwall and the hazardous impoundment moved the feature farther away from the county road.



Post-construction photo of Drakes Chapel site. Elimination of another highwall feature has moved the water body farther away from the road.

Granddaddy Reclamation Project

The AML unit completed the Granddaddy Abandoned Mine Land Reclamation Project in the summer of 2016. The project reclaimed three dangerous endwall features along well traveled roads, and addressed two connected hazardous water bodies by partial backfilling. The Granddaddy Reclamation Project is located on privately owned land bordered on the north by county gravel road SW 200, and on the south by county gravel road SW 250. The site is located 11 miles north of Montrose, in Henry County.

The Granddaddy project reclaimed approximately 16 acres in the Granddaddy Problem Area (MO119). Reclamation eliminated the health and safety hazards associated with 350 feet of endwall features and dangerous steep embankments located next to busy county roads. Other activities include: grading and re-contouring the areas of disturbance, leveling 7 acres of spoil piles, and revegetating the site with a mixture of cool season grasses and legumes to control erosion.

The project was awarded to Double S Dirk Works Inc., located in Liberal. Construction activities began on June 1, 2016, and were deemed substantially complete August 4, 2016. Final construction cost was \$300,984.26.



Photo shows the proximity to a dangerous embankment along County Road 250.



Post-construction photo County Road 250. Note the elimination of the dangerous embankment. Also shown is a rock swale to protect the slope from erosion.



Photo shows the proximity of the county road to a dangerous endwall and a hazardous water body associated to the Granddaddy south pit.



Photo shows the reclamation and partial backfill of the Granddaddy south pit.



Post-construction photo of north pit moved away from County Road 200.

AML NON-COAL RECLAMATION PROJECTS

Although the Land Reclamation Program uses federal money designated to reclaim abandoned coal mines, the money may also be used to reclaim non-coal vertical mineshaft openings if they meet certain criteria. These non-coal problems are allowed to be corrected with a request from the Governor if it is necessary for the protection of the public health, safety, and general welfare from extreme danger, thereby meeting Priority I problem criteria.

Between July 1, 2015 and June 30, 2017, 10 dangerous non-coal shafts were closed in the Joplin/Tri-State mining district while an additional two were backfilled in St. Francois County. Two notable projects known as the Sheridan Drive Reclamation Project located in Joplin and the 130 Galena St. shaft located in Oronogo sealed mine openings that suddenly developed. Reclamation of these shafts generally includes excavating to bedrock or solid earth and constructing a steel-reinforced concrete plug over the open shaft.

Sheridan Drive Reclamation Project

On September 26, 2016, the Land Reclamation Program hired Freddy Van's Inc., utilizing the programs drilling and grouting contract to seal a

horizontal adit extending from an abandoned mine shaft. The project was located on Sheridan Drive, which is a public road in Joplin. The city reported a horizontal adit continuing from a vertical opening that followed the center line of the road. The underground adit was a 5 by 5 foot opening and was approximately 45 feet in length. This adit was located 8 to 13 feet below the road surface. The city of Joplin sealed the vertical opening located at the end of this horizontal adit with reinforced concrete prior to commencement of the drilling and grouting activities. This worked to create a seal to backfill against. To keep the road from collapsing into this opening, two holes were vertically drilled, the holes were cased, and flowable grout was pumped into the void under pressure.

130 Galena St. Shaft

On June 20, 2017 a subsidence located at 130 Galena St. in Oronogo was successfully sealed. This subsidence occurred above an abandoned lead/zinc mineshaft in Jasper County. This feature existed directly below the south side of the home where the landowner was living. The subsidence was 12 feet in diameter and 7 feet deep. The house was suspended above this opening causing stress and damage to the structure. Reinforced bars were placed into the opening, and 22 cubic yards of concrete was poured to a height just below the home's foundation.

Occasionally a dangerous mine shaft may be closed by backfilling with rock, soil material, or backfilling with concrete to create a monolithic concrete plug. These closure methods are quick and relatively inexpensive, but often may not be the best choice. Most often a more costly, yet more permanent closure method is preferred. This more permanent closure consists of excavating the loose soil material around the hole down to the bedrock; constructing a platform; pouring a wedge-shaped, steel-reinforced, concrete plug at the top of the shaft; and backfilling over the concrete with earthen material. A closure of this type typically ranges from approximately \$12,000 to \$20,000 per shaft but can vary based upon the specific conditions of each shaft.

Currently, there are three non-coal shafts in the inventory to address. However, it is suspected there are many more open shafts we are unaware of that will need to be closed. Dangerous mine shafts will continue to open up (especially in the Tri-State lead/zinc mining district in the Joplin area) and will be investigated and closed to protect the public.



Mine Shaft Collapse near Joplin. Typical 10-foot by 10-foot non-coal vertical mineshaft opening, 150 feet deep.

INDUSTRIAL MINERALS

Legislative and Rule Changes

On August 28, 2014, the Land Reclamation Commission was renamed to the Missouri Mining Commission. In addition, commission membership and qualifications was amended to add another commissioner who has training and experience in subsurface mining, three members of the commission may belong to the same political party and two members may have a direct connection to the mining industry 444.520 RSMo.

The Land Reclamation Act 444.760-444.790 RSMo. underwent changes that include:

1. Inclusion of the following minerals: cadmium, barium, nickel, cobalt, molybdenum, germanium, gallium, tellurium, selenium, vanadium, indium, mercury, uranium, rare earth elements, platinum group elements, manganese, phosphorus, sodium, titanium, zirconium, lithium, thorium, or tungsten 444.765(11) RSMo.

2. Definitions were added/amended at 444.765.1:

A. (4) “Commission”, the Missouri mining commission in the department of natural resources created by section 444.520;

B. (7) “Director”, the staff director of the Missouri mining commission or his or her designee;

C. (11) “Mineral”, a constituent of the earth in a solid state which, when extracted from the earth, is usable in its natural form or is capable of conversion into a usable form as a chemical, an energy source, or raw material for manufacturing or construction material. For the purposes of this section, this definition includes barite, tar sands, oil shales, cadmium, barium, nickel, cobalt, molybdenum, germanium, gallium, tellurium, selenium, vanadium, indium, mercury, uranium, rare earth elements, platinum group elements, manganese, phosphorus, sodium, titanium, zirconium, lithium, thorium, or tungsten; but does not include iron, lead, zinc, gold, silver, coal, surface or subsurface water, fill dirt, natural oil or gas together with other chemicals recovered therewith;

3. “Notwithstanding any statutory fee amounts or maximums to the contrary, the director of the department of natural resources may conduct a comprehensive review and propose changes to the fee, bond, or assessment structure as set forth in this chapter. The comprehensive review shall include stakeholder meetings in order to solicit stakeholder input from regulated entities and any

other interested parties. Upon completion of the comprehensive review, the department shall submit a proposed fee, bond, or assessment structure with stakeholder agreement to the Missouri mining commission. ...” 444.768.1 RSMo.

4. Public Notification Requirements at 444.772 10. At the time that a permit application is deemed complete by the director, the operator shall publish a notice of intent to operate a surface mine in any newspaper qualified pursuant to section 493.050 to publish legal notices in any county where the land is located. If the director does not respond to a permit application within 45 calendar days, the application shall be deemed to be complete. Notice in the newspaper shall be posted once a week for four consecutive weeks beginning no more than 10 days after the application is deemed complete. The operator shall also send notice of intent to operate a surface mine by certified mail to the governing body of the counties or cities in which the proposed area is located, and to the last known addresses of all record landowners whose property is:

- (1) Within two thousand six hundred forty feet, or one-half mile from the border of the proposed mine plan area; and
- (2) Adjacent to the proposed mine plan area, land upon which the mine plan area is located, or adjacent land having a legal relationship with either the applicant or the owner of the land upon which the mine plan area is located.

The notices shall include the name and address of the operator, a legal description consisting of county, section, township and range, the number of acres involved, a statement that the operator plans to mine a specified mineral during a specified time, and the address of the commission. The notices shall also contain a statement that any person with a direct, personal interest in one or more of the factors the director may consider in issuing a permit may request a public meeting or file written comments to the director no later than 15 days following the final public notice publication date. If any person requests a public meeting, the applicant shall cooperate with the director in making all necessary arrangements for the public meeting to be held in a reasonably convenient location and at a reasonable time for interested participants, and the applicant shall bear the expenses.

5. 444.773 RSMo. authorizes the staff director to issue or deny a permit after a public meeting and a party that is unduly affected by the decision may appeal the staff director's decision to the Administrative Hearing Commission.

There have been no rule changes in 2016 or 2017. Staff currently are comparing the rules to The Land Reclamation Act for appropriate additions, revisions and rescissions. All rules are currently under review through the department's Red Tape Reduction efforts pursuant to Executive Order 17-03.

Public Participation

When applying for a new site, transferring an existing 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 first tier landowners, not related to the company within one-half mile of the mine plan boundary and to the governing body of the counties or cities where the proposed mine area is located. The operator also is 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 about 45 days. Operators are required to hold a public meeting if one is requested. Operators also are meeting with great success in holding their own version of a public meeting or "open house" neighborhood gatherings to discuss mine plans when proposing a new site.

Since Aug. 28, 2001, 76 public meetings have been held based on the 2001 edition of The Land Reclamation Act. Attendance figures at the public meeting ranged from one individual to a crowd of more than 100 people. Seventy-two of the public meetings resolved the concerns expressed by the public, thus eliminating most requests for hearings before the Administrative Hearing 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 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 444.773.1 RSMo., requires the staff

director to make a decision regarding the issuance or denial of an applicant's permit. The staff director's decision can be appealed to the Administrative Hearing Commission. If a hearing is held, the Administrative Hearing Commission would then make a recommendation to the Missouri Mining Commission. The decision of the Missouri Mining Commission could then be appealed to the proper court of appeals.

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 meetings about the issuance of permits.

The Land Reclamation Commission granted nine hearings since the 2001 edition of The Land Reclamation Act. Requests for hearings require a tremendous amount of staff time along with resources to address, and will become increasingly common as mining companies look to open sites near heavily populated areas. In seven of the cases, the operator was issued a certificate to operate a surface mine. One case involved the operator withdrawing their application. On May 23, 2013, the commission granted a hearing for AA Quarry's permit application. On June 17, 2013, Bart Tichenor was selected to serve as Hearing Officer. After multiple hearing dates in mid-2014, the commission issued a permit to engage in surface mining to AA Quarry November 20, 2014.

Since the enactment of law (444.773 RSMo.), from August 28, 2014, to December 31, 2017, 34 public meetings have been held and two hearings were requested through the Administrative Hearing Commission.

New sites and expansions to existing sites are needed in order to provide building commodities that meet the needs and demands of ongoing 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 public meetings 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. The public meeting process has brought an acute awareness to the department 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.

Permitting

Industrial mineral mining permit certificates are issued for a one-year period. The industrial mineral permits must be continually renewed until the Missouri Mining Commission or staff director deems all mined land covered by the permit has been 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.

A new electronic permitting process will be online in 2018. A tremendous amount of time was spent in 2017 developing what is called the Land Reclamation Information System. This new system will allow an operator to electronically submit an application along with an electronic payment. More about this new system will be in the next Biennial Report.

Inspections

Prior to 2007, the state was 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 became 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 inspection staff assigned to the northeast portion of the state had a relatively normal schedule. Now, at least 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 some sites being greater than 300 acres such as limestone quarries. In 2016, there were 768 permitted industrial mineral sites, and 474 inspections were

conducted. In 2017, there were 792 permitted mine sites, and 497 inspections were conducted. Inspection staff attained a compliance rate of almost 100 percent when working with the operator through conference, conciliation and persuasion. These total numbers are consistent in average when compared to the number of inspections conducted during the past few years. This similar rate of inspection numbers are related to:

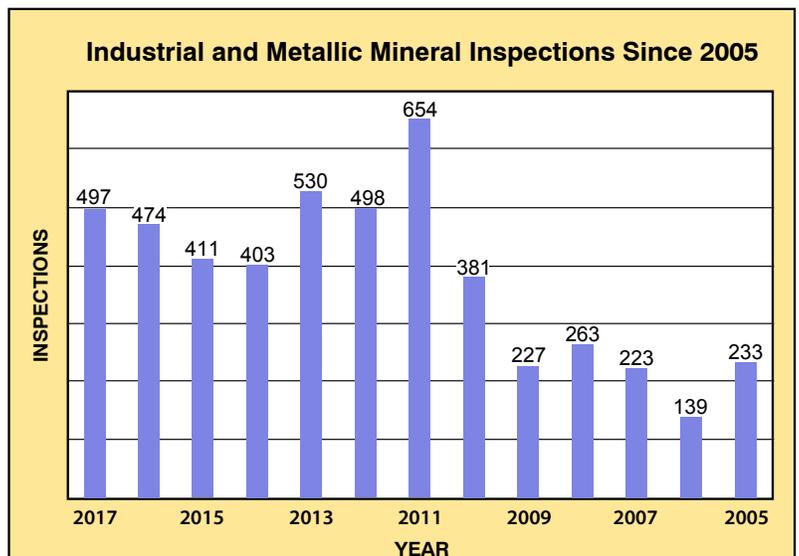
- Longer employee retention time
- Increased efficiency for producing inspection reports
- Fewer turnovers in inspection staff

The Industrial Minerals Unit projects to maintain a total of 400 inspections per year in years to come, as long as the unit retains inspection staff and certified inspectors to conduct investigations. Each of the four inspectors conducts about 100 inspections. Conducting inspections at this rate will mean sites will be inspected once every two years. This is a huge improvement when compared to the last 10 years.

Types of Inspections

In 2016 and 2017, an average of 485 site inspections were conducted. Inspections typically fit into three categories:

- Regular Inspections
- Complaint Inspections
- Bond Release and Other Inspections





Big Creek Quarry, Lincoln County.



Polite Ready Mix, Reynolds County.



Creek Cleaning, Reynolds County.

Regular Inspections

Regular Open Pit 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 ensure the material being excavated is unconsolidated. Inspectors also look to ensure 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 exists from the flowing water.

Concern Inspections

Concern inspections are conducted after the program receives notification that an industrial mineral operation may be in violation of The Land Reclamation Act. Concerns filed may involve blasting, noise, truck traffic, water pollution, digging in flowing water, pumping turbid water from a pit, erosion or siltation. Following an investigation, the inspector and operator often are successful in resolving a citizen's complaint in a timely manner. However, many concerns 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 concern be investigated within 30 days. The goal is to respond within 14 days of receiving a concern, however, an investigation usually is conducted within seven work days. There were 31 concerns filed and investigated in 2016, and 20 concerns filed and investigated in 2017.

Bond Release and Other Inspections

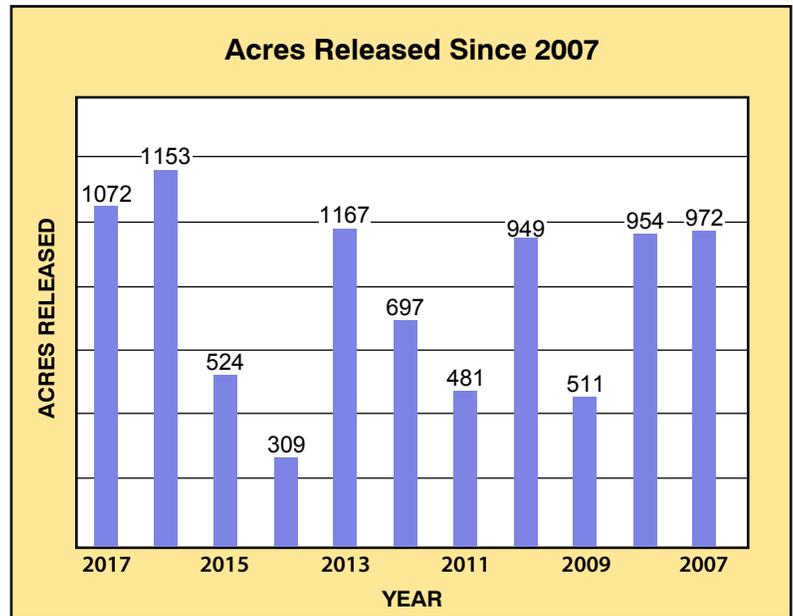
Bond and reclamation responsibility release is an important part of the mine closure process. Bond release inspections are conducted at the operator's request when reclamation has been completed. The mining company also will send the landowner a letter announcing the intent to seek a release of the mined land. The landowner may request a hearing before the Missouri Mining Commission if they feel the land is not properly reclaimed and likewise if the bond release application is denied, the operator may request a hearing.

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. 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 that is under permit and bond may be released as unaffected.

The staff director determines if the bond, or any portion thereof, should be released. When mined land is properly reclaimed, a request for approval for bond release is made to the Missouri Mining Commission or staff director. If either the Missouri Mining 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 1,153 acres of reclaimed mine land in 2016 and 1,072 acres in 2017.



Harbison Walker International reclaimed clay pit, Warren County.



In 2016 and 2017, an average of 1,113 acres were released.

To obtain a "Request for Approval of Reclaimed Land" form, visit the department's website at dnr.mo.gov/forms/780-0946-f.pdf or contact the Land Reclamation Program by telephone at 573-751-4041.

The department and programs also are conducting environmental assistance visits for new operators. Typically, the department allows an operator to conduct operations for a few months before conducting an initial inspection. Inspectors 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 inspection. If an operator requests an inspection to see how to conform to the mining laws, an inspector will provide that type of assistance inspection. Since 2007, staff annually inspect every site that is within the watershed of Outstanding State Resource Waters or Outstanding National Resource Waters.

Enforcement

Enforcement powers of the Missouri Mining 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 in which 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.

Six notices of violation were issued during 2016 and 2017. Two violations were administrative in nature, four violations involved performance standard requirements. Administrative violations often involve mining without a valid permit, failure to maintain bond or failure to renew a permit. The performance standard violations involved failure to maintain adequate buffer from the flowing water line and widening the stream channel. An increase in the number of site inspections at industrial minerals operations typically carries the potential for an increase 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 law and regulations and are less likely to be in a violation situation. Potential enforcement actions are avoided or minimized through close coordination with Land Reclamation Program staff.



Gottschalk Stone Company, dimensional stone, Wayne County.



Failure to maintain a 10-foot buffer to flowing water line, and mining below the water line, Iron County.

Bonding

Open-pit sand and gravel operations mining 5,000 tons or less per year are 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 and \$500 for every acre permitted thereafter. 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" form. The certificate of deposit must also be assigned to the state of Missouri and the issuing bank must acknowledge this action using an Assignment of Certificate of Deposit. The assignment must be irrevocable and conditioned on the release of the bond by the Missouri Mining Commission. 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. At the end of 2017, there is record of:

\$ 21,692,400.00	Surety Bonds
\$ 3,178,336.97	Certificates of Deposit
\$ 5,083,995.00	Letters of Credit
\$ 29,954,731.97	Total Amount in Bond

Bond Forfeiture

The Land Reclamation Act went into effect Jan. 1, 1972, and it permitted and regulated the mining of limestone, clay, barite, tar sands, 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. An operator who forfeits the bond may not be issued another permit to engage in surface mining from the Missouri Mining Commission in accordance with 444.778.2 RSMo.

The bonding amount was subsequently found to be inadequate to cover reclamation costs, and there were additional 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 it 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 the responsibility of the 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 Land Reclamation Program quickly learned there was not enough bond money 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 left a reclamation responsibility to the state in 2006 or 2007. In 2008 and 2009, a total of 93 acres were forfeited involving two limestone and two sand and gravel mining operations. In 2010 and 2011, no bonds were forfeited. In 2012 and 2013, two clay mine sites for a total of 43 acres were forfeited along with an 8-acre limestone site. In 2014 and 2015, forfeiture of the White Rock Quarry, in Lincoln County, consisting of 41 bonded acres, took place. In 2016 and 2017, no bonds were forfeited.

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 method does not allow excavating machinery in the flowing portion of the stream. It is 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.

In 2017, the program permitted 237 in-stream sites. Numerous operators across the state excavate sand and gravel deposits, commonly known as gravel bars, as a source of aggregate material.

During the 1990s, in-stream sand and gravel mining underwent several changes in regulatory

control within Missouri. In the early 1990s, the Land Reclamation Program was the permitting and enforcement authority that both issued permits for this type of mining activity, and 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 U.S. Army Corps of Engineers (USACE) who took over the entire process of permitting and inspecting these mining facilities. USACE lost 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 USACE 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 reissued to the mining industry during the early months of 1999 by the Land Reclamation Program to take the place of the existing USACE permits. This responsibility continues to the present day on the part of the Land Reclamation Program.



4-E Sand & Gravel, Douglas County.

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 Outstanding National Resource Waters or Outstanding State Resource Waters. Outstanding resource waters are defined by the department's 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 three rivers that fall under this jurisdiction are Eleven Point, Jacks Fork and Current.

The Ozarks counties of Phelps, Crawford, Dent, Shannon, Reynolds, Texas, Carter, Douglas and Howell contain a majority of the either State or National Outstanding Resource Waters. Some smaller designated areas are present in a few other counties in Missouri. In-stream sand and gravel operations are prohibited from those waters listed as Outstanding National Resource Waters. Clean water laws require mining operations in watersheds within National Outstanding Resource Waters 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 Land Reclamation Program issues a letter to operators in these watersheds advising them of six extra conditions, along with a certificate to operate a surface mine. 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 already do this 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.

A no discharge system also is required for washing and other processing areas along with all other types of businesses that operate in watershed within an Outstanding Resource area. 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, which is not a viable option as it would be reflected in construction costs. Currently, adequate supplies of sand and gravel exist to meet growth demands in the watersheds within the Outstanding State Resource Waters in 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 within the Outstanding State 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 no different than others. 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. Operators in the Ozarks are managing their business on a thin line and believe extra conditions imposed on their operation are unfair circumstances. There are a number of websites that provide free aerial photographs, allowing operators to locate isolated gravel bars.

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 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 staff director's duties are to secure appropriate staff, coordinate existing environmental programs, issue permits, conduct 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. After Aug. 28, 1989, active metallic minerals

waste management areas operating under a National Pollutant Discharge Elimination System permit, or dam safety registration, or both, were required to submit a Metallic Minerals Waste Management Permit within six months, or within 90 days after filing an application for a National Pollutant Discharge Elimination System construction permit or dam safety construction permit, whichever is applied for first. The operator applied to the staff 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.

Buick Mine cyclone spreader, Reynolds County.



The Doe Run Company, Sweetwater tailings, Reynolds County.

Permitting

In 1991, the department issued 11 permits to operators under The Metallic Minerals Waste Management Act. During 2001 and 2002, the Land Reclamation Program continued the five-year review of the metallic minerals waste management permits. In 2002, the only underground iron ore producer, the Pea Ridge Iron Ore Company transferred their 180-acre permit area to an entity by the name of Upland Wings Inc. Upland Wings was bought out by Pea Ridge Resources in 2011. Pea Ridge Resources is conducting studies to determine if mining will resume. Additionally, the tailings at Pea Ridge are being studied for recovery of magnetite and rare earth elements. In December 2017, the Pea Ridge Iron Ore Mine went through a series of court judgments and a receiver has ownership of the mine. Mr. Jim Kennedy is working through the court system to regain ownership of the Pea Ridge Iron Ore Mine.

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 the following:

- The design and construction of waste control structures and tailings dams.
- The characterization of waste products.
- The methods for control and protection of surface water.
- The methods for protection of ground water and aquifers.
- The geology and seismicity of the area.
- The potential of subsidence.
- The reuse and off-site removal of wastes.
- The surface reclamation of waste management areas.

During the ongoing permit application review and five-year review of the closure and inspection-maintenance plans, Land Reclamation Program staff coordinate permitting with the other programs within the department involved with the metallic minerals waste management areas. They include Missouri Geological Survey's Geological Survey Program and Environmental Quality Division's Air Pollution Control Program, Solid Waste Management Program, Hazardous Waste Program, and the Water Protection Program. This coordination process affords other program staff to review and comment on the technical aspects of the

plans so that all of the department's issues may be incorporated into the permit.

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, Environmental Protection Agency and The Doe Run Company signed a voluntary administrative order on consent. The order requires the company to conduct certain response actions to abate an imminent and substantial endangerment to the public health, welfare and environment.



The Doe Run Company, mine-clay capped tailings, Viburnum.



Pea Ridge Iron Ore Mine tailings impoundment, Washington County.

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. The Herculaneum smelter closed December 31, 2013, and no longer will produce slag.

During this reporting period, The Doe Run Company has been updating the five-year closure and inspection-maintenance plans for the following mines: Sweetwater, West Fork and Glover.

The West Fork and Glover five-year review and permit update are complete.

Inspections

Typically, inspections are performed semi-annually on the 10 metallic minerals waste management permit areas within Missouri. During the course of these inspections, all aspects of each company's permits are evaluated. The main focus of these inspections is to assess the company's compliance with virtually every environmental law that is administered by the department. The Land Reclamation Program is entrusted as the coordinating agency within the department for each active metallic mineral producer currently operating in Missouri. It is the program's responsibility to act as the liaison for 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 these sites until mineral production ceases, and mine closure begins. Only one lead producer in Missouri is in active closure at the present time. TAI's Magmont Mine ceased production in 1995 and began the actual reclamation of the surface effects of nearly 30 years of lead mining and processing.

During 2001 and 2002, three more facilities ceased production. The Doe Run Company's Viburnum mine and Buick primary smelter also ceased production. The Doe Run Company's Glover smelter has received approval from the department for closure of the Doe Run slag pile and the ASARCO Slag Pile. 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 the submission of revised closure plans for review and approval.

Asarco Inc. owned the facility until the 1960s until 1998 and began conducting investigation and cleanup of contamination from past smelter operations pursuant to a September 6, 1994, Consent Decree filed in Iron County Circuit Court. Asarco was performing site-wide corrective action under the Consent Decree until 2004 when those activities ceased due to Asarco's financial condition. Asarco filed for Chapter 11 bankruptcy in 2005.

As part of the Asarco bankruptcy proceedings, the department's Hazardous Waste Program worked with the Missouri Attorney General's Office to evaluate information on potential remedial options and related costs resulting from releases to the environment attributable to Asarco. A report titled, *Former Asarco Smelter, Glover, Missouri, Expert's Preliminary Opinion Concerning Remediation Costs*, July 26, 2007, was prepared by department staff in support of bankruptcy mediation proceedings conducted in early September 2007 in Kansas City, Missouri. These proceedings spawned discussions between the department, Attorney General's Office, and The Doe Run Company regarding application of any funds received by the State of Missouri through the Asarco bankruptcy process. These discussions led to the development of a voluntary agreement (the Glover Site Project Trust Agreement) between the department and The Doe Run Company which was executed September 7, 2011. This agreement is designed to allow The Doe Run Company to utilize the funds recovered from the bankruptcy proceedings to perform work that would otherwise have been required of Asarco under the 1994 Consent Decree. The summary judgment dated November 11, 2013, ordered allocation of the bankruptcy claim to be disbursed to the Missouri Hazardous Waste Fund and to the Trustee of the Glover Site Project Trust.

Funds deposited in the Missouri Hazardous Waste Fund are used to cover the department's ongoing oversight costs including document review and approval, site visits, and inspections. Funds from the Glover Site Project Trust are being used for the design, consolidation and closure of the former Asarco slag pile, development and implementation of the Phase I Remedy Investigation Work Plan, development and implementation of interim corrective measures and a Corrective Measures Study. Ultimately, funds will be used for remedy implementation and long-term remedy operation, maintenance and monitoring as part of the department's oversight.

Reclamation efforts at the Glover Facility represents years of efforts from the department, Attorney General's Office, and court proceedings. Jones Railroad Repair was awarded the contract to reclaim the Glover Slag Pile.



Glover, ASARCO slag pile prior to reclamation, Iron County.



Glover, ASARCO slag pile reclaimed, Iron County.

Enforcement

To date, four enforcement actions under the provisions of the MMWMA have been necessary by the Land Reclamation Program. Enforcement actions were at two smelters and two mines. These 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 for failure to submit annual permit fees.

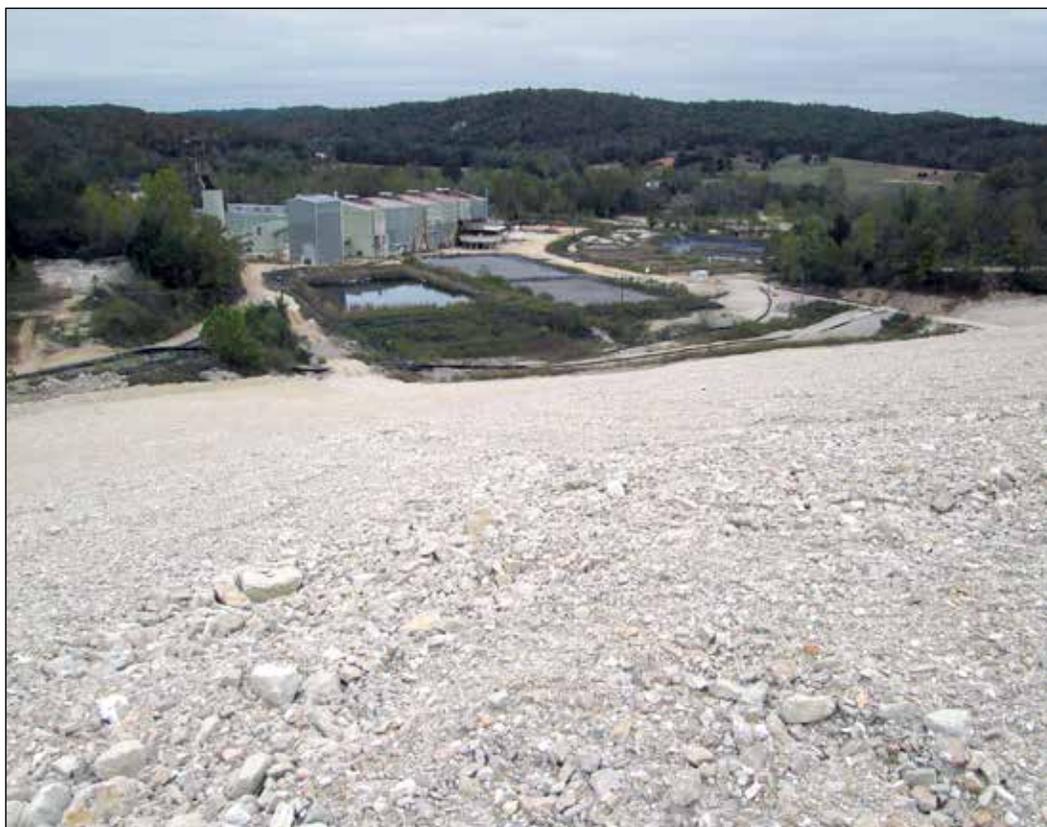
Enforcement under this law is significantly different from enforcement under either the coal or industrial minerals units of the program. When it becomes necessary to issue a citation to any of the metal producers, the authority to do so rests solely with the director of the department. Enforcement is authorized by law only after attempts to eliminate the violation through conference, conciliation and persuasion have been exercised and exhausted. In 2010 and 2011, the department and Attorney General's legal staff worked with Doe Run in negotiation settlement concerning The Doe Run Company's Sweetwater Mine. These negotiations produced an enhanced environmental protection plan that goes above the requirements in The Metallic Minerals Waste Management Act.

Bonding

Under The 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 staff 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 canceled or terminated by the operator except after no less than 90 days' notice and substitution by some other financial assurance approved by the staff 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.



The Doe Run Company, West Fork tailings dam armored, Reynolds County.

INFORMATION ON THE INTERNET

Missouri Department of Natural Resources

- Department Home Page dnr.mo.gov
- Land Reclamation Program dnr.mo.gov/geology/lrp
- Land Reclamation Program Forms dnr.mo.gov/forms/#LandReclamation
- The Complete Missouri Mining Law revisor.mo.gov/main/OneChapter.aspx?chapter=444
- Code of State Regulations (see Division 40) sos.mo.gov/adrules/csr/current/10csr/10csr

U.S. Department of the Interior, Office of Surface Mining

- Office of Surface Mining, Washington D.C. osmre.gov
- Office of Surface Mining, Mid-Continent Regional Coordinating Center, Alton, Ill. mcrcc.osmre.gov

Other Mining and Reclamation Organizations

- National Association of Abandoned Mine Land Programs naamlp.net
- Interstate Mining Compact Commission imcc.isa.us
- National Association of State Land Reclamationists naslr.org
- Missouri Limestone Producers Association molimestone.com
- The Mining Industry Council of Missouri momic.com



Reclamation of abandoned mine in Henry County.