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SURFACE COAL MINING

Financial Assurances for, and Long-Term Oversight of, Mines with Valley Fills in Four Appalachian States

On April 29, 2010, GAO revised this product to correct information published on page 10 in footnote 22. The original product indicated that the Corps completed a modification to Nationwide Permit 21 on July 15, 2009. The text has been corrected to indicate that the Corps proposed that modification on July 15, 2009.

GAO-10-206

January 2010

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Financial Assurances for, and Long-Term Oversight of, Mines with Valley Fills in Four Appalachian States

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Highlights

Highlights of GAO-10-206, a report to congressional requesters

Why GAO Did This Study

Surface mining for coal in Appalachia has generated opposition because rock and dirt from mountaintops is often removed and placed in nearby valleys and streams. The Office of Surface Mining Reclamation and Enforcement (OSM) in the Department of the Interior and states with approved programs regulate these mines under the Surface Mining Control and Reclamation Act (SMCRA). The Army Corps of Engineers (Corps), the Environmental Protection Agency (EPA), and states also regulate different aspects of coal mining, including the filling of valley streams, under the Clean Water Act. Under SMCRA, mine operators must provide financial assurances sufficient to allow mines to be reclaimed. Under the Clean Water Act, the Corps may require financial assurances that the impact of mines on streams can be mitigated. GAO was asked to examine (1) the approaches OSM, the states, and the Corps have taken to obtain financial assurances for surface coal mines with valley fills; (2) federal and state agencies' monitoring of these mines after reclamation and mitigation are complete; and (3) the federal laws agencies may use, and have used, to address latent environmental problems. GAO gathered information from state and federal agencies in Kentucky, Tennessee, Virginia, and West Virginia about their financial assurances practices, long-term monitoring, and use of federal laws to address environmental impacts at former mine sites. This report makes no recommendations.

View GAO-10-206 or key components.
For more information, contact Anu Mittal at (202) 512-3841 or mittala@gao.gov.

What GAO Found

OSM, the states, and the Corps use different approaches to financial assurances for reclamation and mitigation. Under SMCRA, states have flexibility to require mine operators to provide a bond for the full cost of reclamation or participate in an alternative bonding system such as a bond pool, which may combine bonds, taxes on coal production, and other sources of funding. West Virginia relies exclusively on an alternative bonding system, while Tennessee exclusively uses a full-cost bonding system. The other two states, Virginia and Kentucky, rely on a combination of full-cost bonds and an alternative bonding system. Under the Clean Water Act, the Corps has discretion to require that mine operators provide assurances that funds will be available to mitigate the effects of burying streams with valley fills but it has not done so in the four states we reviewed. Instead, the Corps has relied on other mechanisms to ensure that mitigation will be completed satisfactorily, according to Corps officials. For example, some Corps officials said they rely on SMCRA financial assurances to ensure required mitigation.

OSM, EPA, the Corps, and the four states' mining and environmental agencies are not required to monitor former mountaintop mines with valley fills for long-term environmental degradation after reclamation and mitigation are complete and financial assurances have been released. However, several of them, along with the U.S. Geological Survey, have conducted or funded analyses of conditions near reclaimed mine sites with valley fills that have shown environmental impacts. Specifically, analyses have shown that (1) reforestation efforts at some reclaimed surface coal mine sites needed improvement; (2) surface coal mine sites have contaminated streams and harmed aquatic organisms; (3) valley fills may affect water flow; and (4) mine operators have not always returned mine sites to their approximate original contour when required to do so under SMCRA. Federal and state agencies have taken some actions to respond to these findings, including adopting new guidelines for reforestation practices.

Several federal laws may be available under limited circumstances to address long-term environmental problems at former mine sites. These laws include SMCRA; the Clean Water Act; the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), also commonly known as Superfund; and the Resource Conservation and Recovery Act. For example, the Clean Water Act authorizes EPA or a state to require a permit if discharges are detected from a former surface mine, and CERCLA may authorize EPA to respond to certain pollution from former surface mines. According to the agencies, they have rarely or never needed to use these authorities.

We provided a draft of this report to OSM, the Corps, EPA, Kentucky, Virginia, and West Virginia for review and comment. The federal agencies generally agreed with the report, while the states were critical of what they perceived to be the message of the report.

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Abbreviations

AOC	Approximate original contour
Corps	Army Corps of Engineers
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	Environmental Protection Agency
OSM	Office of Surface Mining Reclamation and Enforcement
PEIS	Programmatic environmental impact statement
RCRA	Resource Conservation and Recovery Act
SMCRA	Surface Mining Control and Reclamation Act
TMDL	Total maximum daily load

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United States Government Accountability Office
Washington, DC 20548

January 14, 2010

The Honorable Jeff Bingaman
Chairman
Committee on Energy and Natural Resources
United States Senate

The Honorable Lamar Alexander
Ranking Member
Subcommittee on Children's Health
Committee on Environment and Public Works
United States Senate

Surface mining for coal in the mountainous areas of Appalachia—a process often referred to as mountaintop mining—has generated opposition in recent years because of its impact on landscapes, streams, ecosystems, and communities. In mountaintop mining, before the underlying coal can be extracted, the land is cleared of forests and other vegetation. Explosives or other techniques are then used to break up the overlying solid rock, creating dislodged earth, rock, and other materials known as "spoil." Some or most of the spoil is placed back on the mined-out area to return it to its approximate original contour. However, excess spoil that cannot be safely placed back is often placed as "fill" in adjacent valleys or hollows.[1] In some cases, this excess fill buries the headwaters of streams. (See fig. 1 for an example of a valley fill.)

[1]Federal and state regulations identify different types of fills, including valley fills, head-of-hollow fills, and durable rock fills. These definitions differ in their description of fill characteristics, including placement, slope, and material composition. For ease of reading, we refer to all types of fills as valley fills in this report.

Figure 1: A Valley Fill in West Virginia

Source: GAO.

Note: The triangular area in the middle of the photo is a valley fill. The fill material is dirt and rock that have been placed into the valley. The visible terraces help control the flow of water across the fill. Fill material may bury the headwaters of a small stream in a valley such as this one.

Mountaintop coal mines that produce valley fills have affected the land and streams in the central Appalachian states of Kentucky, Tennessee, Virginia, and West Virginia. According to federal and state estimates, from 1994 through 2003, surface mining had disturbed about 400,000 mostly

forested acres in these states and generated thousands of valley fills.[2] Furthermore, these valley fills buried 724 miles of headwater streams in the four states from 1985 through 2001. Another 367 miles of streams in the Appalachian region are expected to be affected by surface mines that were approved for permits from October 2001 through June 2005.[3] In December 2009, we reported on characteristics of mining in the mountainous areas of Kentucky and West Virginia, including the number of valley fills approved in those states since 2000.[4] Specifically, we reported that Kentucky and West Virginia collectively approved nearly 2,000 fills to store at least 4.9 billion cubic yards of excess spoil in nearby valleys.[5]

Surface coal mining is regulated by the Surface Mining Control and Reclamation Act of 1977 (SMCRA). SMCRA created the Office of Surface Mining Reclamation and Enforcement (OSM) in the Department of the Interior to implement and enforce the act. SMCRA allows an individual

[2]Environmental Protection Agency (EPA), *Mountaintop Mining/Valley Fills in Appalachia Draft Programmatic Environmental Impact Statement*, U.S. EPA Region 3, 9-03-R-00013 (2003). The impact statement was prepared by EPA, the Army Corps of Engineers, the Office of Surface Mining, the U.S. Fish and Wildlife Service, and the West Virginia Department of Environmental Protection. The document was incorporated by reference in a final impact statement dated October 2005.

[3]Department of the Interior, Office of Surface Mining Reclamation and Enforcement, *Environmental Impact Statement: Proposed Revisions to the Permanent Program Regulations Implementing the Surface Mining Control and Reclamation Act of 1977 Concerning the Creation and Disposal of Excess Spoil and Coal Mine Waste and Stream Buffer Zones*, OSM-EIS-34 (2008).

[4]GAO, *Surface Coal Mining: Characteristics of Mining in Mountainous Areas of Kentucky and West Virginia*, GAO-10-21 (Washington, D.C.: Dec. 9, 2009).

[5]Among the factors affecting the construction of valley fills is a Department of the Interior regulation known as the stream buffer zone rule. The rule, as originally promulgated in 1983, prohibited the dumping of excess spoil material within 100 feet of a perennial or intermittent stream except when such activities "will not cause or contribute to the violation of state or federal water quality standards and will not adversely affect the water quantity or quality or other environmental resources of the stream." In December 2008, the previous administration modified the rule to allow a surface coal mine operator to place excess spoil material excavated by the operation into streams if the operator can show it is not reasonably possible to avoid doing so. The current administration unsuccessfully sought to have the U.S. District Court of the District of Columbia vacate the 2008 rule. On November 30, 2009, the Department of the Interior published an advance notice of proposed rulemaking requesting comments on alternatives for revising the current Surface Mining Control and Reclamation Act regulations, which include the 2008 rule. Kentucky, Virginia, and West Virginia have not implemented any changes to their own stream buffer zone rules in the wake of the federal rule change.

state to develop its own program to implement the act if the Secretary of the Interior finds that the state program is in accordance with federal law.[6] A state with an approved program is said to have "primacy" for that program. OSM has approved state programs for Kentucky, Virginia, and West Virginia, and annually evaluates how well the state programs are administered. OSM manages the mining program in Tennessee.[7] One goal of SMCRA's, among others, is to assure that mines are reclaimed as contemporaneously as possible with surface coal mining operations and to protect the environment from problems—such as water quality degradation—that may result from mining. SMCRA requires the operator to provide financial assurance, in the form of a performance bond, in an amount sufficient to allow the relevant regulatory authority—either OSM or the state mining agency—to reclaim the mine site if the operator does not.[8]

Mountaintop coal mine operators may also be required to obtain permits under the Clean Water Act.[9] The Department of Defense's Army Corps of Engineers (Corps), the Environmental Protection Agency (EPA), and state agencies may all have a role in approving or overseeing permits issued under the Clean Water Act for certain activities associated with surface coal mine operations. For example, the Corps has the authority to issue a permit to a mine operator who seeks to discharge spoil into a stream when constructing a valley fill, and it may require the operator to compensate for the loss of the stream through mitigation—actions such as creating a

[6]In passing SMCRA, Congress found that "because of the diversity in terrain, climate, biologic, chemical, and other physical conditions in areas subject to mining operations, the primary governmental responsibility for developing, authorizing, issuing, and enforcing regulations for surface mining and reclamation operations subject to this act should rest with the states."

[7]The Secretary of the Interior conditionally approved a Tennessee state program on August 10, 1982; however, because Tennessee failed to adequately implement certain parts of its program, OSM took over its inspection and enforcement responsibilities on April 18, 1984. Subsequently, the state repealed most of the Tennessee Coal Surface Mining Law of 1980 and its implementing regulations, effective October 1, 1984. As a result, on October 1, 1984, OSM withdrew approval of the Tennessee permanent regulatory program and promulgated a federal program for the state.

[8]In this report, we use the terms "financial assurance" and "bond" interchangeably.

[9]The Clean Water Act is codified at 33 U.S.C. §§ 1251-1387 (2006).

new stream or enhancing a degraded stream.[10] The Corps also has the authority to require an operator to provide financial assurances to ensure a high level of confidence that the compensatory mitigation project will be successfully completed.

In this context, you asked us to examine (1) the approaches OSM, the states, and the Corps have taken to obtain financial assurances for surface coal mines with valley fills; (2) the extent to which federal and state agencies monitor and evaluate these mines after reclamation and mitigation are complete; and (3) the federal laws agencies may use, and have used, to address any latent environmental problems associated with these mines that may occur after SMCRA or Clean Water Act financial assurances have expired.

This report focuses on the four Appalachian states of Kentucky, Tennessee, Virginia, and West Virginia because these areas accounted for nearly 83 percent of the surface coal production in Appalachia in 2008 and more than 98 percent of recently-approved valley fills across the country.[11]

To address our objectives, we reviewed relevant federal and state laws, regulations, and policy guidance on surface coal mining, financial assurances, reclamation, and mitigation. We also spoke with headquarters and field officials from OSM, the Corps, EPA, and state mining agencies regarding financial assurance practices in Kentucky, Tennessee, Virginia, and West Virginia. Furthermore, we interviewed federal and state agency officials to obtain information on the long-term monitoring and evaluation their agencies have done related to reclaimed and mitigated mine sites. We also analyzed the applicability of selected environmental laws—in addition to SMCRA and the Clean Water Act—to address long-term environmental problems that might be caused by mine sites with valley fills, and interviewed agency officials to learn if such laws had been used in that

[10]Before requiring mitigation, the Corps requires a demonstration that impacts to U.S. waters have been avoided where practicable and that unavoidable impacts have been minimized to the extent practicable. According to the Corps, it provides an evaluation and analysis of avoidance, minimization, and compensation strategies and ensures that all unavoidable losses of waters are adequately offset through compensation on the vast majority of projects associated with surface coal mining sites.

[11]The data on coal production is from the Energy Information Administration and can be found at http://www.eia.doe.gov/cneaf/coal/page/acr/table1.html. The data on valley fills are based on permits approved from October 1, 2001, through June 30, 2005, as reported in OSM-EIS-34.

context. A more detailed description of our scope and methodology can be found in appendix I.

We conducted this engagement from October 2008 to January 2010 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions in this report.

Background

The central Appalachian coal region plays a large part in supplying the country with its energy needs. Specifically, in 2008, West Virginia and Kentucky were the second- and third-largest coal-producing states in the nation—behind Wyoming—and accounted for more than 76 percent of the coal produced from surface mines in Appalachia. West Virginia produced about 69 million tons of coal from surface mines, while Kentucky produced about 51 million tons. Virginia produced close to 9 million tons and Tennessee less than 2 million tons from surface mines in 2008, respectively.

SMCRA Regulates Surface Coal Mining Operations and Requires Financial Assurances

SMCRA requires mine operators to obtain a permit before starting to mine.[12] The permit process requires operators to submit detailed plans describing the extent of proposed mining operations, how reclamation on the mine site will be achieved, and the estimated per-acre cost of reclamation. In reclaiming the mine site, operators must comply with regulatory standards that govern, among other things, how the reclaimed area is regraded, replanting of the site, and the quality of water flowing from the site.[13] (See app. II for selected details about these key reclamation standards.) In general, an operator must reclaim the land to a use it was

[12]For simplicity in this report, we refer to permittees and operators as operators. The permittee is the person or entity who holds the permit and is legally responsible for the permit, whereas the operator is the person or entity who conducts coal removal operations. The permittee and the operator may or may not be the same person or entity.

[13]A purpose of SMCRA is to ensure that adequate procedures are undertaken to reclaim surface areas as contemporaneously as possible with the surface coal mining operations. OSM and the states have regulations requiring that backfilling and grading begin within a certain number of days after coal removal in a particular area.

capable of supporting before mining or an alternative post-mining land use that the regulatory authority deems higher or better than the pre-mining land use. Additionally, although the operator is generally required to redeposit spoil on the mine site so that it approximates the original contour of the site, the operator may in certain circumstances receive a variance to this general requirement and leave the land flat or gently rolling. In addition, a mountaintop removal operation is one that, by definition, will not restore the area to its approximate original contour.[14] However, only specific types of post-mining land uses—including industrial, commercial, agricultural, residential, or public uses—are allowed for mountaintop removal operations.[15]

SMCRA requires the operator to submit a bond in an amount sufficient to ensure that adequate funds will be available for the regulatory authority—either OSM or a state with primacy—to complete the reclamation if the operator does not do so.[16] The bond provisions of SMCRA apply generally to all types of coal mines and do not include any requirements that are specific to mines with valley fills. However, the bond amount for a particular site cannot be less than $10,000 and must also be sufficient to ensure the completion of the reclamation plan for that particular site if the work had to be completed by the regulatory authority in the event of forfeiture. In this report, we refer to a bond that is equal to the expected cost to reclaim the entire site as a "full-cost bond." OSM has prepared guidance for mine operators on how to calculate their bond amounts to capture the likely costs of reclamation. Bond amounts can be adjusted as the size of the permit area or the projected cost of reclamation changes. When all reclamation standards identified in SMCRA and the operator's

[14]Other types of mountaintop mining have different requirements. For example, steep slope mining describes mining operations in mountainous terrain that may, or may not, include an approximate original contour variance. Steep slope operations that do not have an approximate original contour variance follow the same requirements as other permits that comply with approximate original contour requirements.

[15]State regulations regarding allowable post-mining land uses vary. For example, West Virginia prohibits certain agricultural alternative post-mining land uses for mountaintop mining operations, including rangeland and hayland.

[16]The operator may choose to provide "incremental" bonds covering a portion of the permitted area rather than the entire permitted area.

permit—including compliance with water quality standards—have been met, the bond is completely "released" to the operator.[17]

The OSM regulations implementing SMCRA recognize three major types of bonds: corporate surety bonds, collateral bonds, and self-bonds.

- A surety bond is a bond in which a surety company guarantees the performance of the permittee's obligation to reclaim the mine site. If the mining company does not reclaim the site, the surety company must pay the bond amount to the regulatory authority or the regulatory authority may allow the surety company to perform the reclamation instead of paying the bond amount.

- Collateral bonds include cash; certificates of deposit; liens on real estate; letters of credit; federal, state, or municipal bonds; and investment-grade securities deposited directly with the regulatory authority.

- A self-bond is a bond in which the permittee guarantees its own performance with or without separate surety. Self-bonds are available only to operators who meet certain financial conditions. To remain qualified for self-bonding, operators must, among other requirements, maintain a net worth of at least $10 million, possess fixed assets in the United States of at least $20 million, and have an "A" or higher bond rating.

SMCRA also authorizes states to enact an OSM-approved alternative to a full-cost bonding system as long the alternative achieves the same objectives. One kind of alternative bonding system is known as a "bond pool." Under this type of system, the operator may post a bond—e.g., a surety bond or collateral bond—for an amount determined by multiplying the number of acres in the permit area by a per-acre assessment. The per-acre assessment may vary depending on the site-specific characteristics of the planned mining operation and the operator's history of compliance with state regulations. However, the per-acre bond amount may be less than the estimated cost of reclamation. To supplement the per-acre bond,

[17]SMCRA creates three discrete phases of reclamation for purposes of bond release. Phase I includes backfilling, regrading, and drainage control. Upon successful Phase I reclamation, up to 60 percent of the bond can be released. Phase II occurs after establishment of revegetation. No part of the bond can be released at this point if the water flowing from the permit area is exceeding applicable state effluent limitations established under the Clean Water Act. Phase III requires meeting post-mine land use standards, which may include revegetation success standards and meeting all other applicable reclamation requirements.

the operator generally must pay a fee for each ton of mined coal and may also be required to pay other types of fees. Funds are placed within a pool and can be used to reclaim sites that participants in the alternative bonding system do not reclaim.[18] Under OSM regulations, all alternative bonding systems must provide a substantial economic incentive for the operator to comply with reclamation requirements and must ensure that the regulatory authority has adequate resources to complete the reclamation plan for any sites that may be in default at any time.

Once bonds have been completely released to a mine operator, the relevant regulatory authority may terminate its jurisdiction under SMCRA.[19] However, the regulatory authority may also revoke an operator's permit if the operator fails to comply with the permit's provisions. Under those circumstances, the operator may forfeit the bond to the regulatory authority. The regulatory authority then becomes responsible for reclaiming the land to the reclamation standards found in the operator's permit. If the amount forfeited is insufficient to pay for the full cost of reclamation, the operator remains liable for remaining costs. The regulatory authority may complete reclamation and may sue the operator to recover additional expenses. Failure to complete reclamation has other serious consequences for mine operators—SMCRA prohibits applicants from obtaining future SMCRA permits if they have unabated violations of law or regulations applicable to surface mining; state regulations specifically note that bond forfeitures based on violations that are not subsequently corrected disqualify operators from obtaining future permits.

Clean Water Act Provisions Also Regulate Aspects of Surface Coal Mining Operations

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Section 404 of the act allows the Corps to issue permits for the discharge of material, including fill material, into waters of the United States at specified disposal sites.[20] Such permits are needed for the construction of a

[18]In commenting on a draft of this report, the Department of the Interior noted that bond pools may also include civil penalties and interest.

[19]State regulations may require termination of jurisdiction over a mining operation once a bond is released.

[20]33 U.S.C. § 1344 (2006). The Corps regulates discharges of fill material into three categories of stream known as ephemeral, intermittent, and perennial. According to the Corps, most valley fill construction in the four states we reviewed has involved the discharge of fill material into ephemeral streams.

valley fill.[21] Section 404(c) authorizes EPA to deny or restrict the use of any disposal site where it finds that the discharge will have unacceptable adverse effects. Mining companies may be able to construct valley fills under one of two types of permits issued by the Corps. First, the mining company may be authorized to construct a valley fill under the Corps' "nationwide permit" for surface coal mining.[22] A nationwide permit provides coverage for substantially similar activities that are expected to cause only minimal adverse environmental effects on an individual and cumulative basis. Second, the Corps may issue an "individual permit." Individual permits are issued on a case-by-case basis for activities that are expected to have more than a minimal impact. Before issuing an individual permit, the Corps must evaluate the operator's proposed activity for several factors, including, but not limited to, its effects on environmental values—such as fish, wildlife, and water quality—and safety issues, as well as any proposed mitigation for the project.

Under guidelines prepared by the EPA Administrator and the Secretary of the Army acting through the Chief of Engineers, pursuant to section 404, the Corps may issue permits to discharge fill material, if, at a minimum, compliance with the guidelines is demonstrated. One aspect of compliance is that the discharge does not cause or contribute to "significant degradation" of waters of the United States.[23] Under these guidelines, an operator would not be permitted to discharge fill materials into waters of the United States if there is a practicable alternative to such a discharge

[21]According to the Corps, a section 404 permit does not cover the construction of an entire valley fill: the Corps only authorizes the discharge of fill material into waters of the United States in association with the underdrain beneath the valley fill; the construction of the rest of the fill is regulated pursuant to SMCRA. For ease of reading, we will continue to refer to this process as the construction of a valley fill.

[22]Surface coal mine operators must notify the Corps of their intent to discharge fill material into waters of the United States in association with surface coal mining and reclamation activities under a nationwide permit—known as Nationwide Permit 21—and receive written authorization prior to commencing activity. In March 2009, a federal district court judge in the Southern District of West Virginia vacated Nationwide Permit 21 and enjoined the Corps from issuing authorizations pursuant to Nationwide Permit 21 in the district until the Corps has determined that Nationwide Permit 21 will not have adverse cumulative impacts as required by the Clean Water Act. A June 11, 2009, Memorandum of Understanding between the Corps, the Department of the Interior, and EPA states that the Corps will propose to modify Nationwide Permit 21 to prohibit its use to authorize discharges of dredged or fill material into waters of the United States for surface coal mining activities in the Appalachian region of Kentucky, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia, and on July 15, 2009, the Corps proposed that modification.

[23]40 CFR Part 230.

and would be required to minimize discharges that cannot be avoided. If such discharges are unavoidable, the Corps can require as a condition of the permit that the operator compensate for the loss or degradation of regulated waters. In the case of valley fills that bury streams, such compensatory mitigation could involve (1) creating a new stream, (2) enhancing a degraded stream, or (3) preserving an existing stream. The mitigation work may be done within the permitted area (on-site) or outside of the permitted area (off-site). Mitigation may be performed by the mine operator or a third party, such as a public or nonprofit entity, under agreement with the Corps.

The Corps' Clean Water Act implementing regulations and related policies authorize the Corps' district engineers to require financial assurances when approving section 404 permits in order to ensure a high level of confidence that compensatory mitigation will be successfully completed.[24] The Corps allows financial assurances to be in the form of bonds, escrow accounts, casualty insurance, letters of credit, legislative appropriations for government sponsored projects, or other appropriate instruments, subject to the approval of the district engineer. If assurances are required, district engineers are to determine the amount based on factors such as the size and complexity of the compensatory mitigation project, the likelihood of success, the past performance of the project sponsor, and any other factors they deem appropriate. Also, Corps district engineers must release financial assurances once they determine that the operator has demonstrated that a compensatory mitigation project has successfully met its performance standards. Typically, the monitoring period to assess the success of a compensatory mitigation project is 5 years but this period may be extended for projects that take longer, such as stream restoration.

The Corps' authority to require financial assurances to ensure compensatory mitigation differs from the authority that mining agencies have under SMCRA to require bonds for mine reclamation.

[24]The district engineer is the lead official in each district. There are 38 Corps districts in the United States. According to Corps officials, there are five Corps districts in Appalachia that are responsible for implementing the section 404 permit program in the four states we reviewed. Those district offices are located in Louisville, Kentucky; Pittsburgh, Pennsylvania; Nashville, Tennessee; Norfolk, Virginia; and Huntington, West Virginia. Corps regulations and policies are 33 CFR Part 332 (Compensatory Mitigation For Losses Of Aquatic Resources) and *Guidance on the Use of Financial Assurances, and Suggested Language for Special Conditions for Department of the Army Permits Requiring Performance Bonds*, Regulatory Guidance Letter, No. 05-1 (Feb. 14, 2005).

- While SMCRA explicitly calls for mining agencies to require all operators to provide bonds, the Corps' Clean Water Act regulations authorize district engineers to decide whether financial assurances are necessary on a permit-by-permit basis. The district engineer may determine that financial assurances are not necessary for a specific project if an alternate mechanism is available to ensure a high level of confidence that the compensatory mitigation will be provided and maintained.

- While SMCRA authorizes mining agencies to directly hold and use financial assurances to ensure the required reclamation is completed if the operator defaults on its reclamation obligations, the Corps does not have statutory authority under the Clean Water Act to do so.[25] In light of that limitation, the Corps' regulations and policies stipulate that if a district engineer does choose to require financial assurances, those assurances must be payable to a third party—such as a governmental or nongovernmental environmental management organization—that will agree to hold the funds and complete the mitigation in accordance with the Corps' instructions if the operator defaults on its obligations.

In addition to needing a Clean Water Act section 404 permit to construct a valley fill, mine operators need to obtain a National Pollutant Discharge Elimination System, or section 402, permit if they discharge pollutants from industrial point sources.[26] Point sources are discrete conveyances such as pipes.[27] Section 402 permits, generally administered by the states under EPA-approved programs, include limits on the amount of pollutants—such as suspended solids—that mines can directly discharge into bodies of water.[28] Surface coal mines contain sediment ponds and drainage ditches that collect runoff from all disturbed areas, including water from the base or perimeter of valley fills or other locations that may

[25]Under 31 U.S.C. §3302(b), any funds that the Corps receives, such as a bond, must be accounted for as a "miscellaneous receipt" under the Miscellaneous Receipts Statute and must be deposited in the General Fund of the U.S. Treasury. Thus, those funds could not be used to provide the required compensatory mitigation for a specific project.

[26]These pollutant discharge limits are derived from technology-based "effluent guidelines" established by EPA or in water-quality standards developed by states and approved by EPA.

[27]33 U.S.C. § 1362(14) (2006).

[28]EPA regulations have established effluent guidelines for coal mining and preparation under section 402 for iron, manganese, total suspended solids, and pH. States may establish standards for these and other pollutants associated with surface coal mines. For any pollutant without a published standard, permit writers may use their best professional judgment.

then flow into a stream. These flows may need to comply with point source pollutant limitations specified in a section 402 permit. Section 402 permits also require that mine operators submit periodic discharge monitoring reports to the regulatory authority, which is typically a state agency.[29] A mine operator cannot obtain the release of its SMCRA bond if the land is contributing suspended solids and other pollutants, in excess of applicable state effluent limitations, to stream flow or runoff outside the SMCRA permit approved area.

Under SMCRA and the Clean Water Act, Agencies Have Approved Permits for Mines with Thousands of Valley Fills in Central Appalachia

The regulatory authorities in the four states we reviewed have collectively authorized thousands of valley fills since the enactment of SMCRA in 1977. Although the total number of valley fills approved since 1977 is uncertain, data we collected from OSM, Kentucky, Virginia, and West Virginia show that at least 2,343 valley fills have been authorized since January 2000.[30] Specifically,

- Kentucky authorized 1,488 valley fills through July 30, 2008;
- Tennessee authorized 17 valley fills through December 31, 2008;
- Virginia authorized 327 valley fills through August 17, 2009; and
- West Virginia authorized 511 valley fills through July 30, 2008.

Notably, approval of a valley fill does not necessarily mean that it will be constructed. For example, according to Virginia state officials, of the 327 valley fills approved between January 2000 and August 2009, 97 were completed, 103 were under construction, 90 were not started, and 37 were "not needed and/or not constructed."

[29]While it retains independent oversight authority, EPA has approved the permitting and compliance authorities of the section 402 program in Kentucky, Tennessee, Virginia, and West Virginia.

[30]The data from Kentucky and West Virginia are from electronic databases. While both states have collected some information in their databases since the late 1970s, Kentucky officials told us their fill data are less reliable prior to 2000. West Virginia officials also told us they did not consistently record information on fills in their database until the late 1990s. Virginia officials told us that they did not have an electronic database with information on valley fills. They collected information for us by reviewing the hardcopy files of permits issued since 2000. Similarly, OSM officials conducted a review of permit files to provide us with information on fills in Tennessee—the state with the fewest fills.

While OSM and state mining agencies have been approving SMCRA permits with valley fills since the late 1970s, the Corps did not begin to consistently require section 404 permits for valley fills until the spring of 2002, when the Corps and EPA jointly issued regulations revising the definition of fill material. Prior to this revision, the Corps interpreted excess spoil to be a "waste" regulated under section 402 of the Clean Water Act rather than a fill material regulated under section 404.

The Corps could not readily provide us with data on the total number of section 404 permits it has issued for valley fills, the number of operators it has required to complete mitigation for valley fills, the types of mitigation called for, or the status of mitigation projects. The Corps did provide us electronic data showing that in the four states we reviewed it approved 378 Nationwide Permit 21 permits from March 2002 through December 2008 and 171 individual permits for surface coal mining operations from March 2002 through September 2009.[31] However, its database does not contain information on how many of those permits were for valley fills.[32] In addition, its electronic database indicated that only 57 of the nationwide permits required compensatory mitigation projects; Corps officials believed that number to be understated because the database is not complete. Although not captured in its electronic database, the information on valley fills and required compensatory mitigation projects is more completely documented in the Corps' paper permit files, according to agency officials.

[31]The 171 individual permits represented the approximate number of permits the Corps approved during that period for surface mining operations in the counties in Kentucky, Tennessee, Virginia, and West Virginia that the agency identified as being in the Appalachian region affected by its July 15, 2009, proposal to prohibit the use of the Nationwide Permit 21 for surface coal mining activities. See footnote 22.

[32]The Corps may approve other types of mining activity besides valley fills under the Nationwide Permit 21 and individual permits for surface coal mining.

Mining Agencies and the Corps Use Different Approaches to Financial Assurances for Reclamation and Mitigation

The four states in our review use different approaches to fulfill SMCRA's requirement that mine operators provide adequate financial assurances for completing reclamation. These states primarily vary in whether they require mine operators to fulfill their financial assurance obligation strictly through a full-cost bond or whether they allow operators to use alternative bonding systems that combine bonds, taxes on coal production, and other sources of funding. The Corps has not used its discretionary authority to require surface coal mine operators in the four states to provide financial assurances for mitigation work required as part of their section 404 permit, according to Corps officials. Furthermore, Corps officials said the Corps has relied on other permit conditions for assurance that mitigation will be satisfactorily completed.

State Mining Agencies' Approaches to Financial Assurances Vary

The three states with primacy that we examined—West Virginia, Virginia, and Kentucky—have financial assurance programs that differ from each other and from the federal program that OSM administers in Tennessee. Each of the three states has received approval from OSM to use an alternative bonding system, although they do so to varying degrees.

- West Virginia requires that all operators participate in a bond pool.
- Virginia relies primarily on a bond pool but also uses a full-cost bonding system.
- Kentucky relies primarily on a full-cost bonding system but also uses a bond pool.
- Tennessee uses a full-cost bonding system.

West Virginia

All mine operators must participate in the state's alternative bond system. The state has limited the site-specific per-acre bond to between $1,000 and $5,000.[33] The state also collects a tax on each ton of coal produced. The current tax is 14.4 cents per ton of clean coal produced. The state deposits those funds into a Special Reclamation Fund and a Special Reclamation

[33]The amount within that range is determined using criteria spelled out in West Virginia's regulations. These criteria include such factors as the type of surface mining being proposed, the number of excess spoil fills, other geologic and hydrologic characteristics of the site, and the compliance history of the operator, among other things.

Water Trust Fund.[34] As of June 2008, the combined balance for the two funds was $46.9 million. The state can use these funds to reclaim lands that were permitted and abandoned after August 3, 1977, for which there is not enough bond amount to cover reclamation.

The West Virginia legislature created an advisory council in 2001 to ensure the effective, efficient, and financially stable operation of the Special Reclamation Fund. The advisory council is required to report to the legislature every year on the financial condition of the fund. Furthermore, the West Virginia Department of Environmental Protection is required to conduct formal actuarial studies every 2 years and conduct informal reviews annually on the Special Reclamation Fund and Special Reclamation Water Trust Fund. In January 2009, recognizing that the tax rate was scheduled to drop from 14.4 cents per ton to 7 cents later that year, the advisory council recommended that the state legislature adjust the tax rate to 13 cents per ton for at least a 5-year period or provide for additional funding needed to ensure solvency. While the council concluded that the fund was solvent as of January 2009, it stated that, based upon projections in the 2008 actuarial study and with only the known revenue sources at that time, the fund balance would be negative by 2015. In April 2009, the state legislature set the tax rate at 14.4 cents per ton, effective July 1, 2009; called for a review of the tax every 2 years to determine whether it should be continued; and stipulated that the tax could not be reduced until the funds have sufficient monies to carry out required reclamation.

Virginia

Virginia offers the option of a bond pool to operators who meet eligibility criteria; other operators must post a full-cost bond. As of October 2009, the majority of active surface mine permits were covered by the bond pool. According to officials from the Virginia Department of Mines, Minerals and Energy, as of October 13, 2009, there were 148 active surface mine permits in the bond pool and 18 surface mines covered by full-cost bonding. The total bonded amount in the bond pool was about $143 million, while the total for full-cost bonding was about $14 million. An

[34]In 2008, the West Virginia legislature authorized, but did not separately fund, the Special Reclamation Water Trust Fund (Water Trust Fund). Since July 2008, coal tax revenues based on a tax rate of 1.5 cents per ton have been paid into the Water Trust Fund, while coal tax revenues based on a rate of 12.9 cents per ton have been paid into the Special Reclamation Fund. According to the state, payments for both land and water reclamation will be made from the Special Reclamation Fund until 2018, at which time payments for water treatment would be made from the Water Trust Fund.

operator must be able to demonstrate at least 3 consecutive years of compliance under Virginia's Coal Surface Mining and Coal Reclamation Act or any other comparable state or federal act to participate in the bond pool. Once in the pool, an operator cannot opt out. Operators in the pool must pay an entrance fee of $1,000 when the total balance of the pool is determined to be greater than $2 million; the entrance fee increases to $5,000 if the total fund balance falls below $1.75 million, and remains at $5,000 until the balance again exceeds $2 million. A fee of $1,000 is required of all operators in the pool when the permit is renewed.[35] Participants in the bond pool also furnish a bond of $1,500 or $3,000 per acre, depending on when the permit was issued.[36] Regardless of acreage, bonds for operations entering the fund on or after July 1, 1991, must be at least $100,000. If forfeiture occurs, the state may, after using the available bond monies, use the bond pool funds as necessary to complete reclamation liabilities for the permit area.

To oversee the bond pool's general operations, the Virginia legislature created a reclamation fund advisory board that meets at least twice each year to make recommendations to the director of the Department of Mines, Minerals and Energy.[37] The advisory board must also report to the director and to the governor on the pool's financial status and recommend to the director any new or amended regulations for administering or operating the pool. According to the department, the advisory board concluded in August 2009 that the fund was solvent.

Kentucky

Kentucky offers mine operators who meet eligibility criteria the option of participating in a bond pool, but the vast majority of operators provide full-cost bonds. According to the most recently available state data, as of May 2007, only 65 permits were covered by the bond pool. As of June 30, 2009, OSM data showed that there were a total of 893 permits for surface mining in Kentucky. To participate in the bond pool, state regulations require that an operator have an acceptable or better history of

[35]Permits are renewed after 5 years.

[36]Bonds for permits issued prior to July 1, 1991, were $1,500 per acre, while those issued after are $3,000 per acre.

[37]According to state regulation, the Reclamation Fund Advisory Board is to consist of five members appointed by the governor subject to confirmation by the General Assembly, three of whom shall represent the coal industry; one of whom shall be a representative of the director to the Department of Mines, Minerals and Energy; and one of whom shall be a member of the public without any coal industry interests.

compliance with the state's mining regulations, among other criteria. The cost of membership ranges from $1,000 to $2,500 and depends on a member's performance record. In addition, participants must obtain a bond that ranges from $500 to $2,000 per acre, depending on the performance rating of the member. Finally, members pay a 5 cent per-ton fee for surface-mined coal. When the Kentucky Bond Pool Fund reaches $17.4 million, the assessment of tonnage fees is to be suspended for all members who have made 36 or more monthly payments to the fund. If the fund level drops to $12.3 million, the tonnage fee requirement will be reinstated for all members. The funds in the pool are available only for reclamation costs at sites operated by members of the pool. Bond pool members' per-acre bonds are fully released at the completion of the initial phase of reclamation. After the initial phase, a permit is covered only by the bond pool.

In Kentucky, the law requires a review of the actuarial soundness of the bond pool every 3 years. The last Kentucky actuarial study, which evaluated the pool as of May 31, 2007, concluded that the fund, with a balance of $19.7 million, was solvent and that it had been building its assets at a faster pace than the increase in its outstanding liabilities. As an indication of the pool's financial soundness, the study noted, the pool could survive the failure of its two largest members. The study concluded that the fund's soundness had improved because its liability was more evenly spread among its members. The study recommended that the state continue the 5 cent per ton fee for surface coal mines and limit the maximum amount of bond funds held for any member operator to $6 million, or about 30 percent of the total bond pool. According to the state's bond pool administrator, the pool has continued the 5 cent per ton fee as recommended. He also said there has never been a member of the bond pool to have bonds in excess of $4 to $5 million because the program primarily offers bonding assistance to small coal operators.

Tennessee

Tennessee is the only one of the four states we reviewed to use a full-cost bond system exclusively. As of September 30, 2008, the state had 15 active surface coal mines. OSM held bonds totaling about $17.8 million for those 15 mines. In 2007 OSM revised its regulations for Tennessee to address concerns that full-cost bonds were not adequate to handle the problem of

post-mining acid- or toxic-mine drainage.[38] Specifically, the new regulations provide a mechanism in Tennessee to allow operators to establish a trust fund or annuity to cover the cost of postmining pollution discharges in lieu of a performance bond.[39] OSM's policy in Tennessee is to assume that post-mining pollution discharges will need to be treated for at least 75 years, barring evidence to the contrary. When OSM established the trust fund and annuity options in Tennessee, it stated that a system that provides an income stream may be better suited than full-cost bonds to ensure the long-term treatment of postmining pollution discharges. According to OSM, surety bonds, the most common form of a full-cost bond, are especially ill-suited for this purpose because surety companies normally do not underwrite a bond when there is no expectation of release of liability. The addition of this authority in Tennessee builds upon the experience of Pennsylvania, which had already established a process for accepting trust funds or annuities to pay for postmining discharges.

OSM Oversees State Bonding Programs and Has Made Bonding a National Priority for the 2010 Evaluation Year

In October 2009, the acting director of OSM announced that OSM was making bonding a national priority of its 2010 annual evaluation of state mining programs.[40] Specifically, the acting director instructed regional and field office directors to evaluate how states are complying with their own regulations for determining required bond amounts. The instructions further stated that the evaluations should assess whether (1) the states' methods of determining bond amounts ensure that adequate funds are available to the state in the event that the operator forfeits its bond, (2) the bond calculation methods include a mechanism to adjust bond amounts or provide other financial assurance to cover the cost of unanticipated long-term postmining pollutional discharges that develop after permit approval, and (3) the state re-evaluates the bond amount each time a permit is

[38]Acid mine drainage is acidic water rich in heavy metals that forms through the chemical reaction of surface water (rainwater, snowmelt, and pond water) and shallow subsurface water with rocks that contain sulfur-bearing minerals, resulting in sulfuric acid. Acid mine drainage commonly flows from or is caused by surface mining, deep mining, or coal refuse piles. According to EPA, there are a number of major environmental problems caused by acid mine drainage: (1) disrupts growth and reproduction of aquatic plants and animals, (2) diminishes valued recreational fish species, (3) degrades outdoor recreation and tourism, (4) contaminates surface and groundwater drinking supplies, and (5) causes acid corrosion of infrastructure like wastewater pipes.

[39]Tennessee Federal Regulatory Program, 72 *Fed. Reg.* 9616 (Mar. 2, 2007).

[40]A new director of OSM was confirmed subsequent to this announcement. The agency's 2010 evaluation year is from July 1, 2009, through June 30, 2010.

revised or renewed. According to an OSM official in the Appalachian Regional Office, OSM chose bonding as a national priority after surveying managers and staff for their oversight priorities. OSM's November 2009 work plan calls for OSM to examine a sample of forfeited sites to determine whether adequate bonds were posted and whether the sites were reclaimed as proposed in their reclamation plans. For those sites covered in part or in total by a full-cost bond, OSM plans to use its directive on bond calculation as a basis for evaluating the adequacy of bonds. OSM plans to finalize a report on its findings by September 1, 2010.

In addition, OSM announced in November 2009 that it was considering rulemaking to address concerns related to bonding programs. One of OSM's concerns is that mine operators do not always apply for bond release in a timely manner, particularly for phases II and III. OSM noted that there is no legal requirement that operators apply for bond release in a timely manner and identified several options for improving timeliness. Another concern of OSM was that the data needed to assess the success of reclamation has not been adequate. To improve data quality, OSM is considering requiring operators to submit an annual status report to the regulatory authority with information on areas that are permitted, bonded, disturbed, backfilled and graded, newly planted, and that have reached one or more of the phases of bond release.

While OSM has made bonding an oversight priority for 2010 and is considering related rulemaking options, it has reported on various aspects of state bonding programs in prior annual evaluations. For example, in its 2009 evaluation year report on West Virginia, OSM reported that it did not appear that the state was meeting requirements for inspections at bond forfeiture sites. OSM estimated that the state had completed about 55 percent of the required inspections at bond forfeiture sites.[41] In its 2009 report on Virginia, OSM reported that it had reviewed a sample of operators that applied for phase III bond release during the year and found that on-the-ground reclamation had been successful. In its 2009 report on Kentucky, OSM provided information on the number of forfeited permits at which reclamation was complete or underway. OSM has reported on the states' bonding programs in other evaluations, but it was not within the scope of our review to assess the effectiveness of those programs.

[41]In commenting on a draft of this report, West Virginia noted that it conducted additional inspections not counted by OSM, including site visits related to contract monitoring and water treatment activities.

The Corps Has Not Required Financial Assurances for Valley Fill Permits in the Four States but Has Relied on Other Mechanisms

The Corps has not required operators with section 404 permits for mines with valley fills to provide financial assurances to ensure mitigation is completed, according to officials in the five district offices that approve permits in the four states we reviewed. Corps officials said they have not required financial assurances for the following reasons:

- The agency does not have statutory authority to directly hold and use performance bonds to ensure that mitigation is completed. Officials said that if they did require financial assurances, an operator would need to identify a third party to hold the assurances and complete the mitigation if the operator does not. Some Corps officials said, however, that few third parties with the ability to conduct stream restoration have been available.
- The mine operators have had sufficient capital to complete required mitigation or have demonstrated their ability to successfully complete other mitigation work.
- It is assumed that mine operators will comply with compensatory mitigation requirements without financial assurances.
- The operators' approved mitigation projects are not yet complete and therefore the Corps has no evidence that these projects will be unsuccessful.

Corps officials told us the Corps has relied on mechanisms other than financial assurances to ensure that mitigation associated with valley fill permits will be satisfactorily completed. Specifically, one mechanism may require the operator, under the terms of its permit, to prepare an adaptive management plan. Such a plan would identify alternative mitigation actions the operator would take in the event that elements of the original plan did not succeed. In addition to an adaptive management plan, the Corps may require a permit to include a contingency plan that identifies acceptable alternative compensatory mitigation should the approved mitigation project fail. A contingency plan could require that the operator purchase mitigation credits from an in-lieu-fee program if the planned mitigation does not succeed.[42]

[42]In-lieu-fee arrangements are often sponsored by public or nonprofit entities. Under agreements with the Corps, in-lieu-fee sponsors receive payments from multiple operators required to perform compensatory mitigation. Then, at a later date, the sponsors use these funds to implement compensatory mitigation projects.

Some Corps officials also told us that the SMCRA bond could be used to cover the mitigation required under section 404, but others disagreed. According to a Norfolk, Virginia district Corps official, when off-site mitigation is part of the 404 permit, the Virginia state mining agency will expand the area covered by the SMCRA bond beyond the mine area to include land on which the 404 mitigation is to be done. The Norfolk, Virginia district official stated that this practice is consistent with the Corps' 2004 mitigation policy for surface mining operations.[43] This policy encourages district engineers to coordinate with state or OSM staff and the mining operators to incorporate required SMCRA features—such as drainage ditches and sediment ponds—into section 404 compensatory mitigation plans. On the other hand, Corps officials in Huntington, West Virginia, said they consider the SMCRA bond as a financial assurance only for mitigation projects done on the surface mine site. In further contrast, a Corps district official we spoke with in Louisville, Kentucky, does not consider the SMCRA bond to be an assurance for on-site section 404 mitigation because the goals of reclamation and mitigation are not always the same. According to Corps headquarters officials, the district offices have the discretion to decide if SMCRA mitigation projects qualify as section 404 mitigation. Officials from OSM's Appalachian region and field offices agreed that on-site section 404 compensatory mitigation can be incorporated as a special condition of the surface mining reclamation plan in a SMCRA permit.

Federal and State Agencies Are Not Required to Monitor Former Mine Sites but Have Conducted Some Analyses of Environmental Impacts

OSM, the states' mining or environmental agencies, EPA, and the Corps are not required to monitor former mountaintop mines with valley fills for long-term environmental degradation after reclamation and mitigation are complete and financial assurances have been released. While the agencies are not required to collect post-reclamation monitoring data, several have analyzed conditions near reclaimed mine sites with valley fills and found that (1) reforestation efforts at some reclaimed surface coal mine sites needed improvement, (2) some surface coal mine sites have contaminated streams and harmed aquatic organisms, (3) a link exists between valley fills and changes to water flow, and (4) mine operators have not always returned mine sites to their approximate original contour when required to do so under SMCRA. Several federal and state agencies have taken some actions to respond to these findings.

[43]The Corps, *Mitigation for Impacts to Aquatic Resources from Surface Coal Mining*, (May 7, 2004).

Additional Monitoring after Releasing Financial Assurances Is Not Required or Needed, According to Many Agency Officials

Federal and state agencies in the four Appalachian states we reviewed are not required by SMCRA or the Clean Water Act to monitor mine sites with valley fills or associated mitigation sites after they have determined that reclamation and mitigation are complete. Most officials we interviewed at the federal and state mining and environmental protection agencies in the four states we reviewed said post-reclamation or post-mitigation monitoring is not needed, with officials from several agencies explaining that the laws or their implementing regulations require adequate monitoring before an agency can determine that either reclamation or mitigation is complete. For example, in order to obtain bond release under SMCRA, mine operators must be able to demonstrate to agency inspectors that revegetation, water quality, and other standards are being met. Generally, this period is 5 years after the last reclamation activity. Officials from EPA and the state departments of environmental protection also told us that they do not monitor mine sites for water pollution discharges after they have been reclaimed. In order to achieve bond release, according to OSM and state officials, the operator typically removes and reclaims all sediment ponds that are subject to section 402 discharge permits and must demonstrate that discharge limits have not been exceeded for a year. Therefore, once the bond has been released, officials would no longer have a reason to monitor the site for section 402 permit violations. Officials from two Corps districts said that the Corps' requirement that the operator monitor and report on mitigation sites for 5 to 10 years before the Corps will determine that the mitigation is complete is sufficient. In addition, officials from three Corps district offices told us that because they did not begin to consistently issue section 404 permits for valley fills until 2002, few mitigation projects have been in place long enough to have been completed and thus are not available for post-mitigation review.

While the agency officials we spoke with generally said that additional monitoring is not necessary after reclamation and mitigation are complete, there were some that said that additional monitoring is needed to evaluate the long-term effectiveness of those activities. Specifically, officials from EPA's Office of Water and region 3 and 4 offices said that they believe monitoring has not been adequate to document the success of section 404 mitigation projects.[44] Officials from the U.S. Geological Survey Water Science Center in West Virginia told us that additional long-term

[44]EPA's Region 3 includes Virginia and West Virginia, as well as Delaware, the District of Columbia, Maryland, and Pennsylvania. Region 4 includes Kentucky and Tennessee, as well as Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina.

monitoring is needed to collect data on a range of issues, including water contamination, flooding, and land stability.

Agencies Have Conducted Some Studies, which Show Long-Term Impacts from Valley Fills, and Taken Some Actions

Several agencies have conducted or funded studies that show some evidence of the effect of environmental changes associated with mountaintop mines with valley fills after reclamation. The majority of the studies that agencies referred us to were done as part of the 2003 draft multiagency programmatic environmental impact statement (PEIS) on mountaintop mining and valley fills.[45] Among the concerns raised by these studies were reforestation efforts, effects of mining on aquatic organisms, relations between valley fills and floods, and reclamation to the approximate original contour. Several agencies have taken actions in response to some of these concerns, such as promoting new reforestation methods.

OSM and State Mining Agency Studies Found that Reforestation Efforts at Reclaimed Mine Sites Needed Improvement

OSM and state mining agencies have found that reclamation efforts on mountaintop mines and valley fill sites could be improved to yield more successful reforestation. For example, the 2003 draft PEIS noted that previously forested mountaintop mine sites were more likely to have been revegetated with grasses than with trees. One PEIS study compared revegetation at a sample of southern West Virginia mountaintop removal and valley fill mining sites with adjacent unmined sites; the revegetation had occurred from 8 to 26 years prior to the study, and therefore the operators probably had their bonds released.[46] According to the study, poor vegetation development with time was typical of the reclaimed sites, with significantly lower tree diversity on the mined sites than in adjacent forests. The study found that its data and other published studies supported the conclusion that mining reclamation procedures limit the overall ecological health and inhibit the desired growth of native tree and

[45]EPA, *Mountaintop Mining/Valley Fills in Appalachia Draft Programmatic Environmental Impact Statement*, U.S. EPA Region 3, 9-03-R-00013 (2003). The draft PEIS was prepared by EPA, the Corps, OSM, the U.S. Fish and Wildlife Service, and the West Virginia Department of Environmental Protection. The purpose of the PEIS was to evaluate options for improving agency programs under the Clean Water Act, SMCRA, and the Endangered Species Act that will contribute to reducing the adverse environmental impacts of mountaintop mining operations and excess spoil valley fills in Appalachia.

[46]Steven N. Handel, "Terrestrial Plant (Spring Herbs, Woody Plants) Populations of Forested and Reclaimed Sites." Appendix in Mountaintop Mining/Valley Fills in Appalachia, Draft Programmatic Environmental Impact Statement, Region 3, U.S. Environmental Protection Agency. (Available from: http://www.epa.gov/region3/mtntop/eis2003appendices.htm#appe.)

shrub species on the site.[47] With regard to the study in the draft PEIS, OSM officials told us that SMCRA permits do not always call for reforestation. For example, a mine site might be approved for reclamation as pasture or commercial development. Therefore, reclaimed mine sites may not need to become forested to meet SMRCA requirements.

In June 2008, OSM issued a policy directive to promote the reestablishment of forest land where existing forests had been removed by surface mining.[48] In its directive, and in related advisory documents, OSM noted that past reclamation and revegetation efforts had not been fully successful and had led to low rates of tree survival and growth, forest fragmentation, reduced carbon sequestration, loss of wildlife habitat and forest products, and increased potential for floods. To reverse this trend, the directive encourages, but does not require, the widespread and routine planting of native, high-value trees that should help restore the uses and ecosystems provided by forests prior to mining. The directive also encourages mine operators to avoid compacting the top 4 feet of soil on reclaimed mine sites in order to promote water infiltration and tree growth. The OSM directive is part of a broader effort known as the Appalachian Regional Reforestation Initiative—formed in 2004 by federal and state agencies, the coal industry, environmental organizations, and others in the Appalachian region—to promote improved reforestation techniques on surface-mined lands.[49] Officials from Kentucky, Virginia, and West Virginia told us that the OSM initiative built upon changes in reforestation policy or regulation at the state level. According to an OSM Appalachian Region official, while he believes that the use of these techniques is increasing, he also said that reliable data showing the acres of mined land planted using these techniques are not available. According to this official, OSM is working with participants in the reforestation initiative on methods for assessing success.

[47]The nature of the plant communities that are found on reclaimed mine sites is likely to affect the types and diversity of animals that inhabit those sites. According to the 2003 draft PEIS, the mix of bird species in the study area tended to be affected by the presence of mined or reclaimed mine lands compared with unmined land. Similarly, the mix of amphibian and reptile populations was affected by the presence of mining.

[48]OSM directive TSR-16, *Reforestation of Title IV and Title V Mined Lands* (June 10, 2008) available at www.osmre.gov/guidance/directives/directive931.pdf.

[49]Federal agency signatories to the reforestation initiative include the Forest Service and the Natural Resources Conservation Service in the Department of Agriculture; the Fish and Wildlife Service, the Geological Survey, and OSM in the Department of the Interior; and the National Energy Technology Laboratory in the Department of Energy.

Federal Agencies Have Found That Contaminants from Mine Sites, Including Reclaimed Sites with Valley Fills, Have Harmed Aquatic Organisms

According to the 2003 draft PEIS, approximately 1,200 miles of headwater streams within the boundaries of mining permits (or 2 percent of the streams in the central Appalachian study area) were directly affected by mountaintop mining and valley fills. For example, streams below valley fills were characterized by contaminants discharged from mine sites as well as less diverse and more pollutant-tolerant aquatic invertebrates and fish. Furthermore, in some locations, streams where mountaintop mines and valley fills exist, concentrations of selenium, a potentially toxic element that accumulates in aquatic organisms, were found to exceed standards.

In 2008, EPA scientists reported that aquatic life downstream from 27 active and reclaimed mountaintop mines with valley fills showed subtle to severe effects compared with aquatic life downstream in similar, but unmined, West Virginia watersheds.[50] More specifically, the authors compared three reclaimed mine sites with three unmined sites over a period of 6 to 7 years. According to the study, two of the three reclaimed mine sites showed further degradation of aquatic organisms over the period while the third showed some improvement, but in each case the three reclaimed sites were impaired compared with the unmined sites.

EPA has cited the 2008 study, as well as other analyses, in recent actions that it has taken on section 404 permits for valley fills. In September 2009, EPA announced its plan for the "enhanced coordinated review" of 79 section 404 permit applications for surface mines with valley fills pending with the Corps.[51] In making its announcement, EPA stated, among other things, that on the basis of the scientific literature, its field experience, and available project information, it was concerned that the mitigation proposed may not be sufficient to replace lost aquatic resources. On the other hand, Corps officials told us that they believe that the scientific literature EPA referred to is not complete; specifically, that it lacks adequate site-specific analysis.

[50]Gregory J. Pond, Margaret E. Passmore, Frank A. Borsuk, Lou Reynolds, and Carole J. Rose, "Downstream effects of mountaintop coal mining: comparing biological conditions using family- and genus-level macroinvertebrate bioassessment tools." *Journal of the North American Benthological Society*, vol. 27, no. 3 (2008). The *Journal* identifies the authors as EPA Region 3 scientists.

[51]These 79 permit applications are in addition to a set of 48 section 404 permit applications that EPA reviewed earlier in 2009. EPA raised environmental concerns with 6 of the 48 applications.

Also in September 2009, EPA asked the Corps to reconsider a section 404 permit that it issued in 2007 for the Spruce No. 1 mine in West Virginia with planned valley fills that, if built, would fill more than 8 miles of headwater streams. EPA expressed concerns that the Corps decision to issue the permit did not reflect studies showing that impairments from surface coal mining are persistent over time and cannot be easily mitigated or removed. EPA also raised specific concerns about the mitigation plan in the issued permit, including the planned use of drainage ditches—such as might be constructed at the perimeter of valley fills—as compensatory stream channels. EPA said that it has consistently objected to the use of these ditches as compensation for lost headwater stream channels and requested that the Corps re-evaluate the mitigation plan to ensure that it achieves functional replacement of lost aquatic resources. On September 30, 2009, the Corps' district engineer in Huntington, West Virginia, responded to EPA, noting that the decision to issue the permit had followed extensive coordination with EPA for nearly 10 years concerning the project's scope, alternatives, and compensatory mitigation and included the preparation of an Environmental Impact Statement. Furthermore, the district engineer said that there were no factors at that time that compelled him to consider suspending, modifying, or revoking the permit. However, EPA's acting regional administrator for Region 3 wrote to the Corps on October 16, 2009, that additional modifications would need to be made if the permit were to comply with the Clean Water Act and the regulations implementing the act.

EPA is preparing additional analysis of the impacts of mountaintop mining sites, including reclaimed sites, on water quality and aquatic life. EPA's Office of Research and Development plans to release for public comment a draft assessment in early 2010 that evaluates restoration and recovery methods that mining companies use to address the ecological impacts associated with mountaintop mining and valley fills.[52] EPA plans to prepare the assessment with advice from an expert panel chartered under the Federal Advisory Committee Act.

Federal Agencies and the State of West Virginia Have Drawn a Link between Valley Fills and Changes to Water Flow

Federal and state agencies examining the impact of mountaintop mines with valley fills have found that in streams downstream from these sites, low flows are usually increased and storm flows are sometimes increased. For example, according to the 2003 draft PEIS, streams in watersheds

[52]74 *Fed.Reg.* 48952.

below valley fills tended to have greater base flows.[53] Streams with fills were generally less likely to experience increases in peak flow than unmined areas during most storms. However, they were more likely to experience increases in peak flow during more intense rainfall events. Consequently, the draft PEIS concluded that water flows may increase below valley fills, but that the effects are site-specific. This conclusion was derived, at least in part, from studies by the U.S. Geological Survey, which compared changes in water flow in watersheds with valley fills (some of which had been reclaimed) with watersheds without valley fills.

In addition, the state of West Virginia has examined the extent to which mining activities may have contributed to flooding associated with a particular storm event. On July 8, 2001, the southern portion of West Virginia experienced a major rainstorm that produced disastrous flooding. This flooding damaged or destroyed hundreds of homes and many businesses. Most of the affected counties are in the heart of West Virginia's southern coalfields and have extensive underground and surface mining activities. Logging is also prevalent in this region. In response to public concerns, the governor created a Flood Investigation Advisory Committee and a Flood Analysis Technical Team to focus specifically on the impacts of the mining and logging industry on the July 8th flooding.

The team compared two watersheds with extensive mining (and logging) activities, including valley fills, with a third watershed with no such activities. In general, according to the team, the contributions of mining and logging to increased water flow were relatively small when compared to the total stream flow volumes.[54] It concluded, however, that mining and logging influenced the studied watersheds by increasing surface water runoff and the resulting stream flows at various evaluation points. Consequently, the flood analysis technical team recommended that, among other things, the state revise its regulations to prohibit any increase in surface water discharge over pre-mining conditions and modify certain requirements for valley fill construction. In 2003, the state received OSM's approval to revise its mining regulations to require that permit applications contain a storm water runoff analysis and that the worst case during mining and post-mining evaluations must show no net increase in

[53]The base flow of a stream is the "fair weather" flow, which is largely made up of ground water rather than runoff from precipitation.

[54]Flood Advisory Technical Taskforce, *Runoff Analyses of Seng, Scrabble, and Sycamore Creeks* (June 14, 2002).

peak runoff compared with the pre-mining evaluation.[55] According to the Secretary of the West Virginia Department of Environmental Protection, the state has also modified its valley fill construction rules to further ensure no flooding potential in times of short, intense runoff from flash storms.[56] These modifications include engineering requirements to help ensure the stability of the valley fill.[57]

OSM Has Studied Operators' Reclamation of Mountaintops to Approximate Original Contour

Returning spoil material to a mined out area in order to approximate the original contour and elevation of the mountain helps to reduce the amount of excess spoil that otherwise might be placed in a valley fill. As we reported in December 2009, most operators in West Virginia and Kentucky have not requested a variance from this requirement.[58] However, according to OSM studies in 1999 and 2001 of West Virginia and Kentucky's implementation of the approximate original contour standard, some reclaimed sites where the operator was supposed to return the land to approximate original contour differed little from sites that had been granted variances.[59] OSM also reported in 1999 that most mountaintop removal projects in Virginia were reclaimed to a configuration closely resembling the approximate original contour, even when the state had granted a variance to the operator. Following those findings, the states

[55]West Virginia Regulatory Program, 68 *Fed. Reg.* 40157- 40159 (Jul. 7, 2003) (codified at W. Va. Code R. § 38-2-5.6 (2009).

[56]From a statement the Secretary of West Virginia's Department of Environmental Protection submitted to the Senate Committee on Environment and Public Works Subcommittee on Water and Wildlife for a June 25, 2009, hearing titled "The Impacts of Mountaintop Removal Coal Mining on Water Quality in Appalachia."

[57]In commenting on a draft of this report, OSM noted that it had conducted an evaluation of the state's storm run-off analysis in March 2009. OSM's full evaluation report is on the Web at http://arcc.osmre.gov/cfo/SWORA2008.pdf. In its comments on a draft of this report, the Kentucky Department for Natural Resources noted that the state has regulations in place for flooding analysis and the assurance of no change in pre-mining, during, and post-mining water flows.

[58]GAO-10-21.

[59]Specifically, the OSM report on Kentucky found that state regulators had placed a greater emphasis on the amount of spoil material returned to the mined-out area and not enough emphasis on the post-mining land configuration, land use, slope stability, and drainage controls. In commenting on a draft of this report, Kentucky stated that the sites evaluated by OSM were returned to approximate original contour despite the approval for a variance. Similarly, the OSM report on West Virginia concluded that the state's approximate original contour determinations should give more attention to large, post-mining changes in elevation in relation to the pre-mining relief; the amount and location of spoil placed outside the mined area; and land configuration.

issued new guidance on how to achieve approximate original contour. In 2007 and 2008, OSM reviewed the effectiveness of the states' new contour policies and procedures; the results of those reviews were not available as of November 2009. In October 2009, OSM's acting director instructed the field offices to assess all the states' implementation of approximate original contour standards starting in 2010.

Federal Laws May Be Available Under Limited Circumstances to Address Long-term Environmental Problems Associated with Valley Fills but Have Rarely or Never Been Needed or Used, According to Agency Officials

Several federal laws may be available, under limited circumstances, to address environmental problems associated with mountaintop mines with valley fills after SMCRA or Clean Water Act financial assurances have expired, but these have rarely been needed or used, according to federal and state officials. We selected four federal laws for analysis in this regard: SMCRA; the Clean Water Act; the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), also commonly known as Superfund; and the Resource Conservation and Recovery Act (RCRA).

SMCRA Provides Limited Authority to Address Environmental Problems at Former Mine Sites after Bond Release

OSM and state mining agencies can use additional SMCRA provisions under two limited sets of circumstances to address environmental problems at former mine sites. First, SMCRA regulations require a mining agency to reassert jurisdiction over a mine site after a bond release if it can demonstrate that the release was based on the operator's fraud, collusion, or misrepresentation of a material fact. According to OSM, reassertion of jurisdiction could involve reopening the permit and requiring a new bond. However, OSM and state officials reported to us that they have rarely needed to use this authority. For example, OSM told us that it had reasserted jurisdiction on one post-bond release site in West Virginia that was discharging pollution after the agency successfully argued in court that the company had misrepresented material facts when the bond was released.

Second, SMCRA authorizes OSM and approved states to use funds from OSM's Abandoned Mine Land Fund to reclaim some sites. SMCRA

established the fund to reclaim certain sites mined prior to SMCRA's passage in 1977. However, amendments to SMCRA have made these funds available for additional projects. Specifically, OSM and primacy states can use these funds to reclaim sites for which any bond or other source of funds is insufficient for reclamation when (1) mining occurred between the enactment of SMCRA and OSM approval of a state program or (2) mining occurred between the enactment of SMCRA and its amendment in 1990 and the mine operator's surety has become insolvent.[60] Moreover, these funds must be used to rectify situations posing extreme danger or adverse effects to public health and safety before they are used to restore environmental resources. Funds for carrying out these purposes are generated by a tax on coal production and may also be generated by penalties assessed for violations of SMCRA.[61] OSM officials told us that each year a small amount of civil penalty money is available for any state that requests it, on a competitive basis for site reclamation and that the agency has used these funds in the past for as many as four inadequately reclaimed mine sites each year.

The Clean Water Act Authorizes EPA or State Water Quality Regulators to Require a Permit for Discharges from Former Surface Mines

Two provisions of the Clean Water Act authorize EPA or state water quality regulators to address or monitor water quality issues associated with former mine sites. First, the act authorizes EPA or EPA-authorized states to regulate discharges of pollutants from point sources by issuing and enforcing National Pollutant Discharge Elimination System section 402 permits that include limits on discharges of specific pollutants. According to EPA officials, a point source at a mining site could be, for example, a ditch draining a sediment pond at the base of a valley fill. Mine operators typically remove such point sources prior to receiving full bond release. However, in some circumstances, sediment ponds and associated drainage ditches may be authorized to remain on site if provisions for ongoing maintenance of the pond are made. If, after bond release, conditions at the former mine site change so that pollutants are being discharged from a point source, the party responsible for maintaining the point source—which could be the former mine operator or the landowner of the mine site—would have to obtain a section 402 permit and would be subject to applicable pollutant discharge limitations. EPA officials

[60]SMCRA was enacted on August 3, 1977, and the applicable amendments were passed on November 5, 1990.

[61]The use of civil penalty funds is subject to authorization in an annual appropriation act or other relevant statute.

emphasized that a point source may remain after bond release and that the requirement to maintain a permit for any such remaining point source would be indefinite. However, state officials told us that they have rarely, if ever, needed to use this Clean Water Act authority to require a new permit for a point source at a surface coal mine.[62]

Second, the Clean Water Act requires states to identify impaired waters and to develop "total maximum daily loads" (TMDLs) for impaired waters.[63] States may be able to use information on impaired waters to indirectly mitigate latent pollution associated with former surface coal mine sites. Specifically, if the state determines that a water body is impaired, it must eventually develop, for each pollutant causing an impairment, a TMDL—the amount of the pollutant that the water body can receive, taking into account seasonal variations and a margin of safety, and still meet the water quality standard applicable to that body of water. To implement a TMDL, states allocate pollutant loadings among specific sources, such as mines, and incorporate the loads into the state's water quality management plans and section 402 permits. Thus, if a proposed mine would cause a body of water to exceed its TMDL for a given pollutant, the state may, among other things, impose stricter discharge limits in that site's section 402 permit in order to achieve water quality standards. In addition, the Corps and EPA may use the information on impaired waters in considering whether a section 404 permit for a valley fill operation should be issued. For example, in raising concerns regarding the Corps' permit for the Spruce No. 1 mine in West Virginia in 2007, EPA cited the existence of a TMDL in the mine's watershed; EPA's decision as to whether to veto this permit was pending as of October 2009.

The states we reviewed have identified mining as a general cause of impairment for certain bodies of water, but they have not attributed such impairments to specific mine sites. For example, West Virginia's 2006 Water Quality Assessment Report identified coal mining as a probable source of impairments for about 4,066 miles of streams in the state, but did not identify specific mining permits as a source.

[62]A January 2009 court decision from the Northern District of West Virginia ruled that the West Virginia Department of Environmental Protection was required to apply for section permits for discharges at 18 forfeited mine sites at which it had taken over reclamation. In August 2009, the Southern District of West Virginia issued a similar ruling with regard to three additional bond forfeiture sites.

[63]A TMDL is the maximum amount of a pollutant that can enter into a body of water without violating the relevant water quality standard.

CERCLA May Authorize EPA to Respond to Pollution from Former Mines

CERCLA, commonly known as Superfund, authorizes, but does not require, EPA to respond to the release or threatened release of hazardous substances from a former surface coal mine.[64] Whether a particular release from a former mine constitutes a hazardous substance must be determined on a case-by-case basis. Some of the pollutants commonly associated with coal or coal mining, such as selenium, are considered hazardous substances under CERCLA. CERCLA allows the government to collect the costs of mitigating or cleaning up these substances from responsible parties. However, EPA officials said that the agency has not used CERCLA authority to respond to mine pollution released from a former surface coal mine site.[65] EPA has noted that coal contains trace amounts of hazardous substances, but that such amounts as may be released over time from a former surface mine might not rise to the level that would trigger an EPA response.[66]

[64]A "hazardous substance" refers to material that is listed or would be characterized as hazardous under CERCLA, the Clean Water Act, RCRA, the Clean Air Act, or the Toxic Substances Control Act.

[65]Specifically, EPA officials told us that they have never used CERCLA to conduct a removal action—an emergency response to address threats to people and the environment in the short term—to address an issue at a former surface coal mine site and have never listed a former surface coal mine site on the National Priorities List—EPA's list of some of the most contaminated sites in the country.

[66]Although EPA has not used CERCLA to respond to mine pollution released from former mine sites, it has conducted removal actions under CERCLA to respond to pollution associated with coal production. For example, EPA used CERCLA to respond to a 2000 coal slurry spill resulting from an impoundment failure at a coal preparation plant in Martin County, Kentucky. EPA also used CERCLA to respond to a December 22, 2008, breach in a dike at the Tennessee Valley Authority Kingston Fossil Plant that resulted in the release of 5.4 million cubic yards of coal combustion residue into the nearby Emory River. The spill covered more than 300 acres, made 3 homes uninhabitable and damaged 23 other homes, plus roads, rail lines, and utilities. In addition, EPA has used CERCLA to respond to releases of hazardous substances that were stored at former surface mines but that were not directly related to the surface mining operation.

EPA is Considering Regulating Coal Combustion Residue at Surface Mines under RCRA

As currently implemented, the hazardous waste provisions of RCRA would not generally be available to address environmental issues at former surface coal mines because many of the wastes associated with the extraction, processing, and combustion of coal have been exempted from the definition of hazardous waste.[67] However, concern over one particular coal by-product, coal combustion residue, may lead to regulation of the material as a hazardous waste in the future. Coal combustion residue—the material that is left once coal has been burned, as in a power plant—is sometimes placed on surface mines to abate acid mine drainage. According to OSM, the residue may also be used to enhance soil, seal and encapsulate material, and backfill mine sites. If coal combustion residue were deemed a hazardous waste, surface mines receiving such materials might be subjected to RCRA's hazardous waste provisions and could be forced to address releases of hazardous wastes.[68] Currently, EPA is developing regulations on managing coal combustion residue, including those managed in surface impoundments, such as one that failed in

[67]RCRA establishes a framework for regulation of hazardous and solid wastes: Subtitle C establishes federal "cradle-to-grave" regulation of hazardous wastes, and Subtitle D sets out minimum standards for state management of solid waste in landfills. RCRA includes provisions governing "corrective action"—cleanup—of hazardous wastes at covered facilities, and also authorizes EPA to issue orders requiring persons contributing to an imminent hazard to take necessary actions to clean up hazardous or solid waste releases. An amendment to RCRA, the Bevill amendment, exempted wastes from the extraction, processing and combustion of coal, among others, from the definition of hazardous waste pending further study by EPA. Based on these studies, EPA determined that regulation of these materials as hazardous wastes was not warranted and thus continued the exemption of these materials from the definition of hazardous waste. The Bevill amendment does not necessarily apply to every waste generated by a coal mine; any hazardous waste not exempted under the Bevill amendment would be subject to regulation under RCRA Subtitle C. Furthermore, waste exempted under the Bevill amendment, as well as any other waste that meets the definition of solid waste under RCRA, can in some circumstances be addressed under section 7003 of RCRA. Section 7003 of RCRA allows EPA to restrain the handling, storage, treatment, transportation or disposal of any solid waste or hazardous waste that may present an imminent and substantial endangerment to health or the environment. Thus, for example, EPA could prevent the storage of coal waste in an impoundment on a surface coal mine if such storage presents an imminent and substantial danger.

[68]The placement of coal combustion residue on surface mines for reclamation purposes is currently regulated in general terms under SMCRA in that any material used to reclaim a permitted mine site must comply with SMCRA permitting requirements and performance standards. In commenting on this report, OSM noted that some states allow disposal on mine sites. In May 2000 EPA determined that more specific regulation of the placement of such material on a mine site might be appropriate under the solid waste provisions of RCRA or under SMCRA. In 2007 OSM issued an advance notice of proposed rulemaking to regulate such wastes specifically under SMCRA and drafted but did not publish a proposed rule.

Tennessee in December 2008.[69] EPA is considering a number of approaches for regulating coal combustion residue, including using the solid waste provisions of RCRA, or a combination of the solid and hazardous waste provisions of RCRA.

Agency Comments and Our Evaluation

We provided a draft of this report to the Department of the Interior, the Department of Defense, and the Environmental Protection Agency for review and comment. We also provided a draft of this report to the Kentucky Department for Natural Resources; the Virginia Department of Mines, Minerals and Energy; and the West Virginia Department of Environmental Protection. The three federal agencies generally agreed with our findings, while the three state agencies were critical of what they perceived to be the message of the report.

The Department of the Interior said that it believed the report is an informative and fair characterization of the federal and state program requirements under SMCRA pertaining to financial assurances in the four states we reviewed. The Department of Defense said that, in general, it believed the report is informative and provides a good discussion of the issues involved in financial assurances for surface coal mining in Appalachia. The Environmental Protection Agency noted that the report provides a factual presentation of issues associated with the review and regulation of surface coal mining practices. The agency also noted that the data presented in this and a December 2009 GAO report provide helpful context for federal and state agencies as they continue to work together to address both the near- and long-term consequences of surface coal mining activities on the environment, water quality, and Appalachian coalfield communities.

The three state agencies' comments were critical of the draft report. For example, Kentucky commented that it believed the report is overly broad in its generalized statements, that terms and phrases are used interchangeably so as to confuse the issues, and that the report is written in a manner to misrepresent and sensationalize the issues. We do not agree that the report misrepresents or sensationalizes the issues, and have reviewed our use of terms—such as mountaintop mining, mountaintop

[69]See footnote 66. The surface impoundment at the Kingston Fossil Plant was not located on a surface mining operation, but at a coal processing plant.

removal mining, valley fills, and hollow fills—to ensure that they are used consistently and appropriately throughout the report.

Virginia commented that the report appears to be based on an assumption that there are post-bond release pollution discharges below valley fills, and that it was concerned with our use of an EPA study (by Pond, Passmore, et al.) to support the point that such discharges may occur. The state also noted that pollution problems that may occur are likely to be site-specific. We disagree with Virginia's characterization of our report because we did not assume that there are post-bond release pollution discharges below valley fills. In fact, our report notes that there is little monitoring of sites after bond release, thereby making it difficult to assess post-bond release conditions. Nevertheless, we recognize in the report that there is some evidence, including in the EPA study, that such problems may occur. We agree that problems, if they occur, are likely to be site-specific.

West Virginia noted that all coal mines—not just Appalachian mines with valley fills—are subject to SMCRA and the Clean Water Act. The state also commented that the report seemed to imply that there is a bonding or financial assurance problem in the four Appalachian states we reviewed and that surface coal mines with valley fills are the only mines that have the potential to cause environmental harm. West Virginia also commented that the report implied that the monitoring period before bond release should be longer. While we recognize that other types of coal mining are subject to these laws and may affect the environment, our report focused on surface coal mining with valley fills. The four states we reviewed have more than 98 percent of the recently approved valley fills across the country. In addition, our report contained no conclusions about the adequacy of the bonding programs in the four states or the length of the monitoring period; instead, we attempted to present information on the requirements of the relevant laws. Although West Virginia commented that the report did not give full credit to the state for improvements it has made in reforestation, approximate original contour, and surface water runoff practices, it did not provide any additional information to support these statements. The report does provide information on actions taken by the state in these areas.

We present the agencies' letters containing their general comments, along with our responses to them, as necessary, in appendixes III through VIII. The agencies, with the exception of EPA, also provided technical comments that we incorporated into the report, as appropriate.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution for 30 days from the report date. At that time, we will send copies of this report to interested congressional committees, the Secretaries of the Interior and Defense, and the Administrator of the Environmental Protection Agency. The report will also be available at no charge on the GAO Web site at http://www.gao.gov.

If you or your staffs have any questions about this report, please contact me at (202) 512-3841 or mittala@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix IX.

Anu K. Mittal
Director, Natural Resources and Environment

Appendix I: Objectives, Scope, and Methodology

This appendix details the methods we used to examine (1) the approaches the Office of Surface Mining (OSM), the states we reviewed, and the Army Corps of Engineers (Corps) have taken to obtain financial assurances for surface coal mines with valley fills; (2) the extent to which federal and state agencies monitor and evaluate these mines after reclamation and mitigation are complete; and (3) the federal laws agencies may use, and have used, to address any latent environmental problems associated with these mines that may occur after Surface Mining Control and Reclamation Act (SMCRA) or Clean Water Act financial assurances have expired.

This report focused on the four Appalachian states of Kentucky, Tennessee, Virginia, and West Virginia because these areas account for more than 83 percent of the surface coal production in Appalachia and more than 98 percent of recently approved valley fills across the country. The data on coal production is from the Energy Information Administration and can be found at http://www.eis.doe.gov/cneaf/coal/page/arc/table1.html. The data on valley fills are based on permits approved from October 1, 2001, through June 30, 2005, as reported in Department of Interior, Office of Surface Mining Reclamation and Enforcement, *Environmental Impact Statement: Proposed Revisions to the Permanent Program Regulations Implementing the Surface Mining Control and Reclamation Act of 1977 Concerning the Creation and Disposal of Excess Spoil and Coal Mine Waste and Stream Buffer Zones*, OSM-EIS-34 (2008). We also gathered background data on valley fills approved in the four states from January 1, 2000, through various dates in mid-2008 to mid-2009. The data from Kentucky and West Virginia are drawn from GAO-10-21, *Surface Coal Mining: Characteristics of Mining in Mountainous Areas of Kentucky and West Virginia*. Neither Virginia nor Tennessee maintained valley fill data in electronic form. State officials provided fill data for Virginia and OSM officials provided fill data for Tennessee by reviewing hardcopy permits issued since 2000. We interviewed state and OSM officials about the reliability of the data they provided and compared their results to OSM's 2008 environmental impact statement on excess spoil and stream buffer zones. We determined the data were sufficiently reliable for our purposes.

To address each of the objectives, we obtained documents from and interviewed officials at several federal and state agencies. These included officials in the Department of the Interior's OSM in (1) headquarters; (2) Appalachian Regional Office in Pittsburgh, Pennsylvania; and (3) field offices in Lexington, Kentucky; Knoxville, Tennessee; Charleston, West Virginia; and Big Stone Gap, Virginia. The OSM field office in Knoxville

manages the mining program in Tennessee. We also interviewed and obtained information from officials in the Environmental Protection Agency (EPA) headquarters and regional offices in Philadelphia, Pennsylvania (Region 3) and Atlanta, Georgia (Region 4); officials in the U.S. Geological Survey; and officials in the Corps of Engineers headquarters and district offices in Louisville, Kentucky; Pittsburgh, Pennsylvania; Nashville, Tennessee; Norfolk, Virginia, and Huntington, West Virginia. Those five district offices are responsible for issuing and enforcing the Clean Water Act section 404 permits to surface mines in the states of Kentucky, Tennessee, Virginia, and West Virginia. Moreover, we interviewed and obtained information from the following state agencies in the four states we reviewed: the Kentucky Department for Natural Resources; Kentucky Division of Water; Tennessee Department of Environment and Conservation; Virginia Department of Mines, Minerals and Energy; Virginia Department of Environmental Quality; and West Virginia Department of Environmental Protection.

To describe the approaches OSM, the states, and the Corps have taken to obtain financial assurances for surface coal mines with valley fills, we reviewed relevant sections of SMCRA and OSM's implementing regulations and policy guidance to identify national requirements for financial assurances associated with surface mining reclamation. We also reviewed state mining laws in the three states that have primacy for administering SMCRA—Kentucky, Virginia, and West Virginia—as well as those states' mining agency implementing regulations and policy guidance, to identify the states' approaches to financial assurances for surface mining reclamation established in accordance with the federal standards. We also spoke with officials from OSM headquarters, the Appalachian Regional Office, and field offices, as well as officials from the state mining agencies in Kentucky, Virginia, and West Virginia. We spoke with officials from the OSM field office in Knoxville to discuss financial assurances in Tennessee because these officials manage the mining program in that state. We also reviewed section 404 of the Clean Water Act and the Corps' implementing regulations and policy guidance to identify requirements and policy for financial assurances associated with compensatory mitigation projects. In addition, we contacted Corps officials in the headquarters and the five district offices to identify the extent to which the Corps has included financial assurance requirements in permits it has issued to surface mines for valley fills. We also interviewed officials from the EPA to identify their role and responsibility for overseeing section 404 permits.

To examine the extent to which federal and state agencies monitor and evaluate surface coal mines with valley fills after reclamation and

mitigation are complete, we obtained information from and interviewed officials in OSM's Appalachian Regional Office and field offices, as well as state officials at the mining agencies in Kentucky, Virginia, and West Virginia to identify any routine monitoring and "one-time" evaluations that these agencies have done of mine sites to assess the long-term environmental impact of the reclamation after the SMCRA reclamation bonds have been released. We also interviewed and obtained information from officials in the Corps' five district offices to identify any routine monitoring the Corps has done of mitigation projects after determining that operators have completed their mitigation obligations or any specific studies of completed surface coal mine mitigation projects. In addition, we interviewed and obtained information from officials in EPA's Office of Water in headquarters and regions 3 and 4; the U.S. Geological Survey; and state water quality regulators in Kentucky, Tennessee, Virginia, and West Virginia regarding any monitoring or evaluation of the long-term environmental impact of former surface mines with valley fills. Among the 11 federal and state agencies that we interviewed, none replied that they had done routine monitoring of this nature, and most replied that they had not done any "one-time" studies. The few agencies that replied they had done one-time studies referred us primarily to studies completed as part of the 2003 draft multiagency programmatic environmental impact statement (PEIS). OSM's 2008 final environmental impact statement on proposed regulations for excess spoil management also generally cited the 2003 draft PEIS as a source of information on the environmental impacts of valley fills. The federal and state agencies that collaborated on the draft PEIS conducted or funded more than 30 studies of the impacts of mountaintop mining and associated valley fills and used them as support for evaluating the impacts of various programmatic alternatives. With these facts in mind, we relied heavily on the conclusions that the authors of the draft PEIS drew concerning a number of environmental impacts, including reforestation, water quality and impacts on aquatic organisms, and water flow. We also cited more recent studies provided to us by agency officials, such as a 2008 study by EPA Region 3 on water quality and aquatic organisms near valley fills. Also, during the course of our review, we learned from OSM officials about OSM's evaluation of mine operators' compliance with approximate original contour policies in Kentucky, Virginia, and West Virginia. We reported the results of those evaluations because of their relevance to the construction of valley fills.

To examine the federal laws agencies may use, and have used, to address any latent environmental problems associated with surface mines with valley fills that may occur after SMCRA or Clean Water Act financial assurances have expired, we analyzed SMCRA and the Clean Water Act

and identified provisions that provide mining agencies and water quality regulators authority to address environmental problems on a former mine site after SCMRA bonds have been released. We also interviewed officials from OSM, state mining agencies, and state water quality regulators in the four states we reviewed to learn the extent to which these authorities have been used in the past to address any environmental problems that may have occurred on or caused by a former mine site with valley fills. In addition, we analyzed two other federal environmental laws—the Comprehensive Environmental Response Compensation and Liability Act (CERCLA, also known as Superfund) and the Resource Conservation and Recovery Act (RCRA)—to identify provisions that may authorize or require EPA to address environmental problems that may occur on or be caused by a former surface mine after bonds have been released. We interviewed officials from EPA's Office of Solid Waste and Emergency Response to learn if CERCLA had been used in the past in that context. We also we reviewed an EPA regulatory determination published in 2000 on whether regulation of coal combustion residue was warranted under the hazardous substance provisions of RCRA.

We conducted this engagement from October 2008 to January 2010 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions in this report.

Appendix II: Selected Surface Mining Control and Reclamation Act Reclamation Standards

The Surface Mining Control and Reclamation Act (SMCRA) requires that mined land be reclaimed consistent with environmental performance standards, including making the land available for post-mining uses. The SMCRA permit process requires operators to submit detailed plans describing the extent of the proposed mining operations and how reclamation will be achieved. In reclaiming the land, operators must comply with regulatory standards that govern, among other things, the final contour of the reclaimed area, the revegetation of reclaimed mine sites, and the quality of water leaving the mine site. This appendix describes these key reclamation standards.

Standards for Approximate Original Contour

In general, mountaintop mine operators are required to return mine sites to their approximate original contour (AOC) unless the operator receives a variance from the regulatory authority. This means that the surface configuration achieved by backfilling and grading of the mined area must closely resemble the general surface configuration of the land prior to mining and blend into and complement the drainage pattern of the surrounding terrain, with all highwalls[1] and spoil piles eliminated.

The Office of Surface Mining (OSM) and the states may grant a variance from the requirement to return the site to AOC—meaning that the land would be left relatively flat—in certain circumstances, including those in which the operator can demonstrate that the site will be suitable for certain post-mining land uses.[2] According to OSM, these variances present an opportunity to create relatively flat, flood-free land capable of supporting economic development. In our recent report on trends in

[1]A highwall is a cliff of exposed rock left after a surface mining operation has cut into the landscape.

[2]SMCRA authorizes both "exceptions" and "variances," to AOC requirements, but federal and state regulations use only the term "variance," as we do for consistency. The AOC requirements may not apply to permits to remine a previously mined site. The reason is that a previously mined site may not have enough material to regrade the site to the AOC standard.

mountaintop mining, we reported that variances from the AOC requirement have been relatively rare in Kentucky and West Virginia.[3]

A purpose of SMCRA is to assure that adequate procedures are undertaken to reclaim surface areas as contemporaneously as possible with the surface coal mining operations. OSM and the states require that backfilling and grading begin within a certain number of days after coal removal in a particular area.

Standards for Revegetation

OSM and state law and regulations for mine reclamation also address how sites are to be revegetated after they have been backfilled and graded. To obtain bond release under SMCRA, mine operators must show successful revegetation 5 full years after the last year of augmented seeding, fertilizing, irrigation, or other work.[4] What is planted depends on the approved post-mining land use, such as forestry or hayland and pasture.

State regulations set forth different requirements for factors including plant species, variety, density, and coverage for different post-mining land uses. The states have standards for the extent of vegetation that must be initially planted and how much must survive in order to receive bond release. For example, West Virginia's regulations call for mines sites with a forest land post-mining land use to be planted with at least 500 woody plants per acre. This is to include at least 350 trees and 150 shrubs. The state specifies that a least 5 species of trees be used, including at least 3 higher value hardwoods such as oak, ash, or maple. The state also

[3]See GAO, *Surface Coal Mining: Characteristics of Mining in Mountainous Areas of Kentucky and West Virginia*, GAO-10-21 (Washington, D.C.: Dec. 9, 2009). According to Kentucky's and West Virginia's data, most recently issued surface coal mining permits issued required the land to be reclaimed to AOC, although both states also granted some permits with AOC variances. Specifically, 76 percent (or 294 permits) of the 388 permits that Kentucky issued from January 2002 through July 2008 required the operator to reclaim the land to AOC. The remaining 24 percent (or 94 permits) contained 99 AOC variances. In West Virginia, 85 percent (or 181 permits) of the 212 permits issued between January 2000 and July 2008 required the operator to reclaim the land to AOC. The remaining 15 percent (or 31 permits) contained 33 AOC variances. We did not collect data on AOC variances for Virginia for the purposes of that report or for this review. However, in commenting on a draft of this report, Virginia said that "variances from AOC have traditionally been, and currently are, rare."

[4]The 5-year period of responsibility applies to regions of the country, such as Appalachia, that receive at least 26 inches of rain per year. In drier regions, the period of responsibility is 10 years.

specifies a minimum success standard of at least 450 trees and shrubs per acre and a 70-percent ground cover.

Standards for Water Quality

SMCRA requires that mine operators' bonds be of an amount sufficient to ensure the completion of the site's reclamation plan by the regulatory authority, which includes compliance with water quality standards. These standards include those established by EPA or the states under the Clean Water Act and referenced by SMCRA. Each reclamation plan is to include a detailed description of the measures to be taken during the mining and reclamation process to ensure the protection of the quality of surface and ground water systems, both on- and off-site, from adverse effects of the mining and reclamation process. OSM has stated that a reclamation bond may not be released where active or passive water treatment systems are being used to achieve compliance with applicable standards.[5]

SMCRA regulations contain specific water protection requirements. The regulations include requirements that all surface mining and reclamation activities be conducted to minimize disturbance of the hydrologic balance within the permit and adjacent areas and to prevent material damage to the hydrologic balance outside the permit area. The hydrologic balance requirements include standards for water quality and effluent limitations, sediment control, siltation and discharge structures, and activities in or adjacent to perennial or intermittent streams. Permit applicants must submit a probable hydrologic consequences determination with their permit application as well as a hydrologic reclamation plan indicating how any probable hydrologic consequences will be prevented or remediated, including how the general hydrologic balance requirements will be met. In addition, the regulations that address backfilling and grading require operators to cover acid- or toxic-forming materials with a minimum of 4 feet of nontoxic material, or treat the material to neutralize its toxicity in order to prevent water pollution. With regard to excess spoil used as fill material, the regulations require that leachate and surface runoff from the fill will not degrade surface or ground waters or exceed effluent limitations set for iron, manganese, total suspended solids, and pH. The regulations also require that slopes be protected to minimize surface erosion at the site and that the fill be designed using recognized

[5]Craig B. Giffin, *West Virginia's Seemingly Eternal Struggle for a Fiscally and Environmentally Adequate Coal Mining Reclamation Bonding Program*, 107 W. Va. L. Rev. 105 (2004); See West Virginia Regulatory Program, 61 *Fed. Reg.* 6511-6517 (Feb. 21, 1996).

professional standards, certified by a registered professional engineer, and approved by the regulatory authority.

Appendix III: Comments from the Department of the Interior

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

DEC 2 2 2009

Ms. Robin M. Nazzaro
Director, Natural Resources and Environment
U.S. Government Accountability Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Ms. Nazzaro:

Thank you for providing the Department of the Interior the opportunity to review and comment on the draft Government Accountability Office Report entitled "*SURFACE COAL MINING: Financial Assurances for, and Long-Term Oversight of, Mines with Valley Fills in Four Appalachian States*" (GAO-10-206).

We appreciate the diligent work of the team that prepared the report and the large amount of data collected, synthesized, and analyzed. In general, we believe that this report is an informative and fair characterization of the Federal and state program requirements under the Surface Mining Control and Reclamation Act of 1977 pertaining to financial assurances in Kentucky, Tennessee, Virginia, and West Virginia. We have enclosed several comments and suggestions that, in our view, will enhance the quality and clarity of the report.

If you have any questions, or need additional information, please contact Michael K. Robinson, Chief, Office of Surface Mining Reclamation and Enforcement's Appalachian Region Technical Support Division, at (412) 937-2882.

Sincerely,

Wilma A. Lewis
Assistant Secretary
Land and Minerals Management

Enclosure

Appendix IV: Comments from the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

DEC 15 2009

Ms. Robin M. Nazzaro, Director
Natural Resources and Environment
U.S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

Dear Ms. Nazarro:

This is a Department of Defense (DOD) response to the GAO Draft Report GAO-10-206, "SURFACE COAL MINING: Financial Assurances for, and Long-Term Oversight of, Mines with Valley Fills in Four Appalachian States," dated November 23, 2009 (GAO Code 361023).

We appreciate the work of the team that collected and analyzed the data and prepared the report. In general, we believe the report is informative and provides a good discussion of the issues involved in financial assurances for surface coal mining in Appalachia. We have several general and specific comments and appreciate the opportunity you provided to review this draft document. If our comments are addressed, we feel that the quality and clarity of the final report will be enhanced. Our comments are attached in the enclosure. We draw your attention to General Comment Number 3, which concerns your discussion of pending projects subject to the Enhanced Coordination Procedures and the Spruce Mine permit in West Virginia. The Spruce Mine permit decision is currently in litigation and we therefore recommend that you remove the discussion associated with this project. Further, the discussion of both Spruce and projects on the ECP list are not relevant to the three objectives you have identified in this study and we therefore request that you remove this information from the report.

See comment 1.

See comment 2.

Please do not hesitate to contact me if you have any questions. Your staff may also contact Mr. Chip Smith, my Assistant for Environment, Tribal and Regulatory Affairs, at (703) 693-3655.

Very truly yours,

for Jo-Ellen Darcy
Assistant Secretary of the Army
(Civil Works)

Enclosure

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The following are GAO's comments on the letter dated December 15, 2009, from the Assistant Secretary of the Army, Civil Works.

GAO Comments

1. While we appreciate the Army Corps of Engineers' (Corps) sensitivity to the litigation associated with the Spruce mine, we do not feel that any change to our report is warranted. We do not specifically discuss the litigation, which was brought by environmental groups against the Corps, but rather an ancillary conflict between the Corps and the Environmental Protection Agency (EPA). Our brief discussion of the matter presents both sides of the conflict between EPA and the Corps using the agencies' own words sourced wholly from publicly available documents and refrains from making any conclusions as to the merits of the case.

2. We disagree with the Corps' comment that a discussion of projects subject to the enhanced coordination procedure and the Spruce mine are irrelevant to the objectives of our study. Both of these points are relevant to our second objective, which asks us to describe the extent to which federal and state agencies monitor and evaluate the impacts of surface coal mining activities. Both the enhanced coordination procedure and the Spruce mine case provide examples of how federal regulators are using studies that we discuss in the report. Therefore, we did not revise the report in response to this comment.

Appendix V: Comments from the Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Ms. Robin M. Nazzaro
Director
Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

DEC 2 4 2009

OFFICE OF
WATER

Dear Ms. Nazzaro:

Thank you for your November 23, 2009, correspondence to U.S. Environmental Protection Agency (EPA) Administrator, Lisa P. Jackson, concerning interagency review of the proposed report, *Surface Coal Mining: Financial Assurances for, and Long-Term Oversight of, Mines with Valley Fills in Four Appalachian States* (GAO-10-206). As EPA Assistant Administrator for Water, I want to express my appreciation for the continued attention and objective focus given to this very important environmental issue. EPA has provided technical assistance to the U.S. Government Accountability Office (GAO) in the development of this report. We have also reviewed the current draft report, noting that it provides a factual presentation of issues associated with the review and regulation of surface coal mining practices and offers no specific recommendations for the agencies. EPA has no additional comments to offer.

I would, however, like to take this opportunity to recognize one of the key premises on which this report is based -- the importance of better understanding the long-term implications of authorized surface coal mining activities. As the draft report points out, valley fills have directly impacted almost 1,100 miles of streams in the central Appalachian States of Kentucky, Tennessee, Virginia and West Virginia from 1985 through 2005. Furthermore, the draft report refers to a recent finding from the final report GAO-10-21, which states that nearly 2,000 valley fills were approved in the States of Kentucky and West Virginia from 2000 through 2008. These and other data presented in both GAO reports provide helpful context for Federal and State agencies as we continue to work together to address both the near and long-term consequences of surface coal mining activities on the environment, water quality, and Appalachian coalfield communities.

Thank you again for the opportunity to review draft report GAO-10-206. We appreciate your ongoing contribution of helpful information in regard to this important issue. EPA will continue to utilize this data as we work with our Federal and State regulatory partners, industry, and the public to improve the environmental review of surface coal mining under the Clean Water Act.

Sincerely,

Peter S. Silva
Assistant Administrator

cc: Ms. Andrea Brown, GAO
Mr. Ross Campbell, GAO

Appendix VI: Comments from the Kentucky Department for Natural Resources

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR NATURAL RESOURCES

Steven L. Beshear
Governor

2 Hudson Hollow
Frankfort, Kentucky 40601
Phone: (502) 564-6940
Fax: (502) 564-5698
www.eec.ky.gov
www.dnr.ky.gov

Leonard K. Peters
Secretary

Carl E. Campbell
Commissioner

December 17, 2009

Ms. Robin M. Nazzaro, Director
Natural Resources and Environment
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Nazzaro;

Reference is made to your correspondence of November 23, 2009 where in you conveyed a draft copy of your proposed report entitled "Surface Coal Mining: Financial Assurances for, and Long-Term Oversight of, Mines with Valley Fills in Four Appalachian States (GAO-10-206)" for our review and comment. We have reviewed the draft document and our comments and suggestions are as follows:

General Comments

1. We sincerely appreciate GAO's intent to craft an informational document designed to provide credible information and reliable data. However, we believe this document is overly broad in its generalized statements. Terms and phrases are used interchangeably so as to confuse the issues and written in a manner that appears to misrepresent and sensationalizes the issues. Because coal mining and coal energy issues have become increasingly prevalent in the press, it is imperative that clear and accurate facts utilizing correct language be presented to appropriate agencies and the public.

See comment 1.

2. As was previously pointed out to GAO staff, we felt the Kentucky "Statement of Facts" we received from your staff was a "bit thin", so we didn't have a significant number of comments or concerns to convey during the conference call of November 3, 2009. Had we had the opportunity to review the statements that are made in the draft report we would have provided considerably more comments. The work of federal and state governments must be transparent so that our stakeholders may be well informed for learned decisions. Therefore, we must

See comment 2.

See comment3.

See comment 4.

See comment 5.

See comment 6.

See comment 7.

See comment 8.

point out that throughout the report you use several terms interchangeably that can create a false impression with your readers:

a) You call all excess spoil disposal areas "Valley Fills". As you observe in footnote # 23, there are significant differences. Valley fills result in a much larger "disturbed" footprint and directly impact intermittent and perennial streams compared to hollow fills that impact ephemeral stream reaches. These substantial differences of types of fills should not be buried in a footnote but rather be made part of the report text. Incidentally, there are very few valley fills in the Kentucky coalfields.

b) You use the term "Mountaintop Mining" and "Mountaintop Removal" as though they are synonymous and these terms occur in the same sentence (e.g. page 7 – next to last sentence in the first paragraph; page 7– footnote #11). Mountaintop removal is a regulatory defined mining method that bears the weight of law in its application and restrictions. Mountaintop mining is truly an egregious term that has no regulatory reference and misconstrues actual mining activities. We believe that the language of "mining in mountainous areas" that GAO used in their previous report (GAO-10-21) more aptly describes the mining scenarios in the eastern Kentucky coalfields.

c) There is a significant difference between the number of fills approved and the number actually constructed. Your agency has made that observation in the past and we feel that it deserves being restated in this report. Advancing this flawed premise for tabulating stream miles buried (pgs.2-3, 28) is simply erroneous and falsely alarms the reader.

Specific Comments

3. Page 9, 2nd paragraph: The statement "Once bonds have been completely released to a mine operator, the relevant regulatory authority may terminate its jurisdiction under SMCRA," should be revised to say "*Regardless of bond type*, bonds that have been completely released to a mine operator, the relevant regulatory authority *must* terminate its jurisdiction under SMCRA."

4. Page 10, top partial paragraph: It should also be noted that SMCRA also prohibits applicants from obtaining future SMCRA permits if they have previous bond forfeitures.

5. Page 14, Footnote 24: It is true that Tennessee has the fewest fills. Compared to Kentucky and West Virginia, Tennessee has a very small coal mining industry and thus, the fewest mining permit applications. This information should be included or recognized in your report.

See comment 9.

6. Page 15, 2nd paragraph: A new paragraph starting with "The Corps has not used its discretionary authority..." should be inserted as previous statements in the paragraph refer to the SMCRA process. We also believe the Corps has used its authority via in-lieu fees to provide financial assurance for 404 mitigation work.

See comment 10.

7. Page 24, 2nd paragraph: The statements in this paragraph reflect some sort of investigation(s). However, no citations of these "findings" are given. Additionally, we recommend using the phrase "*tenuous link*" rather than "tentative link" when describing the relationship between water flow and valley fills.

See comment 11.

8. Page 25, 2nd paragraph: The statements from the EPA's Office of Water are largely editorial and do not apply to the purpose of this report. Also, we are not surprised that USGS asks for additional long-term monitoring as that is one of their agency responsibilities and they seek financial assistance in this effort whenever possible.

See comment 12.

9. Page 27, Footnote 41: The statement that "amphibians and reptiles were affected by the presence or absence of mining" leads us to believe that herpetiles are basically intolerant of any condition. That being said, perhaps this statement needs to be removed.

See comment 13.

10. Page 31, 3rd paragraph: When discussing water flow, it seems somewhat contradictory to state that "contributions of mining and logging to increased water flow were relatively small" compared to the need to "ensure no flooding potential." Though the authors are specifically targeting West Virginia for this concern, Kentucky has regulations in place for flooding analysis and the assurance of no change in pre-, during and post-mining water flows.

See comment 14.

11. Page 32, 2nd paragraph: In reference to the OSM (Kentucky) study on approximate original contour, "the operator was supposed to return the land to approximate original contour differed from sites that had been granted variances," it should be noted that those Kentucky sites were returned to AOC despite the approval for a variance.

Again, we sincerely appreciate the opportunity for review and comment. Please let us know if you have any questions or if we can be of further assistance.

Respectfully,

Carl E. Campbell

Carl E. Campbell, Commissioner

The following are GAO's comments on the letter dated December 17, 2009, from the Commissioner, Department for Natural Resources.

GAO Comments

1. We do not agree that the report misrepresents or sensationalizes the issues; however, we do agree that it is important to be accurate and use correct terminology. Throughout the report we have strived to be accurate and have been careful to consistently and accurately use terms and phrases that are commonly used in regulation or the coal mining literature. In its comment, the state did not provide specific examples of what it believes are inaccurate facts or inappropriate terms. However, subsequent comments from the state referred to our use of the terms mountaintop mining, mountaintop removal mining, valley fills, and hollow fills. We have reviewed our use of these terms throughout the report to ensure that they are used consistently and appropriately.

2. The state is referring to our practice of holding "exit conferences" near the end of our review. Our policy is to provide the agencies with relevant program responsibilities—typically federal agencies but in this case a state agency—with excerpted material from the draft report. We call this document a "statement of facts." The purpose of the exit conference is to obtain the agency's input regarding the accuracy of the facts presented. The purpose is not to obtain comments on the entire draft report; that step comes later in the process. Therefore, the statement of facts that we sent to Kentucky contained information describing laws, policies, and conditions that pertained directly to the state. We understand that agencies are likely to have additional comments on the full draft report—as Kentucky did in this instance—but also believe that our process of holding exit conferences to discuss the statement of facts followed by a request for formal comments on the full report is a transparent one.

3. We understand that Kentucky's regulations define both hollow fills and valley fills, but not all states make this distinction in practice. Federal and state regulations identify different types of fills, including valley fills, head-of-hollow fills, and durable rock fills. These definitions differ in their characteristics, including placement, slope, and material composition. For ease of reading, we refer to all types of fills as valley fills in this report. The term valley fill is not meant to indicate the size of a particular fill or the type of stream affected—ephemeral, intermittent, or perennial.

4. We agree with the state's specific comment and have clarified the report accordingly. In our discussion of post-mining land use requirements, we are referring specifically to mountaintop removal, one type of mountaintop mining. For further clarity, we have added a footnote that compares the requirements for mountaintop removal to those for steep slope mining, another kind of mountaintop mining. Throughout the rest of the report, however, we continue to use the term mountaintop mining to refer generally to all types of coal mining in mountainous areas. This usage is consistent with our previous report mentioned by the state (GAO-10-21) that was also recently reviewed by state officials. This usage is also consistent with the Environmental Protection Agency's (EPA) 2003 draft Programmatic Environmental Impact Statement on Mountaintop Mining/Valley Fills in Appalachia.

5. We agree that not all fills approved are ultimately constructed, and make that point in the report. However, we do not believe that our report overstates the miles of buried streams and did not modify the report in response to this comment. The sources for the data that we include in the report are the 2003 draft Programmatic Environmental Impact Statement on mountaintop mining and valley fills and the Office of Surface Mining's 2008 final environmental impact statement on excess spoil and the stream buffer zone. For example, the 2003 draft statement reported that 724 miles of streams were "directly impacted by valley fills (i.e., covered by fill)."

6. We disagree with the comment. While we understand that some state regulations require termination of jurisdiction at bond release, the federal regulations only state that the relevant regulatory authority may terminate its jurisdiction under the Surface Mining Control and Reclamation Act (SMCRA) at bond release. Therefore, we have not revised the report in response to the comment.

7. We disagree with the comment. SMCRA does not specifically prohibit applicants from obtaining future SMCRA permits if they have previous bond forfeitures. SMCRA generally prohibits applicants from obtaining future permits if they have unabated violations. However, in response to the comment, we have added detail on the state regulations, which do specifically note that bond forfeiture based on violations that are not subsequently corrected disqualify operators from obtaining future permits.

8. We did not modify the report in response to this comment because the background section of the report does include data on the differences in recent surface coal mine production in the four states. Specifically, the report notes that Kentucky produced about 51 million tons while Tennessee produced less than 2 million tons in 2008.

9. This paragraph summarizes the section that follows, and we do not agree that an editorial change is needed. We believe that our description of the Army Corps of Engineers' practices is accurate on the basis of information obtained from that agency.

10. The citations on which the findings are based are provided later in the body of the report. We did not add citations to this summary paragraph. However, we have deleted the word "tentative" from our discussion of impacts on water flows. We believe that the documents we cite, along with comments we received from the Department of the Interior, support our characterization in the final draft of the report.

11. We do not agree that the EPA statements are largely editorial and made no change to them. We believe that the EPA and U.S. Geological Survey statements on inadequate monitoring are as germane to the purpose of the report as the statements from state agency officials, who believe monitoring is adequate.

12. We have clarified the footnote to indicate that the mix of amphibian and reptile populations was affected by the presence of mining.

13. We have not modified our characterization of the West Virginia Flood Advisory Technical Task Force report because we believe it is an accurate summary of the task force report. However, we have modified the report to include Kentucky's comment on its regulations related to flood analysis and avoidance.

14. We have added this information to footnote 57.

Appendix VII: Comments from the Virginia Department of Mines, Minerals and Energy

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

DIVISION
ENERGY
GAS AND OIL
MINED LAND RECLAMATION
MINERAL MINING
MINERAL RESOURCES
MINES
ADMINISTRATION

COMMONWEALTH OF VIRGINIA

Department of Mines, Minerals and Energy

Washington Building / 8th Floor
1100 Bank Street
Richmond, Virginia 23219-3638
(804) 692-3200 FAX (804) 692-3237
www.dmme.virginia.gov

MEMORANDUM

TO: Robin M. Nazzaro
Director, Natural Resources and Environment Government Accountability Office

FROM: Stephen Walz, Director
Virginia Department of Mines, Minerals and Energy

SUBJECT: Draft GAO-10-206 Surface Coal Mining: Financial Assurances for, and Long-Term Oversight of, Mines with Valley Fills in Four Appalachian States

DATE: December 22, 2009

Thank you for the opportunity to review the GAO draft report on mountaintop mining and financial assurances. The Virginia Department of Mines, Minerals and Energy offers the following comments. We would be glad to discuss these further if needed.

See comment 1.

The draft report appears to be based on an assumption that there are post bond release pollution discharges below fills. The Pond-Passmore Report that has been used to support this assumption cites impacts to one species of mayflies due to total dissolved solids (TDS). We are concerned about basing conclusions on this report as it has not been widely peer reviewed and other scientific studies refute the TDS issue. Additionally, problems such as selenium have not been identified as being a problem in Virginia. Conclusions based on such assumptions should be modified to note that such problems are site specific and any proposed modification to regulatory approaches should account for such site-specific conditions. Across the board, one size fits all changes to the regulatory program may not be appropriate for all sites in all states.

See comment 2.

When addressing water quality, the draft report does not acknowledge the presence of other extensive land disturbing activities in watersheds being mined and their impacts on water quality. To provide a complete picture, the draft report should recognize that these activities add to stream impacts and should be accounted for in any assessment of how surface coal mining activities affect water quality.

See comment 3.

All state regulatory programs require that permitted operators take actions to minimize the disturbances to the hydrologic balance. This is not noted in the draft report. For example, mine operators are required to conduct a Probable Hydrologic Consequence assessment before a

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TDD (800) 828-1120 --- Virginia Relay Center

permit is issued and address any negative impact to the hydrologic balance. The draft report should address how these actions protect water quality in the area affected by coal mining operations.

See comment 4.

Concerns over water quality downstream of fills after bond release could be addressed by the use of wetlands below fills. Passive wetland systems have proven to be effective in treating water during bond release. Use of passive wetland systems would require a change to OSM regulations.

See comment 5.

Throughout the draft report there are numerous references to the 2003 Mountaintop Mining/Valley Fills in Appalachia Draft Programmatic Environmental Impact Statement or 2003 draft PEIS. This document was finalized in October 2005 and should be noted as such.

We have additional comments regarding specific points in the draft report. We are providing them below.

The following are GAO's comments on the letter dated December 22, 2009, from the Director, Department of Mines, Minerals and Energy.

GAO Comments

1. We do not assume that post-bond release pollution discharges occur below valley fills. In addition to the Pond-Passmore study, our draft report cited the 2003 draft Programmatic Environmental Impact Statement, which concluded that streams below mountaintop mines with valley fills were characterized by contamination. We agree that the contamination may not necessarily have been post-bond release, and we agree that contamination problems are likely to be site specific, when they occur. We did not revise the report in response to this comment.

2. The focus of this report was surface coal mining and not all activities that may affect water quality. Therefore, while we agree that other land disturbing activities may affect water quality in watersheds with mining, we have not included a discussion of those activities.

3. Points relating to hydrologic balance, such as effluent limitations, are discussed throughout the report in general terms and more specifically in Appendix II. We have added more detail on hydrologic balance requirements to Appendix II in response to this comment. This material is included in the appendix because, while we understand that adherence to regulations designed to protect the hydrologic balance of the mine site during the mining operation may help to minimize water quality issues after bond release, we were asked to discuss mechanisms available to address environmental problems after bond release, when the Surface Mining Control and Reclamation Act's hydrologic balance requirements would no longer apply.

4. We have not modified the report in response to the state's comment because we did not analyze the use of passive wetlands, or other methods, for treating water after bond release.

5. The state is correct that the 2003 draft programmatic environmental impact statement was finalized in October 2005, and we have revised footnote 2 to make that clear. The final version of the statement incorporated the 2003 draft statement by reference. However, the 2005 final statement did not contain all of the material found in the draft statement. For example, studies of the impacts of mountaintop mining were in the appendixes of the 2003 draft, but not the 2005 final statement. Therefore, we believe that it is preferable to refer the

readers of our report to the 2003 draft statement instead of the 2005 final statement.

Appendix VIII: Comments from the West Virginia Department of Environmental Protection

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

west virginia department of environmental protection

Division of Mining & Reclamation
601 57th St., SE
Charleston, WV 25304
Phone (304) 926-0490 Facsimile (304) 926-0456

Joe Manchin III, Governor
Randy C. Huffman, Cabinet Secretary
www.wvdep.org

December 22, 2009

Robin Nazzaro
Director, Natural Resources and Environment
Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Ms. Nazzaro:

Thank you for the opportunity to review and comment on the draft Government Accountability Office report GAO-10-206, "Financial Assurances for, and Long-Term Oversight of, Mines with Valley Fills in Four Appalachian States."

See comment 1.

All coal mining nationwide is subject to the Federal Surface Mining Control and Reclamation Act (SMCRA) and the Clean Water Act. Mining of coal nationwide has similar potential to impact to the environment. Bonds and or financial assurances are required in all states and are not unique to the four states chosen for the report. It seems the GAO is artificially implying that there is a bonding or financial assurance problem in the four states and that mines with valley fills are the only mines that have the potential to cause environmental harm.

See comment 2.

West Virginia's bond forfeiture program is one of the most aggressive in the nation in assuring reclamation of sites which have had bonds forfeited, including the treatment of water on sites that require chemical treatment of water. The West Virginia regulatory program has addressed most of the needed improvements identified in the analyses referenced in your report, in reforestation, approximate original contour compliance, surface water runoff, as well as other improvements beyond the scope of GAO's findings. The GAO makes it sound as if all these studies are recent and that little has been done about the findings. More recently studies on impacts to aquatic organisms are being evaluated.

See comment 3.

Furthermore, although the report contained no recommendations it implies that monitoring periods before bond release should be longer. In reality, the bond release period turns out to be much longer than the required evaluation time due to maintenance or other requirements that would start the clock over. To require a never ending jurisdiction for formerly mined sites would be contradictory to the basic premise of ending jurisdiction under SMCRA.

Promoting a healthy environment.

Robin Nazzaro
December 22, 2009
Page Two

In closing it appears that this report could have presented a more complete story. More specific comments are attached. If you have questions or comments please contact this office.

Sincerely,

Lewis A. Halstead

Lewis A. Halstead
Deputy Director

LAH/cm

Attachment

The following are GAO's comments on the letter dated December 22, 2009, from the Deputy Director, Division of Mining and Reclamation.

GAO Comments

1. We agree that mining nationwide has similar potential to impact the environment. We also agree that the Surface Mining Control and Reclamation Act requires financial assurances in all states. However, we were asked to examine financial assurances and activities related to monitoring at coal mines with valley fills. The four states we reviewed have the vast majority of coal mines with valley fills. Therefore, we did not revise the report in response to this comment.

2. Our report notes that the state has made changes to its policies and practices related to reforestation, approximate original contour, and surface water runoff. We did not revise the report in response to this comment.

3. It is correct that we are not making any recommendations regarding the length of the monitoring period before bond release. Our report notes that most, but not all, agencies we contacted, believe that monitoring is adequate. At the same time, there is evidence from some monitoring that environmental problems may occur after bonds have been released. We did not revise the report in response to this comment.

Appendix IX: GAO Contact and Staff Acknowledgments

GAO Contact

Anu K. Mittal, (202) 512-3841 or mittala@gao.gov

Staff Acknowledgments

In addition to the contact named above, Robin Nazzaro (Director), Andrea Wamstad Brown (Assistant Director), Sherry McDonald (Assistant Director); Ross Campbell, Antoinette Capaccio, Brian Friedman, Brandon Haller, Carol Hernstadt Shulman, and Desiree Thorp made key contributions to this report. Josey Ballenger, Charlie Egan, Carol Kolarik, and Rebecca Shea also contributed to this report.

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