RECLAMATION REQUIREMENTS FOR BOND RELEASE[1]

by

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Abstract. To the surface coal mining operator, the primary indicator of a successful operation is the efficient and profitable mining of coal. To the regulatory authority, the primary indicator of success is reclamation following mining that is performed in accordance with the permit and the regulations. To satisfy the reclamation goals of the statutes and regulations administered by States and the Interior Department's Office of Surface Mining Reclamation and Enforcement (OSM), all parties involved must strive to achieve a nexus among a number of regulatory elements. These include the bond release regulations, environmental performance standards, revegetation success standards, and the approved reclamation plan designed to return the mined land to a specific use. The process of mining and reclamation is dynamic and greatly affected by economic, geographic, and climatic factors. The challenge, then, is to administer permits, mine coal, and reclaim land in response to ever changing conditions and to strive to avoid conflicts among the elements that are used to determine successful reclamation.

This is not an easy task. Reclamation plans must be well designed, current, and detailed enough that they can be used as a "scope of work" similar to a construction project. The plans must incorporate ways to comply with the environmental performance standards and be designed to meet the ultimate tests of revegetation success.

The standards for reclamation success are not fully formulated or established in all cases. During a recent forum on bond release sponsored by OSM, many regulatory agencies indicated that they are in the process of defining these success standards and developing methods to measure reclamation success. With respect to revegetation, the regulatory requirements that appear to be the most complex and challenging include: revegetation success standards, normal husbandry practices, and methods to measure success. Where success standards have not yet been developed, academia, industry, and the regulatory community need to strive to develop standards.

To assure timely bond release, mining companies and regulatory authorities need to work together to develop well-defined reclamation plans, success standards, and guidelines for achieving and measuring reclamation success. Continuous monitoring of results and implementing remedial actions when needed are necessary steps toward successful reclamation and bond release.

[1] Paper presented at the 9th National Meeting of the American Society for Surface Mining and Reclamation (ASSMR), Duluth, Minnesota, June 14-18, 1992.

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Proceedings America Society of Mining and Reclamation, 1992 pp 27-36
DOI: 10.21000/JASMR92010027

Introduction

The purpose of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87; 30 U.S.C. 1201 et seq) (SMCRA) is to assure the Nation an adequate supply of coal while at the same time, assuring that the environment and agricultural productivity of the land are protected. The Interior Department's Office of Surface Mining Reclamation and Enforcement (OSM) regulates coal mining and administers SMCRA in States that do not have an approved State Program. These include the States of California, Tennessee, and Washington. OSM also regulates coal mining on Indian lands. States that have approved State Programs regulate coal mining in their States based on the requirements of SMCRA. In these cases, OSM has oversight responsibilities for the various State Programs.

A major requirement of SMCRA is for mined land to be reclaimed contemporaneously with mining. A reclamation plan written by the permit applicant and approved by the regulatory authority is the basis for the reclamation work. Developing reclamation plans requires comprehensive planning and forethought. Many of the mines under OSM's jurisdiction are large operations consisting of thousands of acres and are located in arid, semi-arid, and humid climates. Before a bond may be released in arid climates, the permittee's responsibility period (liability period) for revegetation is 10 years following the last augmented seeding, fertilizing, irrigating, or other work that would not be considered a long-term or "normal" land management practice. The responsibility period for revegetation in humid areas is 5 years following the last augmented work performed on the site. Reclamation plans are centered on a specific postmining land use appropriate for the area. Postmining land uses may include grazingland, pastureland, cropland, forestry, recreation, fish and wildlife habitat, and industrial or commercial sites.

In order to obtain release of the performance bond, reclamation work must be performed in accordance with a variety of standards and regulatory requirements. If reclamation plans are not specifically designed to incorporate these requirements, or if on-the-ground work does not follow the approved plan, then release of the performance bond will be delayed.

Another major factor that may delay bond release is any uncertainty about the standards that will be used to judge whether the reclamation work is satisfactory. SMCRA requires that the standards used to measure revegetation success be included in the approved permit and in the approved regulatory program. Consequently, OSM and many State regulatory authorities are in the process of defining these standards and deciding what statistically valid methods will be used to measure success. This work is of the utmost importance. Uncertainty about which revegetation success standards will be used can penalize the industry and delay release of all or part of the reclamation bond. Regulatory authorities, industry, and academia all need to better define what they expect from reclamation and be able to apply appropriate methods to judge success when reclamation is completed.

This paper focuses on revegetation requirements within the Federal regulatory framework for reclamation success. Some of the difficulties experienced by regulatory authorities in defining and applying revegetation success standards are discussed. The material is presented from OSM's point of view as a regulatory authority and is applicable to State regulatory authorities that regulate coal mining under approved State Programs with similar requirements.

Regulatory Requirements

To satisfy the reclamation goals of SMCRA, all parties involved must strive to achieve successful reclamation by complying with a number of regulatory elements. The regulatory elements that apply to revegetation include: 1) the bond release regulations at 30 CFR 800.40; 2) the environmental protection performance standards at 30 CFR 816.111, .113 and .114; and, 3) the revegetation standards for success at 30 CFR 816.116.

The first set of regulations at 30 CFR 800.40 establish a timeframe for bond release based on specific stages or phases of work completed. For

example, a phase I release of up to 60 percent of the bond amount may be granted after the mined area has been backfilled, regraded (which may include replacing topsoil), and the drainage system reestablished according to the reclamation plan.

The second phase of release relates to the revegetation stage of reclamation. If an area has been revegetated according to plan, vegetation has been established, and the area is not contributing more than the allowable level of suspended solids to streamflow or runoff outside of the permit boundary, then OSM may release an additional amount of the bond. If the reclaimed area is prime farmland, the bond is not eligible for a release under this second phase of reclamation until productivity equals premining yields for 3 crop years in accordance with 30 CFR 823.15(b)(3).

As part of both phase I and phase II bond release actions, OSM must recalculate the cost to OSM if OSM had to perform remaining reclamation before deciding how much of the bond may be released. In all cases, bond sufficient to cover the cost of reestablishing the vegetation must remain in place until the final bond release occurs.

After all requirements of the reclamation plan have been met and the period of responsibility for revegetation has expired, OSM may approve a final, phase III bond release. The period of responsibility for revegetation is based on annual rainfall. Mines located in areas receiving more than 26 inches annually have a 5 year responsibility (liability) period. Mines located in areas receiving less than 26 inches annually have a 10 year period of responsibility (liability) as outlined at 30 CFR 816.116. The responsibility period begins after the last augmentation to the revegetation. Work considered to be augmentative is any seeding, fertilizing, and/or irrigating not documented and approved by OSM as a "normal husbandry practice." The decision on what constitutes a normal husbandry practice is based on the land management practices considered to be normal for the area where the mine is located for land uses similar to the postmining land use approved in the permit. Any work done to the revegetated area that, if discontinued, would cause the revegetation to fail or not meet the success standards would be considered augmentative rather than a normal husbandry practice. To avoid continuous extensions of the responsibility period and long delays in receiving bond release, permittees under Federal jurisdiction need to work with OSM to gain a clear understanding of what work can be done that will not re-start the responsibility period.

The second set of regulatory requirements that need to be addressed in the reclamation plan are the general environmental protection performance standards for revegetation at 30 CFR 816.111, .113, and .114. Numerous requirements exist to assure that the revegetated area can support the approved postmining land use. These include seeding and planting to provide a diverse, effective, permanent vegetative cover that is comprised of native or introduced species necessary to accomplish the target postmining land use. In addition, the revegetation must be able to control erosion, have the same seasonal characteristics as the original vegetation, be capable of plant succession and self-regeneration, be compatible with plant and animal species of the area, and meet regulatory requirements with respect to poisonous and noxious plants and introduced species.

The third set of regulatory requirements pertaining to revegetation are the standards for success. As outlined at 30 CFR 816.116, these requirements include meeting all of the general performance standards discussed above, plus meeting criteria for ground cover, production, or stocking that are representative of unmined land in the area. With respect to measuring revegetation for success, reclamation is considered successful if the measurements for cover, production, and stocking are not less than 90 percent of the success standard established in the approved permit. These regulations require OSM to use a 90 percent statistical confidence interval (i.e., one-sided test with a 0.10 alpha error). In addition, the regulations at 30 CFR 816.111 require OSM to select standards for success and statistically valid sampling techniques and include them in approved Federal programs for the areas under its jurisdiction. Similar requirements are imposed on States with primacy that regulate coal on Federal lands within their boundaries.

Within the regulations pertaining to bond release, two distinct levels of revegetation

"success" are included. The first of these is at 30 CFR 800.40(c)(2) where the phrases "successful revegetation has been established" and "revegetation that has been established" appear. In this context, "successful revegetation" has been interpreted to mean that revegetation must be established according to the reclamation plan and demonstrate enough growth to control erosion (Federal Register 1991). Further, to be eligible for a phase II bond release, the revegetation must meet the general requirements at 30 CFR 816.111 pertaining to diversity, species composition, self-regeneration, and plant succession. Requirements for cover and production do not have to be met at phase II unless the postmining land use is prime farmland (Federal Register 1991).

The second reference to "success" is at 30 CFR 800.40(c)(3), which in turn refers to 30 CFR 816.116. These are the success standards pertaining to revegetation and include cover, production, and stocking as well as the requirements of 30 CFR 816.111. In this context, success for final bond release means that the reclaimed area must meet the standards for success established in the permit at the confidence level required for all the vegetation parameters evaluated.

Reclamation Plans

Coal mining companies are required to develop reclamation plans that demonstrate how the performance standards of the regulations at 30 CFR Part 816 will be met. Reclamation plans must also include the proposed methods to be used to measure whether the success standards have been met. If the success standards are not clearly defined by the regulatory program and in the reclamation plan, then how will OSM determine that a bond release is warranted?

An analogy can be drawn between a coal mining operation and a construction project. On the mining side of the project, the contract (or mining plan) is based on specifications for delivery of so many tons of a specific quality of coal to a utility company. On the reclamation side of the project, the client is the general public, surface land owners, and land management agencies. The reclamation plan itself is the contract written to satisfy the performance standards of the regulations that are like design specifications under a construction contract. Filing a performance bond is a condition of the contract (reclamation plan) and release of the bond can only be done when the contract fulfillment criteria (success standards) have been met. Local forestry, wildlife, agricultural, and land management agencies play the role of "consultants" to the project. The ultimate decision on whether the project was completed according to the design specifications and codes (performance standards) rests with the regulatory authority which serves a function similar to a "building/construction inspector."

If the contract fulfillment criteria (success standards) are not specific and if the contract (reclamation plan) does not clearly specify how the contractor will construct the project to meet the criteria, on what will the building inspector base the decision? If it is not possible to determine that a building has been built to code because the requirements are vague and certain operations needed to be inspected after completion, the project could be held "in limbo" indefinitely. Meanwhile, the contractor (mining company) would have money and equipment tied up in the project, and the financial backer (surety or bank) would have the performance guarantee obligated and unavailable for other projects. In addition, the client (public and landowners) would not be able to occupy and use the property. In a scenario like this, everyone loses. In some cases, this describes a current dilemma faced by OSM, State regulatory authorities, and the coal mining companies they regulate. Efforts are currently underway to resolve these issues and prevent delays in releasing bond by developing success standards and statistically valid sampling techniques to evaluate revegetation.

Revegetation Success Standards

States and OSM were recently involved in a major joint effort (Forum 1991) sponsored by OSM to exchange information and to identify problems and possible solutions for defining success standards and sampling techniques applicable to specific geographic and climatic regions. Measuring the success of reclamation is complex and requires developing standards that provide a balance between utility to the approved postmining land use, sound ecology, and site-specific conditions. Participants in the discussions on revegetation described their

current use of specific success standards and voiced concerns about how to deal with standards not yet developed.

Under the Federal program, the frame of reference OSM uses to measure success in meeting the standards varies with different postmining land use designations. For example, when measuring ground cover and production for grazingland and pastureland, the revegetation is either compared with cover and production on a designated reference area or compared with technical standards approved by OSM in the approved mining and reclamation permit. Likewise with cropland, crop production of the reclaimed area is compared with crop production on a reference area or compared with an approved standard. If the postmining land use is fish and wildlife, recreation, or forestry, revegetation success is based upon tree and shrub stocking and vegetative ground cover. Stocking rates are developed in consultation with appropriate land management agencies and are based on local and regional conditions.

As mentioned above, many regulatory authorities are still in the process of defining success standards for all vegetation parameters for all areas under their jurisdiction. As discussed at the bond release forum (Forum 1991), regulatory authorities employ many different approaches to evaluating revegetation.

Considering the use of reference areas, a number of States located in arid climates in the West reported success while others said that reference areas do not work. For example, when applicable to the postmining land use, two Western States indicated they use standards based on comparisons with undisturbed native ground and reference areas. These States think that reference areas are relatively easy to manage, and that it is possible to locate range in good condition (Soil Conservation Service Ratings) for use as reference areas.

On the other hand, a Midwestern State with a humid climate reported that the use of reference areas does not work well because in areas with 40 inches of annual precipitation, native sites are not stable and plant succession is continuous. This State also said that the permit areas are too small to implement the effective use of reference areas.

A State located in the arid Southwest stated that reference areas are not an effective basis for annual comparisons since range conditions are poor and the range is abused in many areas. Also, due to geomorphic variability and the resulting diversity in vegetation, reference areas are not well suited for use as a comparison with postmining topography that is flat and rolling.

A participant from OSM's Federal program in Tennessee stated that the Tennessee program does not use reference areas, but rather bases success of revegetation cover and production on specific technical standards. For example, the standard for pastureland cover is 90 percent. The standard for pastureland and cropland production is the average county yield as reported by the Tennessee Crop Reporting service in the applicable county.

One State located in an arid climate discussed its use of historical vegetation data collected over a period of 3 or more years from an applicable reference area as a means of establishing standards. On the other hand, a Midwestern State discussed its use of standards based upon the condition and characteristics of the soils in the premined area, taking into consideration the postmining vegetation production level expected by the surface land owner.

A State in the West discussed its method for establishing technical standards. Here, data on vegetation by morphological types is collected over a 6 year period. Parameters measured and later used to develop standards include vegetation cover, density, and diversity. This State requires that 51 percent of the postmining species be native species. Reference areas are maintained until the post mining revegetation meets the success standard.

In the geographic areas discussed above where the use of reference areas is not an effective way to measure all vegetation parameters for success, it is clear that success standards must be developed. Academia could provide a great service to industry and the regulatory community alike by assisting in the development of technical standards for the various post mining land uses. In doing this, it is essential to develop standards that both meet the intent of the regulations and provide for practical, efficient reclamation and timely bond release.

To illustrate how bond release can be delayed or denied because of unclear technical commitments in a permit and/or the lack of technical standards in a regulatory program, a hypothetical reclamation operation is discussed below. Under this example scenario, the permit was issued with a post mining land use of forestry and wildlife. When the time came to inspect the reclaimed area for bond release, the permittee was surprised to learn that the bond release had been denied for two major reasons: 1) a fertilization practice had been employed that the regulatory authority considered to be augmentative and, 2) while the revegetation cover appeared to be successful, too many undesirable invader species were present causing neither cover nor diversity to be met. Both situations could have been avoided. The regulatory authority needed to include approved husbandry practices in its program so that the permittee would know what practices would restart the responsibility period, and the permit should have been more specific about when fertilization would be performed throughout the reclamation process. With respect to cover and diversity requirements, the regulatory program and the permit needed to be more specific and the results of ongoing reclamation monitored to assure that the revegetation was on target.

In the reclamation plan, the permittee stated that fertilization would occur after the initial plantings and that additional applications would be made as needed during the growing periods. The permittee applied fertilizer and other amendments to the vegetation late enough in the process that the regulatory authority considered this practice to be augmentative rather than a normal, approved land management practice for wildlife and forestry areas. The permittee thought that the approved reclamation plan provided the flexibility to decide when to apply fertilizer since the plan allowed for applications on an "as needed" basis. This ambiguity in the reclamation plan and the lack of published, approved husbandry practices led to a major difference of opinion on this issue. After the bond release was denied and the responsibility period restarted by the regulatory authority, the permittee requested a hearing.

Another difficulty experienced during the reclamation concerned the species seed mix approved in the reclamation plan. General revegetation guidelines developed by the regulatory authority stated that for wildlife areas, the revegetation must consist of a high percentage of native species. The approved seed mix included native species but a specific percentage of native species was not articulated in either the approved permit or in the success standards of the regulatory program. During the revegetation process, the permittee found that the approved seed mix was not as successful as predicted. Undesirable invader species were helping to provide the necessary cover required. The area had the "appearance" of being successful and the permittee did not monitor the revegetation in terms of species composition. Many of the invader species were undesirable and in the final analysis could not be considered to be providing acceptable cover or diversity. The species approved in the permit were specific to the post mining land use and were selected to provide the diversity needed for a wildlife area to succeed. When the reclaimed area was evaluated for success, it was determined that while present, the percentage of native species was insufficient, and that the invader species dominated the area to the extent that neither cover nor diversity had been accomplished. The permittee appealed this decision as well because the percentage of native species required had not been defined in the success standards of the program and the permittee thought the area included a "high percentage" of native species.

Had success standards for cover and diversity been clearly established for wildlife areas so there were no questions, and had the permittee monitored the revegetation more closely, problems would have been identified earlier. Extension of the responsibility period and delay in bond release could have been avoided. To assure that, in reality, a scenario such as this does not occur, permittees and regulatory authorities must work together to establish the standards against which revegetation will be compared.

Conclusions

As discussed above, many methods are being used to determine what standards must be met before the reclamation is considered adequate for bond release. Where standards have not yet been developed, academia, industry, and the regulatory community must work together to

develop standards. The standards must be realistic and practical enough to provide for compliance with requirements and timely bond release for the permittee. Eventually, these standards need to be included in approved State and Federal programs. To further enhance timely bond release, the regulatory authority must monitor compliance with the approved reclamation plan on a continuous basis. Monitoring is needed to evaluate progress toward meeting the success standards. Regular inspections of revegetation are also needed to identify and resolve problems, all with the goal of meeting the success standards. If on-the-ground revegetation demonstrates results that differ from what is needed to meet the success standards, some remedial action must be taken. One option is for the company to alter its reclamation methods to get back on target with the success standards. If the problem is not the method nor the practice but rather standards that are not clear or not possible to meet, the company could apply to revise the reclamation plan. Waiting until the final bond release inspection to find out that the success standards have not or cannot be met even though a reclaimed area "appears" to be in compliance is a mistake that can cost a company thousands of dollars and years of time. As part of this effort to monitor and evaluate results, the regulatory authority also has a responsibility to assure that its program and the permits it approves contain clear, concise, and well founded success standards and sampling techniques to encourage good reclamation and allow timely bond release. In addition, documenting the results of successful, ongoing reclamation operations shortly after they are completed goes a long way toward simplifying and expediting the bond release process. Successful reclamation and bond release allow the previously mined land to be returned to other uses, satisfying a major goal of SMCRA.

Acknowledgements

We thank Robert Postle, Ecologist, Office of Surface Mining Reclamation and Enforcement, Denver, Colorado, for a detailed and critical review of this paper and for providing technical and editorial support.

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