

United States
Environmental
Protection Agency

EPA Region 3
Philadelphia, PA

EPA 9-03-R-00013A
June 2003

Mountaintop Mining/Valley Fills in Appalachia Draft Programmatic Environmental Impact Statement



APPENDIX A

IDEAS FOR GOVERNMENT ACTION

Mountaintop Mining/Valley Fill Environmental Impact Statement (EIS) Programmatic Review

Ideas for Government Action

December 1999

Introduction

This document presents -- for public review and discussion -- a number of ideas for potential government action to address the environmental impacts of mountaintop mining and valley fills in the Appalachian coalfields. The ideas include potential actions at both the Federal and State levels. They represent different ways to address what the agencies preparing the EIS believe are the major issues. There are far more ideas for government action presented here than can be analyzed in depth in the EIS. Some ideas are alternatives to others. Public comments will assist the agencies to select the most valuable ideas for further analysis and to judge whether the most significant issues within the purpose of the EIS have been identified.

During their program review, the agencies came to some preliminary conclusions about which issues should receive priority attention in the EIS, and grouped the ideas for government action according to these issues. Public input is invited on the selection of priority issues, as well as on the potential actions.

Background. The U.S. Environmental Protection Agency, U.S. Office of Surface Mining, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and West Virginia Division of Environmental Protection are cooperating in the preparation of an EIS on mountaintop mining and valley fill operations in the Appalachian coalfields. The Commonwealths of Kentucky and Virginia are participating in the EIS process, providing available data regarding operations within their jurisdictions.

The purpose of the EIS is *"to consider developing agency policies, guidance, and coordinated agency decision-making processes to minimize, to the maximum extent practicable, the adverse environmental effects to waters of the United States and to fish and wildlife resources from mountaintop mining operations, and to environmental resources that could be affected by the size and location of fill material in valley fill sites."* The draft EIS is on schedule to be released for public comment during the summer of 2000, and the final EIS is slated for completion by January 2001.

To conform with the National Environmental Policy Act, an EIS must evaluate different alternatives and recommend the preferred alternative. For this EIS, the alternatives will be made up of various combinations of possible program changes, such as new or revised regulations, policies, guidance, permitting processes and inter-agency coordination; recommendations for

further research and other means to improve information for making decisions; and even changes to the laws that govern surface coal mining operations. To analyze the relative merit of the alternatives, potential actions will be categorized according to the significant issues which they would address.

How the ideas were developed. The ideas for potential government action reflect the agencies' review of public comments solicited during the initial phase of the EIS scoping process. Ideas also came from the agencies' review of reports of earlier efforts, such as the West Virginia Governor's Task Force Report issued last December. Some ideas reflect program improvements already being developed. Finally, as described in EIS Bulletin 3 (November 1999), ideas were developed during a series of interagency meetings held this summer to review current programs and policies ("program review process").

Instructions. The ideas for government action are presented in a table format so that reviewers who wish to comment can rank each idea. If you wish to indicate your views about the priority of any idea, please do so by writing a number in the right hand column (1-high; 2-medium; 3-low priority). There are also blank rows where you can add new ideas (prioritize **them** too, please) or reword, edit, or clarify an existing idea. If you would like to download the form and type in your comments and edits, you may retrieve an Adobe Acrobat version from the EPA Region III web site at <http://www.epa.gov/region3/mtntop>.

Please return your completed table as soon as possible, and no later than January 3, 2000, to:

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U.S. Environmental Protection Agency
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You may contact Mr. Hoffman by telephone at (215) 814-2995, and send comments by fax to (215) 814-2783. You may also e-mail a file with your mark-ups to: "hoffman.william@epa.gov".

To emphasize, the purpose of this public review and comment opportunity is to assist the agencies in selecting potential government actions to be analyzed in the EIS. You do not have to comment on every idea. If you are only interested in certain issues and would like to prioritize and/or comment only on a portion of the document, we would welcome a partial review as well. We appreciate your attention and response.

Priority Issues

The ideas for government action are presented in three categories, according to whether they should be given priority attention for both Federal and State actions, appear to be most amenable to State action, or are issues which will be addressed in the EIS, but for which no new government actions are presented. The preliminary conclusions about which issues fit into each category are:

1. **Category I** - Priority attention for new Federal and State actions should be given to addressing the issues associated with **protecting aquatic resources**. The ideas for government action address four aquatic resource protection issues:

Issue 1 - Impacts on Aquatic Resources

- A. *Preventing stream loss and adverse surface- and groundwater impacts from valley fills and other mountaintop mining operations;*
- B. *Ability of mined area reclamation practices to restore stream habitat and aquatic functions impacted by mining;*
- C. *Effectiveness of compensatory mitigation projects to make up for the loss of stream habitat and aquatic functions;*
- D. *Protecting watersheds from cumulative effects of mountaintop mining/valley fill activities and other land disturbances.*

2. **Category II** - New actions should be considered particularly at the State level to address the issues associated with **impacts on communities**. The report of the West Virginia Governor's Task Force has already spurred action in West Virginia on concerns in this area. **Protection of terrestrial habitats** is the second issue area. The agencies concluded from the program review that current Federal statutes and regulations generally provide an appropriate and adequate framework, although this conclusion needs to be confirmed by further study in some cases. The ideas for government action in this category address the following:

Issue 2 - Impacts on Communities

- A. *Effects of blasting and other mining activities on homes, water wells and quality of life;*
- B. *Effects of fugitive dust—both as a nuisance and a health risk;*
- C. *Effects from mountaintop mining on flooding of downstream communities;*
- D. *Valley fill stability;*
- E. *Ability for reclaimed mined land to provide an economic and/or social benefit to coal field communities;*
- F. *Effects of mining on scenery and culturally significant landscapes.*

Issue 3 - Terrestrial Impacts

- A. Effects of mountaintop mining on plants and wildlife, including unique/endangered species;*
- B. Effects of deforestation and reduction/fragmentation of forested areas by mountaintop mining;*
- C. Cumulative effects on the environment from mining and other land disturbance;*
- D. Effects of mountaintop mining on biodiversity and sustainability;*
- E. Concerns that current mountaintop mining reclamation practices introduce and increase exotic and invasive plant species.*

3. **Category III - Socio-economic issues** were expressed strongly in the EIS scoping meetings. Many speakers were concerned about the effects of further restrictions of mountaintop mining which might be recommended in the EIS on such economic areas as employment, community businesses whose customers are dependent upon mining employment, equipment suppliers and other businesses whose clients are mining companies, and State-county tax revenues. Speakers also requested that the EIS address the effect of further restrictions on mountaintop mining on energy resources and electricity rates. Some people commented on the future of Appalachia “after mining” and the need to look for other kinds of economic development.

The socio-economic issues which might be posed by restrictions on mountaintop mining will be addressed in the EIS. They will be assessed as an integral part of the economic analysis of the alternatives for government action rather than as a list of possible actions. Development of economic development actions is beyond the scope of the EIS, and beyond the authorities of the agencies participating in the EIS. However, the agencies hope that the information developed during the EIS process will be of value for those with economic development responsibilities.

The EIS will address the relationship of mountaintop coal mining to global climate change and strategies for prevention and/or mitigation.

On to the list of actions.....

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CATEGORY I - PRIORITY ATTENTION ISSUES		
<u>Issue 1 - Impacts on Aquatic Resources</u>		
<u>Subissue A</u>	Preventing stream loss and adverse surface- and groundwater impacts from valley fills and other mountaintop mining operations.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. Improve permit decision making by adopting a less-subjective procedure for evaluating whether excess spoil disposal in valley fills has been minimized relative to the total volume of overburden removed.	
Idea	2. Clarify requirements for obtaining a Surface Mining Control and Reclamation Act (SMCRA) variance from "approximate original contour" for commercial forestry in a way that minimizes excess spoil disposal for this post-mining land use.	
Idea	3. Develop improved water and biological monitoring plans for permit applicants which improve the scientific basis for both SMCRA and Clean Water Act (CWA) permit decisions as part of the West Virginia (WV) interim permitting process. Especially improve evaluation of watershed impacts. Evaluate and finalize these plans based on EIS findings.	
Idea	4. The EIS "Stream" and "Fisheries" technical studies will help the agencies establish the value of headwater streams and assist in setting thresholds for "more than minimal impact" as well as a baseline for mitigation requirements. If the results are inconclusive, additional Federal-State biological studies could be carried out in cooperation with mining companies and advised by academic researchers.	
Idea	5. Inventories of valley fills, assessments of future mining potential, and data on past mining locations are being developed in geographic information system (GIS) format as part of the EIS and other state agency efforts. Progress could be stepped up through public-private cooperation and/or additional funding.	
Idea	6. As part of interim WV permitting activities, the Federal agencies have joined in pre-application meetings with mining companies to: 1) clarify all information-gathering requirements necessary for SMCRA, CWA and threatened/endangered species decisions; 2) improve environmental assessment and protection; and, 3) integrate procedures for making SMCRA and CWA permit decisions so that all impacts and requirements are considered at the same time early in the process. Formalize this process.	
Idea	7. WV interim permitting activities also include encouraging cooperative information-gathering and assessment among companies with present and proposed mines in the same watershed. Formalize this approach to assist in cumulative impact assessments.	

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Idea	8. The WV interim permitting approach uses a more-detailed SMCRA analysis of "cumulative hydrologic impact assessment" (CHIA) by combining surface-water CHIA assessment with CWA-type water quality and aquatic biology reviews. Adopt this process to improve impact assessment.	
Idea	9. WVDEP has begun to perform 404(b)(1) Guideline environmental reviews for small valley fills which do not require individual Corps of Engineers (COE) permits. Adopt this process formally.	
Idea	10. EPA and the COE are training State personnel who will carry out CWA 404 review functions. Periodic training could occur following the EIS.	
Idea	11. To minimize stream area affected by mining, formalize the requirement to place sediment ponds as close as possible to the toe of valley fills.	
Idea	12. Stream buffer zone changes	
Option	(a) To minimize stream loss, interpret the SMCRA stream buffer zone regulations to restrict fills to ephemeral (wet weather flow only) portions of headwater streams.	
Option	(b) Revise the SMCRA buffer zone rules to meet SMCRA 515(c)(4)(d) mandate ("no damage...to natural water courses") and to clarify the relationship with Clean Water Act requirements (e.g., rely on CWA criteria (such as 404(b)(1) Guidelines) to determine placement and size of fills).	
Option	(c) Implement an MOU clarifying compliance with SMCRA buffer zone and CWA requirements related to valley fills. For example, the MOU could explain how to address key criteria such as "material damage" (SMCRA); "significant degradation" to aquatic values and "no practicable alternatives to fill" (CWA).	
Option	(d) In revising the SMCRA buffer zone rule, develop restrictions to control cumulative impact of present and future mining operations in a watershed, e.g.: (1) prohibit filling more than a percentage of stream valley in a watershed; (2) encourage placement of fill in existing impaired areas; and, (3) control timing of new mining to promote recovery in already-disturbed watersheds.	
Idea	13. Use state water quality standards to limit/prohibit valley fills in specific areas containing special attributes or resources (e.g., current standards specify brown trout habitat as specially-protected species). The antidegradation policy or implementation procedures could be used.	
Idea	14. To reconcile differing COE and EPA definitions of "fill material" discharged into U.S. waters, amend current regulations and clarify CWA applicability to valley fills and other discharges from mining operations.	

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Idea	15. Reissue COE Nationwide 21 permit, which regulates discharges of fill material from surface mining authorized under SMCRA, to incorporate geographic or other numerical limits on fills which can be authorized by general permit.	
Idea	16. Environmental decisions for SMCRA and CWA permit evaluations could be improved if methods for identifying functions and evaluating the functions of headwater stream reaches (such as biological indices) are established. Recommend evaluation of possible tools for quick delineation of ephemeral, intermittent, and perennial stream characteristics (e.g., NRCS base flow estimation method, USGS method establishing groundwater table, COE high-water mark, Charles Norris 5% slope method).	
Idea	17. Establish scientific criteria: 1) for designating specially-protected areas (such as impact on threatened/endangered species; stream reaches naturally supporting diverse fish and invertebrate species); 2) on indicators of ecological function, aquatic diversity, productivity and stability; and, 3) on acceptable levels of loss based on functional value. These criteria could increase quality of information in permit applications, facilitate permit decisions to protect sensitive aquatic areas, and assist mining companies in planning.	
Idea	18. Improve interpretation of environmental information and data by state agencies and mining companies through in-depth watershed-based analysis of permit applications and cumulative effects using the latest scientific tools, like biological indices for measuring stream impacts and improvements and enhanced GIS capabilities, and overlay maps of special aquatic protection areas.	
Idea	19. More thoroughly identify and assess existing aquatic resources to assist in minimizing impacts of mining and valley fills through agency/mining company cooperative efforts. The assessment could be institutionalized in State water quality and fish and wildlife inventories and ongoing monitoring programs. A list of types of watershed attributes where valley fills would be prohibited could be developed. Also, include an inventory of areas already degraded by mining; characterize likelihood of recovery and value of resource after recovery.	
Idea	20. Use mapping and inventories to increase availability of information for improved public participation in permit decision-making, especially related to cumulative impacts of other mining and fills in watersheds.	
Idea	21. Conservation agreements, similar to the agreements for the Copper-Bellied Water Snake in western Kentucky and southern Indiana/Illinois), could be established to enhance the permit process ability to avoid adverse impacts to threatened, endangered, or candidate species.	
New Idea		

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New Idea		
New Idea		
<u>Subissue B</u>	Ability of mined area reclamation practices to restore stream habitat and aquatic functions impacted by mining.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. Improve controls governing AOC variances for commercial forestry post-mining land use, such as those under development by OSM and WVDEP.	
Idea	2. Improve controls governing riparian zone restoration requirements to aid stream restoration similar to those under development in the WV interim permitting process.	
Idea	3. Continue the ongoing technical assessment of aquatic ecosystem restoration methods suited for mined land reclamations at demonstration sites and maintain a continuous link with professionals engaged in aquatic restoration nationwide.	
Idea	4. The WV interim permitting effort includes earlier involvement of Federal and state fish & wildlife experts in review of SMCRA permit applications to identify the best opportunities for restoration of aquatic values in watersheds impacted by mining. Formalize this process.	
Idea	5. Requirements for bond releases that eliminate wildlife-sensitive areas such as wetlands and small open water areas could be altered to encourage protection of wildlife and habitat.	
Idea	6. Reclamation regulations for fills could be changed to allow for more storage and/or allow different configuration to aid in minimizing the impacts associated with fills.	
Idea	7. Performance standards could be developed to promote the creation of aquatic habitat as part of reclamation, so as to promote restoration of degraded and lost aquatic habitat.	
Idea	8. A biological component could be added to hydrologic reclamation plan provisions.	
Idea	9. OSM is evaluating contemporaneous reclamation requirements. The evaluation could include judging the effectiveness of contemporaneous standards in mitigating aquatic habitat loss. Improved policies could be developed, if necessary.	
Idea	10. Use a watershed approach to achieve habitat reclamation by involving all companies mining in a watershed and watershed landowners in assessment of opportunities to restore lost aquatic values habitat.	

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Idea	11. SMCRA/CWA permit application requirements could include assessment of opportunities to replace any lost aquatic habitat values due to previous mining and valley filling within the mined watershed.	
Idea	12. Permit monitoring requirements could be established to evaluate the success of aquatic restoration initiatives as part of reclamation. This approach could be institutionalized by requiring CHIA/CWA reviews and reclamation and restoration controls on a watershed basis.	
New Idea		
New Idea		
New Idea		
<u>Subissue C</u>	Effectiveness of compensatory mitigation projects to make up for the loss of stream habitat and aquatic functions.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. The interim permitting process in WV includes an effort to augment WVDEP mitigation requirements with Federal authority under CWA 404. The intent is to require compensatory mitigation for aquatic values because of valley fills or other mining processes. Formalize this approach.	
Idea	2. The interim permitting process in WV is developing a State-Federal mitigation agreement that will result in better identification of stream restoration/compensation requirements during permit application processes. These requirements will be enforceable through permitting conditions. Institutionalize this approach	
Idea	3. To respond to potential cumulative effects of multiple small fills, clarify that compensatory mitigation is appropriate for valley fills affecting smaller than 250 acre watersheds.	
Idea	4. The interim permitting activities in WV include evaluation of State mitigation fund activities and development of a Federal-State cooperative program to identify the best aquatic restoration opportunities which could be implemented as part of compensatory mitigation for unavoidable mining impacts on watersheds (in connection with the State fish and wildlife strategy). This activity could be formalized in a state-wide inventory of stream restoration projects in need of financing.	
Idea	5. Evaluate the adequacy of compensatory mitigation measures to minimize unavoidable mining impacts and impose stricter requirements to assure "no net loss" of aquatic functions from mining operations and valley fills.	

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Idea	6. Where State mitigation funds apply, a “sliding scale” of compensation could be developed so that costs of mitigation would be commensurate with the levels of impacts--rather than compensation based on set “values per stream unit affected.”	
Idea	7. Federal oversight of mitigation could be increased, for instance, by a Memorandum of Understanding among the COE, EPA, FWS and OSM based on the principles in the Federal National Environmental Policy Act (NEPA) regulations.	
Idea	8. SMCRA and CWA requirements could be merged to establish financial liability (e.g., bonding or insurance) to assure mitigation projects are completed successfully.	
Idea	9. Incentives and credits could be developed to minimize mining and valley fill impacts. State and Federal interagency teams could be established to explore and develop incentives (credits) used to improve aquatic areas in watersheds degraded by previous mining activities. Prioritizing streams in need of restoration (as part of the inventory in Idea 4. above) will help identify good sites for credits.	
Idea	10. Mitigation credits could be issued only for the enhancement, restoration, or creation of aquatic resources and discouraged for out-of-kind mitigation, as in the current COE-EPA agreement on mitigation under CWA 404.	
Idea	11. Additional mitigation credits could be given to operations that: (a) restore an AML-impaired stream; (b) eliminate acid mine drainage; (c) dispose of excess spoil on pre-existing benches (from previous mining) in lieu of valley fill; or (d) create threatened and endangered species protection where none existed before, e.g. a mussel preserve. Credits might be given for ISO 14000-certified companies on the basis of using a wide range of best management practices.	
Idea	12. Develop innovative mitigation in partnership with other organizations, such as a fish and wildlife foundation, that shares resources and technical knowledge of federal, state and private entities.	
Idea	13. An interagency award for excellence could be established for mine operators who create a net gain of high-quality aquatic habitat.	
Idea	14. Federal-State interagency teams could be established to evaluate, modify, or develop “best practices.” A specific example would be to develop land forms that incorporate or create aquatic resources (e.g. lakes or ponds) on mined areas available for wildlife habitat and forest production.	
Idea	15. An inventory of AML restoration projects and other stream restoration projects that demonstrate successful aquatic habitat creation, restoration, or enhancement could be compiled and distributed to assist in designing successful restoration projects. Periodic technical conferences could be held to review and update this information.	

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Idea	16. Additional research could be supported by government agencies to document values of headwater streams and options for restoration/replacement of values.	
Idea	17. Working in public-private partnerships for mitigation projects which are testing new technology and methods (with evaluation of results over time) could improve mitigation.	
Idea	18. The U.S. FWS could train permit holders, federal and state agency staff, and applicants on state-of-the-art techniques to protect fish and wildlife resources.	
Idea	19. Guidance could be developed to assist industry and government representatives to implement protective measures, such as: (a) updated advice for SMCRA permit applicants on how to develop and implement better methods to protect fish, wildlife biota and habitat; (b) a federal manual for stream delineation similar to the wetland delineation manual; and, (c) guidance for best management practices to protect ecological resources.	
Idea	20. A detailed technical "how-to" manual could be developed on stream mitigation, replacement of functions (in-kind), and stream restoration.	
Idea	21. A mitigation project monitoring plan could be incorporated into permit inspection schedules.	
New Idea		
New Idea		
New Idea		
<u>Subissue D</u>	Protecting watersheds from cumulative effects of mountaintop mining/valley fill activities and other land disturbances.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. Augmenting CHIA analyses of surface mining permits to include CWA water quality and aquatic biology reviews (Idea I.A.8.) increases the state's capacity to assess cumulative watershed impacts, including consideration of non-mining impacts affecting the same watersheds. Formalize this approach.	
Idea	2. Form watershed planning groups to advise agencies on abandoned mine land reclamation, mining concerns, land use aspirations, etc.	

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Idea	3. The EIS Landscape Ecology study for assessing cumulative impacts, and associated GIS presentations, could provide a valuable long-term tool for assessing impacts of all activities to watersheds, assisting area land use analysis and planning, as well as improving public information.	
Idea	4. As part of the interim permitting activities in WV, important scientific questions about methodologies to assess compliance with water quality standards are being clarified (e.g. using dissolved metals instead of total metals for baseline and compliance monitoring; changing total recoverable to dissolved metals; and the use of “clean sampling and analysis techniques”). Adopt these techniques and standards.	
Idea	5. NEPA environmental assessment is being applied to 404 permit applications for large valley fills during the interim permit processing in WV. Such assessments include information about mining and other land-disturbing activities affecting the same watersheds. A NEPA compliance guidance document is being produced by the Corps of Engineers, with assistance from the other agencies, and guidance will be given to applicants at the earliest possible time (pre-SMCRA permit application) to facilitate coordinated permit reviews for SMCRA, CWA, Fish and Wildlife Coordination Act, and the Endangered Species Act. Based on the EIS findings, the guidance document could be updated and/or expanded	
Idea	6. Liaisons have been established from each agency to serve as an “interagency clearinghouse” on permitting decisions. This type of coordination could be formalized.	
Idea	7. An interagency team could be established to review and coordinate statutory and regulatory requirements under SMCRA and CWA to increase efficiency and environmental effectiveness of state programs to protect water resources.	
Idea	8. State water quality standards could be enhanced by development and adoption of biological criteria.	
Idea	9. CWA Section 402 permit requirements and monitoring could be revised to incorporate biological criteria and promote vegetative cover to reduce erosion and sedimentation.	
Idea	10. Establish a universal stream classification/definition for consistent application by agencies, industry, and the public. Any definition of perennial stream should take into account effects of drought conditions on year-round flow.	
Idea	11. The use of biological indices could be considered for measuring stream impacts and improvements over time where streams are affected by fills; such indices could be included in “probable hydrologic consequence (PHC) and CHIA analyses. Reference areas of undisturbed aquatic habitat could be used as a baseline to compare with mined areas to determine the magnitude of impacts and set mitigation requirements.	
Idea	12. Conduct research to evaluate the control of sediment discharges from mining activities as they combine with the sediment from activities such as timber harvesting and road building/use.	

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Idea	13. Develop government-sponsored training for industry on environmental impact assessment, monitoring, remediation, mitigation, impact avoidance methods, etc.	
Idea	14. Academic programs sponsored by universities in Appalachia could offer training on headwater stream values and other aquatic resources. Public-private assistance could be provided to establish regional centers of excellence on improved watershed assessment tools and indices of aquatic resource health, and on aquatic area enhancement techniques.	
Idea	15. State GIS capabilities could be enhanced to allow for in-depth watershed-based analysis of permits, environmental consequences, alternatives, and mitigation scenarios that could then be accessed by all State and Federal agencies, as well as other stakeholders.	
Idea	16. Support increased capabilities of State environmental agencies to interpret and analyze information and data, and increase coordination between State environmental and fish and wildlife agencies.	
Idea	17. A regional hydrologic database/GIS could be developed to include all baseline hydrologic (chemical, biological, physical) monitoring data for use in PHC and CHIA or landscape ecology.	
Idea	18. Building on the Clean Water Action Plan initiatives, an "Appalachian Highlands" stream monitoring/Watershed Assessment network could be established to integrate Federal, State, applicant, and citizen monitoring in the watersheds affected by mountaintop mining and valley fills.	
Idea	19. Mining companies could be encouraged to establish more consistent and effective outreach with citizens and local communities in watersheds affected by their operations. If done on a watershed basis, all companies with operations in a watershed could cooperate to foster better understanding of current and proposed mining operations and their effects, for example, by hosting annual "state of the watershed meetings" involving local officials, citizens and university experts.	
Idea	20. To improve watershed protection, CWA authorities are developing "total maximum daily load" (TMDL) requirements for pollutants. These currently apply to polluted streams rather than to mountain headwater areas, but similar water quality assessments could be established on a preventive basis, for use in assessing and managing mining and non-mining discharges in the same watershed.	
Idea	21. A system to submit electronic application data could be developed that would satisfy all State and Federal baseline data and analysis requirements and allow for public access.	
Idea	22. Cross training on watershed planning and resource management could be provided for staff of federal and state agencies and details could be initiated to exchange personnel between agencies.	

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Idea	23. Options for improving efficiency could include changing the sequence of permitting to allow consideration of 402 effluent limitations in PHCs; industry preparation of the first draft of CHIA and 404(b)(1) analysis documents as part of the SMCRA application submission; and an expedited SMCRA permitting process for non-fill mining activities.	
Idea	24. Guidance could be developed to assist the applicants in collection of biological stream data. A program could be established to assure the integrity of any self monitoring of mining compliance with environmental safeguards. Quality assurance and control plans could be developed for acceptance of third-party data and the data could be provided to stakeholders.	
Idea	25. The frequency of CWA permit compliance inspections could be increased in order to give the public confidence in the self-monitoring data.	
Idea	26. Establish a system for evaluating frequency and impact of sediment overflow (e.g. from sediment retention ponds) to determine if additional controls are necessary.	
New Idea		
New Idea		
New Idea		

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CATEGORY II ISSUES		
<u>Issue 2 - Impacts on Communities</u>		
<u>Subissue A</u>	Effects of blasting and other mining activities on homes, water wells, and quality of life.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. OSM is collecting information nationally to catalog blasting citizens complaints. This data will illustrate the diverse nature of the complaints (e.g. noise, dust, structure damage, water supply diminution, etc ...), spatial relationship between the adverse effect and blast, the compliance methods used by the company (seismic monitoring, scaled distance etc ...) , and mitigation measures used, the magnitude and pattern of the blast, and follow-up actions by the regulatory authority. The EIS will consider relevant information from this study to recommend actions.	
Idea	2. WVDEP is preparing regulations for implementing the new Office of Blasting as required by WV Senate Bill 681. This will provide an administrative process for handling nuisance complaints related to blasting.	
Idea	3. Establish an informal mediation, alternative dispute resolution process, or frequent facilitated discussion sessions to promote dialogue/mutual trust, and resolve disputes between citizens and mining companies.	
Idea	4. Increase outreach by regulators and potentially-affected citizens adjacent to proposed or approved mining operations for the purpose of explaining citizen rights for application review, complaint filing and resolution, and to generally explain mining process/consequences or answer other questions.	
New Idea		

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<u>Subissue B</u>	Effects of fugitive dust--both as a nuisance and a health risk.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. Currently, there are limited statutory or regulatory controls for fugitive dust and fumes from blasting. The EIS will make recommendations based upon the findings of the West Virginia University study related to this issue.	
Idea	2. Promote better methods (e.g., BMPs) for controlling fugitive dust and blasting fumes.	
Idea	3. Evaluate the need for additional research of the health impact of fugitive dust and blasting fumes.	
New Idea		
New Idea		
New Idea		
<u>Subissue C</u>	Effects from mountaintop mining on flooding of downstream communities.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. OSM has established an internal team to develop revised guidance for the development of PHC and CHIA analysis. Finalize this effort as soon as possible.	
Idea	2. An EIS technical study is evaluating peak runoff downstream of mountaintop mining and valley fill sites to determine whether stream channels could overflow and causing flooding. A recent flooding analysis of Island Creek was conducted, evaluating the "worst-case" cumulative impacts of multiple mining sites. Consider recommendations for program changes, if necessary, on the basis of these studies.	
New Idea		
New Idea		
<u>Subissue D</u>	Valley fill stability.	<i>Priority Ranking (1-high, 2, 3-low)</i>

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Idea	1. The EIS includes a technical study documenting past fill failures and evaluating the effectiveness of existing program requirements to ensure the stability of excess spoil fills. Consider recommendations for program changes, if necessary, on the basis of these studies.	
New Idea		
New Idea		
<u>Subissue E</u>	Ability for reclaimed mined land to provide an economic and/or social benefit to coal field communities.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. Develop ways to improve communication and coordination among government regulators, officials charged with economic development, local government officials, and coal companies, to integrate their plans and develop local economies.	
Idea	2. OSM issued draft post-mining land use policy guidance for steep slope variances from the approximate original contour (AOC) requirement and mountaintop removal. The final policy could promote that reclamation plans for AOC variances enhance the long-term economic viability of coal field communities (e.g. business ventures, tourism, recreational and other public facilities).	
Idea	3. WVDEP is developing rules for “homesteading” reclaimed mine land tracts to low-income eligible people as a residential post-mining land use. Assess whether comparable Federal standards should be developed or that other states consider similar approaches.	
Idea	4. Following the OSM policy on post mining land use, States should consider developing guidance on site criteria necessary for each category of post-mining land use (infrastructure specifications, site preparation performance standards, crop or forestry yield targets, normal/typical animal husbandry practices, industrial classification expectations etc.).	
New Idea		
New Idea		

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Subissue F.	Effects of mining on scenery and culturally significant landscapes.	Priority Ranking (1-high, 2, 3-low)
Idea	1. WVDEP and OSM are piloting the development of policy guidance for use in mining application development and permit review that would determine the amount of spoil that must be placed in the mined area to achieve the SMCRA requirement of approximate original contour (AOC). Application of AOC requirements should minimize the impacts to view sheds especially if the reclaimed land is reforested.	
Idea	2. Establish procedures for early communication among coal companies, landowners, and the local citizens to discuss final land form development, land use potential and mining-related impacts/concerns.	
Idea	3. The EIS includes a cooperative effort with experts to assess the feasibility of reclamation mimicking natural land forms of the area and incorporating water resources (e.g., ponds or lakes). Encourage application of these concepts to SMCRA Title V and IV reclamation to promote more natural scenery.	
Idea	4. Create "land trusts," mitigation "banking" of pristine areas, or other creative mitigation techniques (such as AML reclamation) to offset active mining approvals.	
New Idea		
New Idea		
New Ideas		
Issue 3 - Terrestrial impacts		
Subissue A	Effects of mountaintop mining on plants and wildlife, including unique/endangered species.	Priority Ranking (1-high, 2, 3-low)
Idea	1. Use public/private partnerships (like the Appalachian Wildlife or Forestry Council) with local/regional stakeholder input/participation to identify and protect wildlife assets, create and delineate wildlife refuges, publicize wildlife assets, promote conservation and wildlife area protection initiatives.	

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Idea	2. Support research to identify the success and failings of previous wildlife enhancement reclamation plans (at active and abandoned mines), to come up with better ways to reclaim mine sites to reintroduce wildlife and native plant species, and to improve wildlife revegetation schemes based on species trend data information.	
Idea	3. Support OSM evaluation of the contemporaneous reclamation rule to assure reclamation proceeds as quickly as possible to restore impacted habitats.	
Idea	4. Develop and use a process to delineate and characterize terrestrial habitat, areas that support threatened and endangered species, and other valuable resources.	
Idea	5. Improve the State fish and wildlife plans for enhancing / preserving ecological stability, and use these plans in conjunction as a guide for post mining land use decisions.	
Idea	6. Consider establishing mitigation credit for mining companies who set aside special areas for: 1) breeding habitat, and other general protection of threatened and/or endangered species (e.g. a mussel preserve) where none previously existed; or 2) establishing a wilderness area.	
Idea	7. Form a government/stakeholder team to develop guidance to promote consistent, clear definitions of terms (e.g., native species and land cover, revegetation terminology, etc.) and biological impact thresholds for use in state/Federal programs.	
New Idea		
New Idea		
<u>Subissue B</u>	Effects of deforestation and reduction/fragmentation of forested areas by mountaintop mining.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. WVDEP is developing specific requirements for restoring mountaintop mine sites to commercial forestry.	
Idea	2. During the permitting process, consistently address fish and wildlife enhancement considerations when commercial forestry is proposed as a post mining land use.	
Idea	3. OSM through policy is clarifying the criteria for approving low-intensity agricultural activities (e.g. hayland) when an AOC variance is sought by the mining company.	

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Idea	4. Assist States to incorporate into their respective SMCRA based regulatory programs the land category “commercial forestry” as an viable post-mining land use for mountaintop removal mines.	
Idea	5. Evaluate and recommend a process that encourages the re-establishment of riparian zone reforestation in all previous riparian-forested watersheds, regardless of the type of post-mining land use approved (similar to no net-loss wetland mitigation).	
Idea	6. OSM’s reforestation initiative promotes the technical transfer of “best practices” regarding the growing of trees and woody shrubs on reclaimed mined sites. Support the OSM initiative by recommending reclamation practices that enhance reforestation with species of high-value wood product potential (such as placement of a sufficient thickness of loose-graded spoil, oxidized layer of overburden, and organic material in an un-compacted bed for seedling/root stock establishment).	
Idea	7. Evaluate the feasibility of establishing a system for on-site management of organic wastes (e.g., composting “root wads” and other biomass) to generate on-site dissolved organic carbon to offset mining impacts on headwater streams.	
New Idea	8. Mandate use of BMPs for recycling of non-harvestable forestry products or biomass encountered during the mining process (e.g., use as a replacement for leaf litter in commercial or forestry post-mining land use instead of burning).	
New Idea		
New Idea		
<u>Subissue C</u>	Cumulative effects on the environment from mining and other land disturbances	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. Encourage watershed assessment of the terrestrial impacts of all significant land use disturbances (i.e., not limited to mining). The assessment protocol might include consideration of regional areas, so as to properly assess cumulative impacts (e.g., evaluate population trends over areas larger than watersheds).	
Idea	2. Document and quantify the positive impacts of remining on environmental restoration (improvement of water quality, habitat, ecosystem, safety hazards, etc.).	
New Idea	3. The EIS landscape ecology study will include the development of thresholds that could be considered by States to assess cumulative terrestrial effects.	

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New Idea		
New Idea		
<u>Subissue D</u>	Effects of mountaintop mining on biodiversity and sustainability.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1. FWS, in cooperation with State fish and wildlife agencies, could develop guidance, to promote biodiversity, biological sustainability, and re-introduction of native plants and animals.	
Idea	2. Conduct research, possibly borrowing from other fields of environmental restoration to develop technologies that would speed natural succession changes following mining; and methods encouraging long-term management fostering wildlife.	
Idea	3. Explore options to provide flexibility in SMCRA valley fill configuration requirements to build land forms that will enhance terrestrial habitat.	
New Idea		
New Idea		
<u>Subissue E</u>	Concerns that current mountaintop mining reclamation practices introduce and increase exotic and invasive plant species.	<i>Priority Ranking (1-high, 2, 3-low)</i>
Idea	1 State/Federal fish and wildlife agencies could develop policies, procedures, or best management practices to 1) list "species of concern" that should be avoided in reclamation; 2) foster the re-introduction of native plants and wildlife; and, 3) support biodiversity goals.	
Idea	2 Provide training and guidance to familiarize state agency staff and applicants' personnel with identification of exotic and invasive plant species and ways to discourage invasion onto reclaimed mine sites.	
New Idea		

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CATEGORY III - OTHER ISSUES TO BE ANALYZED BY THE EIS	<i>Priority Ranking (1-high, 2, 3-low)</i>
Effects of further restrictions on mining on the competitiveness of Appalachian coal, employment and coal field communities' businesses and tax revenues	
Effects on utility rates from further restrictions on large scale mining	
Effects of mining on global climate change	

APPENDIX B

**PROGRAMMATIC REVIEWS OF STATUTES AND
REGULATIONS, STATUTE AND EXECUTIVE ORDER
SUMMARIES, REGULATORY PROCESS FLOWCHARTS, AND
STREAM DEFINITIONS**

Programmatic Review

Deliverable Form

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Human and Community

Session: 4

Issue: How do SMCRA regulatory programs and associated guidance address the issue of protecting air resources?

Areas to be considered include: Air resources include fugitive dust, global climate change, Sulfur dioxide, Volatile organic compounds.

Summary of the Effects of Relevant Statutes, Regulations and Policies

Section 515(b)(4) of SMCRA provides that “. . . all surface coal mining and reclamation operations must stabilize and protect all surface areas . . . to effectively control erosion and attendant air and water pollution.” Shortly after the passage of SMCRA, OSM determined that fugitive dust associated with surface mining activities constituted a public health and safety problem, and in 1979, promulgated rules requiring operators to control air pollution from all their mining operations. In 1980, a United States District Court struck down and remanded the rules for revision, because it determined that SMCRA’s legislative history indicates that OSM’s authority to regulate air pollution is limited to activities related to erosion [In re: Permanent Surface Mining Regulation Litigation, C.A. 79-1144 (D.D.C., May 16, 1980)].

OSM re-promulgated its rules regulating air pollution from surface coal mining and reclamation operations in 1983. The Federal performance standards at 30 CFR 816.95 require all exposed areas of surface mining operations to be protected and stabilized to effectively control erosion and air pollution attendant to erosion. This is usually accomplished through the application of mulch to reclaimed areas after backfilling and regrading and the watering of unpaved haul roads.

In 1988, the U.S. Court of Appeals reaffirmed the district court’s ruling finding that OSM’s role in controlling air pollution is limited to pollution attendant to erosion. The Appeals Court found that EPA has the authority under the Clean Air Act (CAA) to regulate fugitive dust from surface mining operations [NWF v. Hodel, C.A. 84-5743 (U.S. Court of Appeals D.C. Circuit, January 29, 1988)].

Applicable Statutory Provisions

Permit Application Requirements

SMCRA section 508(a)

Each reclamation plan submitted as part of a permit application pursuant to any approved State program or a Federal program under the provisions of this Act shall include, in the degree of detail necessary to demonstrate that reclamation required by the State or Federal program can be accomplished, a statement of:

* * *

(9) the steps to be taken to comply with applicable air and water quality laws and regulations and any applicable health and safety standards;

* * *

Performance Requirements

SMCRA section 515(b)

General performance standards shall be applicable to all surface coal mining and reclamation operations and shall require the operation as a minimum to --

* * *

(4) stabilize and protect all surface areas including spoil piles affected by the surface coal mining and reclamation operation to effectively control erosion and attendant air and water pollution;

* * *

Applicable Regulations

Permit application requirements

Title 30 Code of Federal Regulations Section 780.15

(a) For all surface mining activities with projected production rates exceeding 1,000,000 tons of coal per year and located west of the 100th meridian west longitude, the application shall contain an air pollution control plan which includes the following:

(1) An air quality monitoring program to provide sufficient data to evaluate the effectiveness of the fugitive dust control practices proposed under Paragraph (a)(2) of this Section to comply with Federal and State air quality standards; and

(2) A plan for fugitive dust control practices as required under Section 816.95 of this Chapter.

(b) For all other surface mining activities the application shall contain an air pollution control plan which includes the following:

(1) An air quality monitoring program, if required by the regulatory authority, to provide sufficient data to evaluate the effectiveness of the fugitive dust control practices under Paragraph (b)(2) of this Section to comply with applicable Federal and State air quality standards; and

(2) A plan for fugitive dust control practices, as required under Section 816.95 of this Chapter.

Performance Standards

Title 30 Code of Federal Regulations Section 816.95

(a) All exposed surface areas shall be protected and stabilized to effectively control erosion and air pollution attendant to erosion.

(b) Rills and gullies, which form in areas that have been regraded and topsoiled and which either (1) Disrupt the approved postmining land use or the reestablishment of the vegetative cover, or (2) Cause or contribute to a violation of water-quality standards for receiving streams; shall be filled, regraded, or otherwise stabilized; topsoil shall be replaced; and the areas shall be reseeded or replanted.

Applicable Policies

None

EOF

APPENDIX B: PROGRAMMATIC REVIEWS

Introduction

This appendix presents a summary of statutory and regulatory controls in place in 1998 (the beginning of the EIS process) to protect aquatic, terrestrial and community resources. The first part of this appendix presents agency specific programmatic reviews. These programmatic reviews were part of the agencies review of their respective program requirements to determine whether adequate regulatory controls and coordination processes exist among the various programs. The programmatic reviews are organized by agency, resource and issue statement.

The second part of this appendix presents summaries of the primary federal statutes, regulations and executive orders governing aspects of MTM/VF activities. This includes summaries of the Surface Mining Control and Reclamation Act (SMCRA), Clean Water Act (CWA) 402 and CWA 404 , Clean Air Act (CAA), Endangered Species Act (ESA), Fish and Wildlife Coordination Act and Executive Orders for the protection of wetlands and floodplains.

The third part of this appendix presents agency regulatory process flow charts. These flow charts depict the statutory/regulatory processes of the agencies that have jurisdiction over MTM/VF operations, with West Virginia as an example of a state with primacy under SMCRA.

The fourth part of this appendix presents various stream definitions that were in place at the beginning of this EIS process.

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Programmatic Reviews

Agency Involved: Environmental Protection Agency

Domain: Aquatic Resources

Issue: What are the short and long-term effects of individual mountaintop mining operations and associated valley fills on aquatic resources within, adjacent to and downstream of the mined and filled areas?

Values identified:

- (A) Streams, ponds, lakes and rivers:
 - (1) Quality - (a) chemical, (b) sedimentation and (c) temperature
 - (2) Quantity - (a) baseline flow alteration; (b) flooding
 - (3) Biological - (a) aquatic biota and habitat
- (B) Groundwater: (1) Quality; and (2) Quantity
- (C) Wetlands

Summary of Relevant Statutes, Regulations and Policies

The Federal Water Pollution Control Act, commonly known as the “**Clean Water Act**” (CWA) is the basic Federal statute for protecting **surface water quality**. Although there are no regulatory provisions in the law relating to **groundwater** protection, certain provisions can touch upon groundwater quality and quantity. **Wetlands** are considered "waters of the U.S." under the law, and protected by the law's provisions to the same extent as other waters. The law does not regulate surface water quantity, although impacts associated with surface or groundwater quantity can be taken into consideration under certain provisions - notably sec. 404, regulating the discharge of dredged or fill material.

I. General overview

Goal of Act: To restore and maintain the chemical, physical and biological integrity of the Nation's waters. 33 U.S.C. 1251(a)

There are a number of statutory provisions of the CWA which are relevant to the regulation of mountaintop mining and associated valley fills, including:

- Research and monitoring, and funding of State water quality programs (Title I)
- Funds for carrying out water pollution control programs under State Revolving Loan Funds, which could include stream cleanup and restoration activities in areas affected by mountaintop mining (Title VI)

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- Establishment and implementation of water quality standards; identification of impaired waters and development of cleanup requirements (Total Maximum Daily Loads or TMDLs; and development and implementation of programs to control non-point sources of pollution (Title III)
- Permit and enforcement programs controlling discharges of pollution, including discharges of fill material (Title IV)
- Definitions, judicial review, citizen suit provisions and other general matters (Title V)

II. Scope of Jurisdiction: What Waters are Covered by the Act?

The CWA applies to "navigable waters," which are defined as "waters of the United States, including the territorial seas." CWA sec. 502(7) This definition is not limited to waters that are actually navigable. Rather, Congress intended to give navigable waters the broadest possible constitutional interpretation, limited only by the boundaries of the Commerce Clause. EPA regulations (40 CFR Part 122.2) define waters of the U.S. to include:

- interstate waters, including interstate wetlands;
- all waters which are currently used, were used in the past, or may be susceptible to use interstate or foreign commerce...;
- territorial seas;
- wetlands adjacent to U.S. waters; and
- other "isolated" waters (such as intrastate lakes, wetlands, rivers, streams, mudflats, sandflats, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds), having a requisite connection with interstate commerce.

Waste treatment systems and certain areas that were converted for agricultural use prior to 1985 are not waters of the U.S. See 40 CFR Part 122.2.

III. What Activities are Regulated by the Clean Water Act?

The Act regulates the "discharge of a pollutant," which is defined as an "addition" of a "pollutant" from a "point source." CWA sec. 301(a), 502(12). The Act defines "pollutant" as:

...dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discharged equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water.... CWA sec. 502(6)

The Act defines "point source" as:

...any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

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The scope of "point source" extends far beyond industrial and municipal discharges, and has been found to include, for example, channelized stormwater runoff, unintentional overflows from mining spoil piles, and bulldozers and backhoes dumping fill material into wetlands (waters of the U.S.). However, there is a specific exemption from point source permitting under sec. 402 for stormwater runoff from mining operations which is composed "entirely of flows which are from conveyances...used for collecting and conveying precipitation runoff and which are not contaminated by contact with, or do not come into contact with, any overburden, raw material, intermediate products, finished product, byproduct, or waste products located on the site of such operations." 33 U.S.C. 1342(1)(2).

A facility "adds" pollutants where it introduces them into the waterbody from the outside world. Each discharge of pollutants from a point source to waters of the U.S. requires a permit under the CWA. Permits for the discharge of dredged or fill material are issued under sec. 404 of the CWA by the Army Corps of Engineers (or an authorized State). All other permits are issued under sec. 402 by EPA (or an authorized State). (Sec. 402 permits are named "National Pollutant Discharge Elimination System" or NPDES permits.) Absent a permit, the discharge of pollutants from any point source is unlawful. 33 U.S.C. 1311.

Fact Sheets are included in Appendix B which describe the **NPDES Permit Program** (Pages B-159 through B-161) and the **Section 404 Program** (Pages B-173 through B-177) for regulating dredged and fill material disposal (concentrating on EPA's responsibilities). In the Appalachian Coalfield region, all of the States have been authorized to administer the NPDES program. No States have been authorized to administer the sec. 404 permit program.

General NPDES Requirements

Discharges of pollutants through point sources to waters of the United States require permits issued under the National Pollutant Discharge Elimination System (NPDES) program, authorized by the Clean Water Act (CWA). While it retains oversight authority, the U.S. Environmental Protection Agency (EPA) has delegated the permitting and compliance authorities of the NPDES program to West Virginia, Kentucky, and Virginia, as well as all of the other coal mining states in the eastern U.S. For the mining industry, NPDES permits are required for all chemical treatment and sedimentation pond outfalls, including in-stream ponds associated with valley fills. NPDES permits include effluent limits and requirements for self-monitoring and submitting the results to the NPDES authorities on discharge monitoring reports (DMRs). NPDES permits are issued for five year periods and applications for reissuance are required 180 days prior to permit expiration. General permits, rather than individual permits, may be issued by state NPDES authorities for some mining categories, if approved by EPA. In its oversight authority, EPA may review, comment on, and, where not in compliance with NPDES regulations or CWA, object to draft NPDES permits for mining. EPA Region III routinely receives draft NPDES permits for mining facilities with valley fills and coordinates its review with Region III's CWA Section 404 program. EPA does not normally review DMRs for mining facilities, except for those specifically classified as major permits. However, EPA Region III periodically visits NPDES program offices in its coal states, including West Virginia and Virginia, and reviews permitting and compliance actions, including DMRs.

State NPDES Permitting Authorities

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NPDES permits for municipalities and most industries are normally handled by the respective state's water protection agency. However, since mines are required to undergo very comprehensive application reviews and permitting under the Surface Mining Control and Reclamation Act (SMCRA) - delegated to West Virginia, Kentucky, and Virginia by the Office of Surface Mining, U.S. Department of the Interior - some states have elected to provide joint SMCRA/NPDES application reviews and permitting.

West Virginia

The Office of Mining and Reclamation under the Division of Environmental Protection (DEP) provides joint reviews of SMCRA and NPDES permit applications, issuance of SMCRA permits, and the drafting of NPDES permits. The Office of Water Resources, DEP, is the NPDES authority and issues the NPDES permits after coordinating with the Office of Mining and Reclamation.

Kentucky

The Division of Water under the Department for Environmental Protection provides NPDES reviews and permitting separately from SMCRA permitting, which is provided by the Department for Surface Mining.

Virginia

The Division of Mined Land Reclamation under the Department of Mines, Minerals, and Energy is the authority for both the SMCRA and NPDES mining programs. Joint SMCRA and NPDES applications are reviewed and joint permits are issued by the Division.

Effluent Limits

Discharges subject to NPDES permits must meet either technology-based limits or more stringent water-quality based limits, if required to comply with water quality standards of the receiving stream.

Technology-Based Limits

NPDES effluent guideline regulations for the mining industry are established in 40 CFR 434 and cover iron, manganese, pH, suspended solids, and settleable solids. Specific limits are provided for active and reclamation phases of underground mining, surface mining, preparation plants, and refuse disposal. These limits are based on conventional or exemplary treatment levels determined economically achievable - typically neutralization, precipitation, and settling for metals, and just settling for sediment runoff. 40 CFR 434 effluent limits for surface mines including mountaintop mines and valley fills (only if water quality-based limits are not required) are listed below:

- pH - 6.0-9.0 range applicable at all times; exception - a slight increase allowed if treating for manganese
- total iron - 3.0 mg/l monthly avg.; 6.0 mg/l daily avg.*
- total manganese - 2.0 mg/l monthly avg.; 4.0 mg/l daily avg. (applicable where raw drainage has pH under 6.0 or total iron of 10 mg/l or more)
- total suspended solids - 30.0 mg/l monthly avg.; 60.0 mg/l daily avg.
- alternative storm limits; generally applicable when the discharge is caused or increased by a precipitation event within a 24 hour period

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- 0.5 ml/l settleable solids limit applicable at all times; replaces total suspended solids limits
- no iron and manganese limits during this period
- does not apply to refuse fills except during intense storms (1 yr/24 hr or greater)

* (monthly average is defined as the average over any 30 consecutive day period and daily average is the average over any single day).

For other pollutants which may be of concern and not covered by the guidelines, such as aluminum, effluent limits may be determined by best professional judgement (BPJ). 40 CFR 434 limits are applicable until the final SMCRA bond has been released. If pollutant discharges reoccur after bond release, an NPDES permit is required with limits based on BPJ or water quality, if necessary to comply with water quality standards.

Water Quality-Based Limits

Where the 40 CFR 434 effluent guideline limits would not comply with water quality standards for the receiving stream, more stringent limits must be required. There are two common situations where this would occur. First, where the discharge is from an in-stream sedimentation pond constructed at the toe of a valley fill at a location where water quality standards are applicable. The effluent limit should equal the stream water quality standards. Second, where the discharge is large in comparison to the receiving stream, such as water pumped from an underground mine into a stream during summer dry periods. An example for determining a water quality-based limit in this example would be where the mine has a discharge of twice the receiving stream flow. In order to comply with a 1.5 mg/l iron water quality standard in the stream, the discharge would be limited to about 2.3 mg/l rather than the 3.0 mg/l guideline limit, assuming no iron in the upstream portion and that utilization of the whole stream capacity would be allowable to meet water quality standards.

Sedimentation ponds are expected to be located as close as feasible to the toes of valley fills and to each other if in series, in order to minimize adverse stream impacts. Then the outfall of the farthest pond downstream may be considered the permitted outfall. If, however, a pond is located an excessive distance downstream from the toe of a valley fill, the stream stretch in between may be considered applicable to water quality standards and a water quality-based permit may be required for the discharge directly from the toe of the valley fill.

Compliance

Review of discharge monitoring reports submitted by permittees is the major compliance tool for the NPDES program, since inspections are not required by NPDES regulations except for major permits, then only yearly. Discharges from active mines are generally required to be sampled at least twice monthly by permittees and reports submitted quarterly. Compliance actions under CWA for significant violations can range from administrative orders to civil or criminal penalties depending on the severity, willfulness, and other factors. Fortunately for the NPDES program, SMCRA regulations require monthly inspections with quarterly discharge sampling and also require compliance with the same effluent limits as NPDES permits. Violations of effluent limits found by SMCRA inspections are also considered as violations of NPDES permits. However, since SMCRA regulations require non-discretionary compliance actions for all violations, penalties under CWA usually are not applied unless the violations result in significant water quality impacts, such as fish kills.

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Specific State NPDES Approaches and Issues

Although the preceding general information on NPDES requirements applies to West Virginia, Kentucky, and Virginia, each of these states has some variations in the permitting of discharges associated with mountaintop mines and valley fills. These variations along with other pertinent issues include the following:

Individual vs General Permits

- West Virginia - General permits are approved for alkaline surface mines including those with valley fills which cover ephemeral streams - those which flow only in response wet weather. Discharges from these fills require 40 CFR 434 technology-based limits only.
- Kentucky - General permits apply to all surface mines, including mountaintop mines, contour mines and others with valley fills. However, on a case by case basis, water quality-based effluent limits may be a required condition.
- Virginia - All permits are issued on an individual basis in a combined SMCRA/NPDES permit document.

Technology-Based Limits

- West Virginia - 40 CFR 434 plus aluminum where close proximity to trout streams.
- Kentucky - 40 CFR 434 only.
- Virginia - 40 CFR 434 only.

Applicable State Water Quality Standards

- West Virginia - Includes total iron (1.5 mg/l normal; 1.0 mg/l trout), total manganese (1.0 mg/l); pH (6.0-9.0 range), aluminum, and other metals, but no suspended solids.
- Kentucky - Includes similar standards for iron, manganese, pH, aluminum, other metals, but no suspended solids.
- Virginia - Includes only pH; no numerical criteria for iron, manganese, aluminum other metals, or suspended solids.

Water Quality-Based Effluent Limits

- West Virginia - Requires iron, manganese, and pH (same as tech-based) water quality standards for effluent limits for discharges from the outfall of any final in-stream sedimentation pond below a having a drainage area more than 250 acres. Also, in-stream ponds with drainage areas between 200 and 250 acre watersheds may be required to have water quality-based limit depending on environmental factors. Ponds associated with fills in ephemeral streams do not have water quality-based limits. Discharges in close proximity to trout waters may have aluminum wq-based limits.

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- **Kentucky - Requires wq-based limits on a case-by-case basis when there is a specific concern about protecting downstream aquatic life. Kentucky requires compliance with water quality standards between the toes of valley fills and in-stream sedimentation ponds if not very near the valley fill.**
- Virginia - Has no numerical water quality standards criteria for metals; no wq-based limits.

Use of NPDES Form 2C Application Data on Metals (1 sample/5 yr) for Reissuance

- West Virginia - Screens for excessive levels; if found - requires additional sampling. No past indications of additional metals needing to be limited in permit.
- Kentucky - 2C not viewed as pertinent data, since usually a grab sample.
- Virginia - Does not require 2C information from permittee. Instead, the Division conducts sampling on metals at least once during the 5 year permit life. Uses this more reliable data to indicate need for either additional sampling, correcting the problem, or placing an additional limit in the permit (this has not been determined necessary).

Protection of Downstream Trout or Mussels Waters

- West Virginia - Aluminum limits required for trout and special attention to compliance with solids limits for mussels.
- Kentucky - Case by case evaluation where high quality waters are involved.
- Virginia - No special effluent limits but increased attention to compliance. Reduction of endangered mussels has been a continuing concern in the Clinch and Powell River Basins and mining in general has been suspect. Continued attention to this situation is expected, particularly by the U.S. Fish and Wildlife Service, the federal authority for protecting threatened and endangered species.

Biomonitoring

- West Virginia - Baseline benthic surveys are usually conducted on streams below proposed valley fills having more than 250 acre drainage areas either by the permit applicant or the state. This is primarily to provide an assessment of permanent stream loss due to fills and temporary loss due to in-stream sedimentation ponds. It may also be used to help determine downstream impacts. In some cases, stream benthic surveys may be required during the life of the mining operation. Also, toxicity tests are run on pond effluents on a case by case basis, particularly where manganese discharges and potential over treatment with alkaline reagents are a concern.
- Kentucky - Stream biomonitoring is not conducted as a part of the permitting process, but may be provided on a case by case basis after operation where aquatic life impacts are a concern.

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• **Virginia - Similar to Kentucky, biomonitoring may be conducted on a case by case basis on streams below discharges where aquatic life impacts are a concern.**

Metals, pH concerns

West Virginia, Kentucky, and Virginia - Most of the mountaintop and other steep slope mining activities which have valley fills are located in areas where the coal seams and overlying rock strata are generally alkaline. Acid-base accounting procedures are used to determine if the excess spoil, after being intermixed, will provide an alkaline discharge. However, iron, manganese, and acid producing materials can and do occur in isolated seams and overlying shales in some areas. Standard procedures are to segregate this material off to the side during mining and isolate it in the backfill during reclamation by placing it up and off the rock pavement and, where necessary, intermixing it or overlaying it with alkaline material for neutralization. The goal is to keep any acidic or metal bearing material from being leached out by infiltration down through the fill or by groundwater drainage along the rock pavement and also to assure that any leachate that does occur is not acidic. The material is not allowed to be placed within a valley fill. A concern in West Virginia has been the presence of manganese in some mines with valley fills where water quality standards apply at the discharge. Treatment of manganese often requires maintaining pH levels in the 9-10 range in order to meet the 1.0 mg/l water quality standard for the stream, and over treatment with alkaline materials can have caused violations of the 9.0 maximum pH stream standard.

Suspended and Settleable Solids Concerns

West Virginia, Kentucky, and Virginia - Excess solids discharges from sedimentation ponds serving surface mines in steep slope areas - including mountaintop mines and contour mines - present the greatest potential water quality and aquatic life concerns in West Virginia, Kentucky, and Virginia. These ponds include in-stream sedimentation ponds serving valley fills, on-site sedimentation ponds for general storm runoff, and also on-bench sedimentation ditches which are segmented into a series of retention cells. In all of these states, sedimentation control ponds have a single design criteria based on SMCRA regulations to provide adequate settling: 0.125 acre-ft of volume per disturbed acre draining to the pond (or about 200 cubic yards of pond volume per acre of disturbed area). SMCRA regulations require clean out of the ponds when 60 percent full of solids in order to provide adequate detention and settling time. Discharge monitoring reports and inspections generally indicate compliance with 40 CFR 434 effluent limits for suspended and settleable solids, although the 0.125 acre-ft/acre criteria is not specifically designed to achieve these limits. Sampling by permittees and inspectors occurs at various periods - during, immediately after, and in between rainfall events. However, to evaluate the true effectiveness of sediment control facilities, more sampling should be performed during the critical period - in the middle of a storm event when flows through ponds and sediment cells are peaking.

IV. Establishment of Limitations for Point Source Discharges

NPDES: There are three types of limitations on discharges: (1) technology-based; (2) water quality standard-based; and (3) toxic effluent standards (for six pollutants).

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404: Limitations on discharges of dredged or fill material are developed under (1) EPA's 404(b)(1) Guidelines (which are regulations); (2) water quality standard-based, pursuant to State certification under sec. 401; and (3) the Army Corps of Engineers 404 permit regulations.

The Fact Sheet on the **Section 404 Program** noted above outlines requirements of EPA's 404(b)(1) Guidelines. See also the discussion below on **Section 401 State Certification**.

Discussed below are the three types of limitations for NPDES permits, which are imposed by provisions in Title III of the CWA.

V. Technology-based Limitations on Discharges

One of the principal purposes of the landmark 1972 Clean Water Act was to establish levels of effluent treatment which would have to be achieved for all discharges -- co-called "technology-based limits" because the effluent quality performance requirements ("effluent limits") are set after evaluation of the performance of pollution prevention and control technologies for different types of discharges. Requirements have been established for a number of industrial waste discharges, including discharges from coal mining, under nationwide EPA regulations called "Effluent Limitation Guidelines." (See Fact Sheet for **Effluent Limitation Guidelines for Coal Mining** in Appendix B pages B-24 through B-27).

All NPDES permits must contain requirements for permittees to meet effluent quality limits based on performance of control technologies. If an Effluent Guideline has been promulgated for the waste stream(s) regulated in an NPDES permit, the permit limits must be based on that regulation. Where discharge streams are not controlled by these EPA nationwide regulations, NPDES permit writers must establish such limits based on best professional judgment, taking into account the same statutory factors outlined below under the different technology categories.

Although the effluent limits are established based upon the performance of certain reference technologies, permittees are not required to use the reference technologies to meet the limitations (with the exception of a "best management practice" established under 304(e) of the Act).

There are several levels of technology-based requirements, according to type of pollutant and to whether the permittee is an existing facility or a new discharger:

- **Best Practicable Technology ("BPT")** BPT is the first level of control for all pollutants, and was to be achieved by July 1, 1977. 33 U.S.C. 1311(b)(1)(A) In considering what is "practicable," EPA considers a number of factors: (1) the age of the equipment and facilities involved; (2) the process employed; (3) the engineering aspects of applying various types of control techniques; (4) process changes; (5) non-water quality environmental impacts, including energy requirements; and (5) other factors as deemed appropriate. In addition, EPA may consider the total costs of applying a technology in relation to the effluent reduction benefits (e.g. incremental cost per quantity of a pollutant removed from the waste stream).
- **Best Conventional Pollutant Control Technology ("BCT")** BCT is the second level of control for conventional pollutants: oil and grease, biological oxygen demand, fecal coliform, pH and total suspended solids. BCT limits for conventional pollutants exceed BPT limits only where they are "cost-reasonable". The CWA requires EPA to consider, in addition to all the BPT and BAT factors, "the comparison of the cost and level of reduction of pollutants from the discharge from publicly owned treatment works (i.e. municipal sewage treatment systems) from a class or category of industrial sources." 33 U.S.C. 1311(b)(2)(E)
- **Best Available Technology Economically Achievable ("BAT" or "BATEA")** By March 31, 1989, industrial dischargers were to have achieved effluent limitations based on BAT for all toxic and "nonconventional" pollutants (i.e., any pollutant that is not specifically defined as conventional). The Act requires BAT limitations to be set at a level that "will result in reasonable further progress toward the national goal of eliminating the discharge of all

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pollutants...." 33 U.S.C. 1301(b)(2)(A). In establishing BAT, EPA considers the same factors as apply to BPT (above). Technology must be "available," but innovations may be considered, including technologies used in another industry. The Agency has broad discretion to determine what costs are "economically achievable." Generally, EPA evaluates potential job losses and plant closures across an industry as a whole or secondary impacts such as balance of trade, State and Federal tax and royalty revenues. Under limited circumstances, after an effluent limitation is promulgated by regulation, an individual discharger may apply for a variance from BAT requirements for an existing discharge -- but not for a new discharge.

EPA's slow pace in promulgating effluent limitation regulations, and especially in updating such regulations, led Congress to add a provision, sec. 304(m) in the 1987 CWA Amendments requiring EPA to issue biennial "plans" scheduling industrial categories for promulgation and revision of effluent limits. This requirement applies specifically to the limits for toxic and nonconventional pollutants.

- New Source Performance Standards ("NSPS") These standards reflect the greatest degree of effluent reduction achievable with the best available demonstrated control technology (BADT). 33 U.S.C. 1316(a)(1). They apply to all pollutants. Congress expressed its belief that it would be easier for new sources to reach a given level of pollution control than for existing sources. Nevertheless, based on all the factors to be considered, BADT may be the same as BPT, BAT or BCT. A cost-benefit analysis is not required in determining the reasonableness of achieving NSPS, but an affirmative conclusion that the costs can reasonably be borne by industry is required.

Typically, a "new source" is a facility that commences construction after promulgation of the applicable NSPS. If EPA has not promulgated a NSPS applicable to a particular type of facility, then the facility would be a "new discharger" but not a "new source" -- and thus subject to BPT/BCT/BAT limits but not NSPS. NOTE: NSPS have been promulgated for the coal mining category; thus, new coal mines are "new sources."

New sources are protected for 10 years from more stringent requirements. Issuance of a new source NPDES permit by EPA (but not an authorized State) is a "major Federal action" subject to the National Environmental Policy Act.

- Requirements for Indirect Discharges. For industrial discharges to publicly owned treatment works, EPA promulgates Pretreatment Standards. These may be either for existing sources (PSES) or for new sources (PSNS). These standards apply to any pollutant that "interferes with", "passes through" or "otherwise is incompatible with" a municipal sewage treatment system. 33 U.S.C. 1307(b)(1) and 1306.
- Storm Water Discharges. Storm water discharges "associated with industrial activity" are subject to NPDES permits based on the technology-based requirements identified above. EPA has promulgated Phase 1 Storm Water Regulations which define this term in detail. 40 CFR Part 122.

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Coal Remining Sec. 301(p) establishes special requirements to facilitate coal remining operations which begin after February 4, 1987, at a site where coal mining was conducted before August 3, 1977 (the approval date of SMCRA). EPA or a State may issue a permit which modifies requirements with respect to the pH, iron or manganese level of any pre-existing discharge (i.e. any discharge existing at the time of the permit application) affected by the remining operation. Such modified requirements shall apply BATEA using best professional judgment to set specific numerical effluent limitations. The permit applicant must demonstrate that the coal remining operation has the potential to improve water quality. Water quality standards must be met.

VI. Water Quality-based Limitations on Discharges

Where EPA or the States determine that technology-based effluent limits are not sufficient to meet State water quality standards, additional water quality-based effluent limits and/or other requirements must be included in NPDES permits. States are also empowered to impose water quality-based requirements in a variety of Federal permits under sec. 401.

Pursuant to sec. 304(a) of the CWA, EPA conducts scientific investigations and procedures to establish water quality criteria. These are expressed as numerical values for pollutant concentrations in surface waters which will protect different water uses. These criteria are guidance for the States to consider in establishing enforceable water quality standards. The EPA criteria are purely scientific determinations, while economic considerations may play a role when the States adopt water quality standards.

Procedures for Establishing Water Quality Standards

- Each State (and each Tribe authorized to be treated as a State for this purpose) establishes water quality standards for pollutants of concern in their waters. 33 U.S.C. 1313(c). Every three years, States must examine the adequacy of their standards and improve them, if necessary ("triennial review").
- EPA approves State water quality standards or, in the event EPA disapproves a new or revised water quality standard or EPA determines that a State needs a new or revised standard, EPA must promulgate such standard itself. 33 U.S.C. 1313(c)(3) and (4). There are possible mandatory duties if EPA does not act in a timely fashion, but EPA's policy is to work with the States to achieve the necessary standards, if at all possible.

Use of Water Quality Standards

- Water quality standards are not directly enforceable under the CWA, but they are key to implementation of a number of provisions of the law. A number of other Federal statutes which authorize activities that may result in pollution (such as SMCRA) require that water quality standards not be violated.
- Water quality standards are the basis for water quality-based effluent limitations in NPDES permits. 33 U.S.C. 1311(b)(1)(C). They are the basis for identifying "water quality limited waters" and total maximum daily loads of pollutants (TMDLs - from which wasteload

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allocations may be calculated for individual discharges). 33 U.S.C. 1313(d)(1)(A) and (C).
(See the Fact Sheet on TMDLs in Appendix B page B-28.)

- Water quality standards are guideposts for assessing the quality of rivers and other surface waters; the results of these assessments are reported periodically in various assessments and reports required by the CWA, including: the biennial report of the quality of all State waters (so-called "305(b) Report"); the biennial report of waters not expected to meet water quality standards after application of required controls ("303(d) List of Impaired Waters"); and the waters affected by nonpoint sources.
- Water quality standards are the basis for sec. 401 State water quality certifications.

Water Quality-based Effluent Limitations

- As noted, NPDES permits must contain not only technology-based controls but also any more stringent limitations for particular pollutants that are necessary to attain and maintain water quality standards for those pollutants. Sec. 301(b)(1)(C), 33 U.S.C. 1311(b)(1)(C). 44 CFR Part 122.44
- A water quality-based effluent limitation for a pollutant is derived from the applicable water quality standard and takes into account the receiving water (e.g. dilution) and the level of pollutants released from other sources. 44 CFR Part 122.44(d)(1)(vii)(A). It must be consistent with any available wasteload allocation approved by EPA for that pollutant and receiving water. 40 CFR Part 122.44(d)(1)(vii)(B).
- A water quality-based effluent limitation must be calculated at levels to ensure achievement of the water quality standards, regardless of the costs which permittees would incur to meet the limits. Variances or site-specific criteria, adopted in the State water quality standards, and compliance schedules in permits or enforcement orders may be available to help a permittee meet its water quality-based effluent limits.
- Water quality-based effluent limitations may be expressed in numeric or narrative form.

Effluent Standards for Toxic Pollutants

Sec. 307(a)(2) authorizes EPA to establish limits for individual toxic pollutants where the Agency finds the technology-based requirements inadequate. EPA has set effluent standards under this provision for six pollutants: aldrin, DDT, endrin, toxaphene, benzidine and PCBs.

VII. Implementation of NPDES Point Source Program

EPA may allow States and eligible Indian Tribes to administer the NPDES permit program in lieu of EPA. CWA sec. 402(b). To operate the NPDES program, States must adopt State laws providing all the authority necessary to enforce and administer Federal requirements. 40 CFR Part 123.

EPA retains oversight authority over State permit programs, and can revoke the State's authority to run the permit program if it finds the State to be derelict. In practice, EPA goes to considerable

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lengths to assist a State to work out deficiencies in its authorized program and has never revoked a State program.

EPA can review and veto any individual permit issued by a State if EPA believes the permit is inconsistent with the Act's requirements. EPA then issues the permit instead of the State. EPA's refusal to veto a State permit is not reviewable by the courts.

- NOTE: The Fact Sheet on the **NPDES Permit Program** contains further detailed information, and includes the procedures for EPA review of State permits. 40 CFR Part 123.44.

NPDES Permit Appeals Appeals of State NPDES permits are governed by State law. Appeals of EPA-issued individual permits are governed by the evidentiary hearing process in 40 CFR Part 124, Subpart E. Appeals of EPA general permits are challenged by filing a petition for review in the U.S. Court of Appeals. Alternatively, a discharger may apply for an individual permit.

Effect of Permit A discharge in compliance with a valid permit is in compliance with the Act. 33 U.S.C. 1342(k) and 40 CFR Part 122.5. Timely application for renewal of a permit automatically extends the existing permit. 5 U.S.C. 558(c). 40 CFR Part 122.6.

VIII. Nonpoint Source Program

Nonpoint source pollution is water pollution that results from land runoff, precipitation, atmospheric deposition, drainage, seepage, or hydrological modification. A nonpoint source is any source of water pollution that does not meet the legal definition of "point source" in sec. 502(14) of the CWA.

Nonpoint sources are not subject to CWA permit requirements. Rather, they may be regulated by the States or under other Federal statutes. Two related programs, sec. 319 of the CWA and sec. 6217 of the Coastal Zone Act Amendments of 1990, require States to develop nonpoint source management programs. See the Fact Sheet on **319 Nonpoint Source Programs**. If the States fail to develop approvable programs, the Federal government has no authority to establish programs for the States. Sanctions may include loss of grant money.

IX. Sec. 404 Point Source Program

The Army Corps of Engineers ("Corps") is authorized by sec. 404 to issue permits for the discharge of dredged or fill material into waters of the U.S. EPA has the following major responsibilities:

- issues environmental standards (404(b)(1) Guidelines 40 CFR Part 230) that must be applied by the Corps in its permitting decisions.
- has ultimate authority for determining the scope of CWA jurisdiction, and exemptions under sec. 404(f) of the Act (although the Corps makes such decisions on a day-to-day basis).
- can "veto" under sec. 404(c) any Corps permit that would result in "unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas." Specifically, the Administrator "prohibit the

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specification...of any defined area as a disposal site [for dredged or fill material]...." 33 U.S.C.

1344(c).

- can approve a State's authority to assume administration of the sec. 404 permit program in certain waters.

Certain activities that could otherwise constitute discharges are exempt from regulation under CWA sec. 404(f). These include normal farming, silviculture, and ranching activities such as plowing, seeding, cultivating, minor drainages, harvesting for the production of food, fiber and forest products, or upland soil and water conservation practices. 40 CFR Part 232.3. However, such an activity is not exempt if it is incidental to bringing an area of waters (including wetlands) into a use to which it was not previously subject, where the flow or circulation of such waters may be impaired or reduced.

A State may apply to assume authority to issue 404 permits for discharges in the State, except for activities in waters that are navigable in fact (that authority must remain with the Corps). Sec. 404(h) criteria must be met by any State seeking to assume the program. See also 40 CFR Part 233. The requirements for oversight of State 404 programs are analogous to the requirements under NPDES. Only two States, Michigan and New Jersey, have assumed permitting authority under sec. 404.

The Fact Sheet on the **Section 404 Program** outlines key provisions of EPA's 404(b)(1) Guidelines.

X. State 401 Certification

Statutory Requirements

- Sec. 401(a)(1) requires "[a]ny applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters" to obtain a certification from the State where the discharge originates "that any such discharges will comply with the applicable provisions of sections 301, 302, 306, and 307" of the CWA." This means that States may, as a minimum, impose any conditions necessary to meet their water quality standards.
- The Federal agency may not issue a permit unless the State has granted or waived certification. Sec. 402 and 404 CWA permits issued by EPA or the Corps, and SMCRA permits issued by the Office of Surface Mining, are Federal permits subject to sec. 401 certification.
- All the conditions in the State 401 certification must be included in the Federal license or permit. 33 U.S.C.1341(d). The Federal agency may not decide for itself which conditions must be included and which are unlawful.

Reviewability of State 401 Certification

EPA and other Federal agencies are not to review 401 certifications. The legality of certification conditions must be challenged by the permittee or licensee in a court of appropriate jurisdiction, usually a State court.

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XI. Oil and Hazardous Substance Liability

Sec. 311 of the CWA prohibits the unpermitted discharge into waters of the U.S. of oil of any kind, in any form, from onshore or offshore facilities. "Discharge" includes spilling, leaking, pumping, pouring, emitting, emptying or dumping. This section contains special penalty and liability provisions. NPDES permits are to contain oil spill prevention plans.

XII. Inspection and Data-Gathering Authorities

Information gathering, inspections, monitoring and entry, are addressed in sec. 308, 33 U.S.C. 1318. EPA has broad powers to inspect and gather data for rulemaking and enforcement.

Under sec. 308, EPA can require point source owner/operators (including operators of sources which may or may not be point sources) to establish and maintain records, make reports, install, use and maintain monitoring equipment or methods, sample effluents, and provide other information as the Agency may reasonably require.

XIII. Enforcement

Government Enforcement

- Under sec. 309, EPA can enforce against any person discharging without a permit, violating a permit, violating pretreatment standards, violating sludge requirements, or failing to provide information. EPA can enforce NPDES permit requirements even in States with authorized NPDES programs. EPA can bring civil or criminal actions in Federal court, or issue administrative orders to stop a violation and/or assess penalties.
- The CWA is a strict liability statute. However, compliance with a permit is a "shield" against most enforcement actions.
- There are two types of administrative penalty orders: (a) class I -- \$10,000 per violation not to exceed \$25,000; notice and hearing but not formal; judicial review in district court; and (b) class II -- \$10,000 per day not to exceed \$125,000.
- As for judicial penalties, sec. 309(d) authorizes courts to assess civil penalties up to \$25,000 per day per violation considering: the seriousness of the violation, the economic benefit (if any) resulting from the violation, any history of such violations, any good faith efforts to comply with the applicable requirements, the economic impact of the penalty on the violator, and such other matters as justice may require.

Citizen Enforcement

Under sec. 505, a citizen suit may be brought in district court against:

- any person -- including the United States and its agencies -- alleged to be in violation of specific requirements of the Act; or
- the EPA Administrator for failure to perform nondiscretionary duties.

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A Federal citizen suit is authorized where EPA or a State is not "diligently prosecuting" action in court or seeking administrative penalty. However, State enforcement action precludes a CWA citizen suit under the diligent prosecution rule, even though the settlement in the State action was less comprehensive than the remedy sought by plaintiffs in the citizen suit.

The statute requires a 60-day notice of intent to file suit. Citizens are also required to serve a copy of any complaint and any proposed consent decree on the Administrator and the Attorney General.

Attorney's fees are available "to any prevailing or substantially prevailing party whenever...appropriate." 33 U.S.C. 1365(d).

XIV. Financial Assistance

The Act authorizes EPA to provide several types of grants to assist States and other entities to carry out activities associated with restoring surface water quality. Sec. 106 of the CWA authorizes the basic State program grant, which is awarded on the basis of an allotment formula. See 40 CFR Part 15.1 et seq, 40 CFR Part 35.001 et seq.

Title VI authorizes grants to capitalize State Revolving Loan Funds, and a broad range of water pollution control activities are eligible for support under SRF programs. NOTE: the SRF program priorities are affected by annual Appropriations Acts.

Comprehensive Approaches to Elimination or Control of Mine Water Pollution

- Sec. 107 authorizes the Administrator,
 - ...in cooperation with the Appalachian Regional Commission and other Federal agencies, to conduct, make grants for, or to contract for, projects to demonstrate comprehensive approaches to the elimination or control of acid or other mine water pollution resulting from active or abandoned mining operations and other environmental pollution affecting water quality within all or part of a watershed or river basin, including siltation from surface mining. Such projects shall demonstrate the engineering and economic feasibility and practicality of various abatement techniques which will contribute substantially to effective and practical methods of acid or other mine water pollution elimination or control...and in such projects to restore affected lands to usefulness for forestry, agriculture, recreation, or other beneficial purposes.
- Prior to undertaking any demonstration project in the Appalachian region, the ARC must determine that the project is consistent with the objectives of the Appalachian Regional Development Act.
- Federal participation is conditioned upon the State acquiring any land or interests necessary for the project, and providing legal and practical protection to the project area against activities which will cause future acid or other mine water pollution.
- This section, which was added to the law in 1972, had a total authorization of \$30,000,000, to be available until expended.

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EPA provides financial support for State water quality programs. Such financial support is a key factor in many States' ability to administer such CWA-related responsibilities as water quality standards establishment and implementation (e.g. State 401 certification), water quality monitoring, water quality assessment reports, and administration of State NPDES programs.

XV. Research, Investigations, Training and Information

Sec. 104 of the CWA authorizes EPA to carry out a broad program of research, investigations, training, demonstrations, surveys and studies. This program is to be implemented in cooperation with other Federal, State and local agencies. The Agency is mandated to encourage and render technical services to State and local pollution control agencies, and to carry out public investigations of pollution in cooperation with State water pollution control agencies and other interested parties.

Under sec. 104(a)(5), EPA is required -- in cooperation with the States and other Federal agencies -- to "establish, equip, and maintain a water quality surveillance system for the purpose of monitoring the quality of the navigable waters and ground waters...." A significant limitation was imposed, however, by a 1969 Bureau of the Budget (now OMB) instruction that the U.S. Geological Survey would be the only Federal agency authorized to operate fixed (fresh water) fixed monitoring stations. Therefore, EPA's water quality (including biological) monitoring is limited to special studies. The State water pollution control agencies are required to operate water quality monitoring networks (as a condition of receiving sec. 106 program grants). 33 U.S.C. 1256(e).

EPA's research program responds not only to the CWA but also to a number of environmental statutes, and priorities change from year to year. Whereas water pollution control research was prominent in the early 1970s, in recent years the Agency's program has been modest and, in particular, there is very limited funding for water pollution control technology demonstrations.

The Agency is authorized to make research grants to "any State, municipality, or intermunicipal or interstate agency". The Fact Sheet on notes examples of research grants which have been made recently to West Virginia.

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Programmatic Review

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Aquatic **Session:** 1

Issue: How does SMCRA regulations, policies, guidance consider definitions, measures, and knowledge needed to protect aquatic resources?

Definitions, measures, and knowledge include: Common usage of terms and interpretation of aquatic resources; how to measure effects; how to make determinations of impacts and how to determine if those impacts are significant; how to build consensus on the extent of impacts; what information do we need to make decisions; how to improve monitoring requirements; and how to assess impacts over broader areas.

Summary of Effects of Relevant Statutes, Regulations, and Policies

Presented in the following are the terms and definitions pertinent to this aquatic domain are both defined by SMCRA or the complementary implementing regulations. These terms are used frequently in all three sessions of the aquatic domain.

Also included below are the statutory or regulatory methodologies prescribed for the analysis of water quality, and the collection and analysis of pre-permit baseline data for surface water and ground water, and the minimum standards for monitoring after the mining permit is issued.

In addition, described are permit applicant's responsibility to assess the probable hydrologic consequence (PHC) of the proposed mining activity, and the requirement to design a hydrologic reclamation plan that ensures that an adverse hydrologic effect does not occur.

Lastly, the cumulative hydrologic impact assessment (CHIA) regulation is presented. The CHIA is the SMCRA regulatory agency's assessment of what effect the proposed operation coupled with all other existing or anticipating mining activities will have on both the quality and quantity of ground and surface water on a regional basis.

Applicable Statutory Provisions

Definitions

SMCRA section 701. For the purposes of this Act -

(2) "approximate original contour" means that surface configuration achieved by backfilling and grading of the mined area so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and **complements the drainage pattern** of the surrounding terrain, with all highwalls and spoil piles eliminated; **water impoundments may be permitted** where the regulatory authority determines that they are in compliance with section 515(b)(8) of this Act;

Applicable Regulations

Definitions

Title 30 Code of Federal Regulations Section 701.5

Acid drainage means water with a pH of less than 6.0 and in which total acidity exceeds total alkalinity, discharged from an active, inactive or abandoned surface coal mine and reclamation operation or from an area affected by surface coal mining and reclamation operations.

Acid-forming materials means earth materials that contain sulfide minerals or other materials which, if exposed to air, water, or weathering processes, form acids that may create acid drainage.

Approximate original contour means that surface configuration achieved by backfilling and grading of the mined areas so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain, with all highwalls, spoil piles, and coal refuse piles eliminated. Permanent water impoundments may be permitted where the regulatory authority has determined that they comply with Sections 816.49, 816.56, and 816.133 or 817.49, 817.56, and 817.133.

Aquifer means a zone, stratum, or group of strata that can store and transmit water in sufficient quantities for a specific use.

Best technology currently available means equipment, devices, systems, methods, or techniques which will (a) prevent, to the extent possible, additional contributions of suspended solids to stream flow or runoff outside the permit area, but in no event result in contributions of suspended solids in excess of requirements set by applicable State or Federal laws; and (b) minimize, to the extent possible, disturbances and adverse impacts on fish, wildlife and related environmental values, and achieve enhancement of those resources where practicable. The term includes equipment, devices, systems, methods, or techniques which are currently available anywhere as determined by the Director, even if they are not in routine use. The term includes, but is not limited to, construction practices, siting requirements, vegetative selection and planting requirements, animal stocking

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Cumulative impact area means the area, including the permit area, within which impacts resulting from the proposed operation may interact with the impacts of all anticipated mining on surface- and ground-water systems. Anticipated mining shall include, at a minimum, the entire projected lives through bond release of: (a) The proposed operation, (b) all existing operations, (c) any operation for which a permit application has been submitted to the regulatory authority, and (d) all operations required to meet diligent development requirements for leased Federal coal for which there is actual mine development information available.

Drinking, domestic or residential water supply means water received from a well or spring and any appurtenant delivery system that provides water for direct human consumption or household use. Wells and springs that serve only agricultural, commercial or industrial enterprises are not included except to the extent the water supply is for direct human consumption or human sanitation, or domestic use.

Ephemeral stream means a stream which flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice, and which has a channel bottom that is always above the local water table.

Head-of-hollow fill means a fill structure consisting of any material, other than organic material, placed in the uppermost reaches of a hollow where side slopes of the existing hollow, measured at the steepest point, are greater than 20°, or the average slope of the profile of the hollow from the toe of the fill to the top of the fill is greater than 10°. In head-of-hollow fills the top surface of the fill, when completed, is at approximately the same elevation as the adjacent ridge line, and no significant area of natural drainage occurs above the fill draining into the fill area.

Hydrologic balance means the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in a hydrologic unit such as a drainage basin, aquifer, soil zone, lake, or reservoir. It encompasses the dynamic relationships among precipitation, runoff evaporation, and changes in ground and surface water storage.

Hydrologic regime means the entire state of water movement in a given area. It is a function of the climate and includes the phenomena by which water first occurs as atmospheric water vapor, passes into a liquid or solid form, falls as precipitation, moves along or into the ground surface, and returns to the atmosphere as vapor by means of evaporation and transpiration.

Intermittent stream means-- (a) A stream or reach of a stream that drains a watershed of at least one square mile, or (b) A stream or reach of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface run off and ground water discharge.

Perennial stream means a stream or part of a stream that flows continuously during all of the calendar year as a result of ground-water discharge or surface runoff. The term does not include intermittent stream or ephemeral stream.

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Recharge capacity means the ability of the soils and underlying materials to allow precipitation and runoff to infiltrate and reach the zone of saturation.

Renewable resource lands means aquifers and areas for the recharge of aquifers and other underground waters, areas for agricultural or silvicultural production of food and fiber, and grazing lands.

Replacement of water supply means, with respect to protected water supplies contaminated, diminished, or interrupted by coal mining operations, provision of water supply on both a temporary and permanent basis equivalent to premining quantity and quality. Replacement includes provision of an equivalent water delivery system and payment of operation and maintenance costs in excess of customary and reasonable delivery costs for premining water supplies. (a) Upon agreement by the permittee and the water supply owner, the obligation to pay such operation and maintenance costs may be satisfied by a one-time payment in an amount which covers the present worth of the increased annual operation and maintenance costs for a period agreed to by the permittee and the water supply owner. (b) If the affected water supply was not needed for the land use in existence at the time of loss, contamination, or diminution, and if the supply is not needed to achieve the post mining land use, replacement requirements maybe satisfied by demonstrating that a suitable alternative water source is available and could feasible be developed. If the latter approach is selected, written concurrence must be obtained from the water supply owner.

Sedimentation pond means an impoundment used to remove solids from water in order to meet water quality standards or effluent limitations before the water leaves the permit area.

Significant, imminent environmental harm to land, air or water resources means-- (a) An environmental harm is an adverse impact on land, air, or water resources which resources include, but are not limited to, plant and animal life. (b) An environmental harm is imminent, if a condition, practice, or violation exists which-- (1) Is causing such harm; or (2) May reasonably be expected to cause such harm at any time before the end of the reasonable abatement time that would be set under Section 521(a)(3)of the Act. (c) An environmental harm is significant if that harm is appreciable and not immediately reparable.

Siltation structure means a sedimentation pond, a series of sedimentation ponds, or other treatment facilities.

Suspended solids or nonfilterable residue, expressed as milligrams per liter, means organic or inorganic materials carried or held in suspension in water which are retained by a standard glass fiber filter in the procedure outlined by the Environmental Protection Agency's regulations for waste water and analyses (40 CFR 136).

Toxic-forming materials means earth materials or wastes which, if acted upon by air, water, weathering, or microbiological processes, are likely to produce chemical or physical conditions in soils or water that are detrimental to biota or uses of water.

Toxic mine drainage means water that is discharged from active or abandoned mines or other areas affected by coal exploration or surface coal mining and reclamation operations, which contains a

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Valley fill means a fill structure consisting of any material, other than organic material, that is placed in a valley where side slopes of the existing valley, measured at the steepest point, are greater than 20°, or where the average slope of the profile of the valley from the toe of the fill to the top of the fill is greater than 10°.

Water table means the upper surface of a zone of saturation, where the body of ground water is not confined by an overlying impermeable zone.

Title 30 Code of Federal Regulations Section 761.5 (*Pertains to a part areas unsuitable for mining*)

Significant recreational, timber, economic, or other values incompatible with surface coal mining operations means those values to be evaluated for their significance which could be damaged by and are not capable of existing together with, surface coal mining operations because of the undesirable effects mining would have on those values, either on the area included in the permit application or on other affected areas. Those values to be evaluated for their importance include: (a) Recreation, including hiking, boating, camping, skiing or other related outdoor activities; (b) Timber manager and silviculture; (c) Agriculture, aquaculture or production of other natural, processed, or manufactured products which enter commerce; (d) Scenic, historic, archeologic, esthetic, fish, wildlife, plants, or cultural interests.

[Ed note: In Section 761.5, the definition of "significant recreational, timber, economic, or other values incompatible with surface coal mining operations" is suspended insofar as the listed values are evaluated for compatibility solely in terms of reclaimability. (51 FR 41952 (41960),11/20/86]

Title 30 Code of Federal Regulations Section 762.5 (*Pertains to the lands unsuitable for mining process*)

Fragile lands means areas containing natural, ecologic, scientific, or esthetic resources that could be significantly damaged by surface coal mining operations. Examples of fragile lands include valuable habitats for fish or wildlife, critical habitats for endangered or threatened species of animals or plants, uncommon geologic formations, paleontological sites, National Natural Landmarks, areas where mining may result in flooding, environmental corridors containing a concentration of ecologic and esthetic features, and areas of recreational value due to high environmental quality.

Renewable resource lands means geographic areas which contribute significantly to the long-range productivity of water supply or of food or fiber products, such lands to include aquifers and aquifer recharge areas.

Title 30 Code of Federal Regulations Section 780.21 (*Hydrologic Information*)

(a) *Sampling and analysis methodology.* All water-quality analyses performed to meet the requirements of this Section shall be conducted according to the methodology in the 15th edition of "Standard Methods for the Examination of Water and Wastewater," which is incorporated by reference, or the methodology in 40 CFR Parts 136 and 434. Water quality sampling performed to meet the requirements of this Section shall be conducted according to either methodology listed

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above when feasible. "Standard Methods for the Examination of Water and Wastewater" is a joint publication of the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation and is available from the American Public Health Association, 1015 15th Street, NW., Washington, DC 20036. This document is also available for inspection at the Office of the Federal Register Information Center, Room 8301, 1100 L Street, NW., Washington, D.C.; at the Office of the OSM Administrative Record, U.S. Department of the Interior, Room 5315, 1100 L Street, NW., Washington, D.C.; at the OSM Eastern Technical Center, U.S. Department of the Interior, Building 10, Parkway Center, Pittsburgh, Pa.; and at the OSM Western Technical Center, U.S. Department of the Interior, Brooks Tower, 1020 15th Street, Denver, Colo. This incorporation by reference was approved by the Director of the Federal Register on October 26, 1983. This document is incorporated as it exists on the date of the approval, and a notice of any change in it will be published in the Federal Register.

(b) *Baseline information.* The application shall include the following baseline hydrologic information, and any additional information required by the regulatory authority.

(1) *Ground-water information.* The location and ownership for the permit and adjacent areas of existing wells, springs, and other ground-water resources, seasonal quality and quantity of ground water, and usage. Water quality descriptions shall include, at a minimum, total dissolved solids or specific conductance corrected to 25° C, pH, total iron, and total manganese. Ground-water quantity descriptions shall include, at a minimum, approximate rates of discharge or usage and depth to the water in the coal seam, and each water bearing stratum above and potentially impacted stratum below the coal seam.

(2) *Surface-water information.* The name, location, ownership, and description of all surface-water bodies such as streams, lakes, and impoundments, the location of any discharge into any surface-water body in the proposed permit and adjacent areas, and information on surface-water quality and quantity sufficient to demonstrate seasonal variation and water usage. Water quality descriptions shall include, at a minimum, baseline information on total suspended solids, total dissolved solids or specific conductance corrected to 25° C, pH, total iron, and total manganese. Baseline acidity and alkalinity information shall be provided if there is a potential for acid drainage from the proposed mining operation. Water-quantity descriptions shall include, at a minimum, baseline information on seasonal flow rates.

(3) *Supplemental information.* If the determination of the probable hydrologic consequences (PHC) required by Paragraph (f) of this Section indicates that adverse impacts on or off the proposed permit area may occur to the hydrologic balance, or that acid-forming or toxic-forming material is present that may result in the contamination of ground-water or surface-water supplies, then information supplemental to that required under Paragraphs (b)(1) and (b)(2) of this Section shall be provided to evaluate such probable hydrologic consequences and to plan remedial and reclamation activities. Such supplemental information may be based upon drilling, aquifer tests, hydrogeologic analysis of the water-bearing strata, flood flows, or analysis of other water-quality or quantity characteristics.

(c) *Baseline cumulative impact area information.* (1) Hydrologic and geologic information for the cumulative impact area necessary to assess the probable cumulative hydrologic impacts of the proposed operation and all anticipated mining on surface- and ground-water systems as required by

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Paragraph (g) of this Section shall be provided to the regulatory authority if available from appropriate Federal or State agencies.

(2) If the information is not available from such agencies, then the applicant may gather and submit this information to the regulatory authority as part of the permit application.

(3) The permit shall not be approved until the necessary hydrologic and geologic information is available to the regulatory authority.

(d) *Modeling.* The use of modeling techniques, interpolation, or statistical techniques may be included as part of the permit application, but actual surface- and ground-water information may be required by the regulatory authority for each site even when such techniques are used.

(e) *Alternative water-source information.* If the PHC determination required by Paragraph (f) of this Section indicates that the proposed mining operation may proximately result in contamination, diminution, or interruption of an underground or surface source of water within the proposed permit or adjacent areas which is used for domestic, agricultural, industrial or other legitimate purpose, then the application shall contain information on water availability and alternative water sources, including the suitability of alternative water sources for existing premining uses and approved post mining land uses.

(f) *Probable hydrologic consequences determination.* (1) The application shall contain a determination of the probable hydrologic consequences (PHC) of the proposed operation upon the quality and quantity of surface and groundwater under seasonal flow conditions for the proposed permit and adjacent areas.

(2) The PHC determination shall be based on baseline hydrologic, geologic and other information collected for the permit application and may include data statistically representative of the site.

(3) The PHC determination shall include findings on:

(i) Whether adverse impacts may occur to the hydrologic balance;

(ii) Whether acid-forming or toxic-forming materials are present that could result in the contamination of surface or ground water supplies;

(iii) Whether the proposed operation may proximately result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit or adjacent areas which is used for domestic, agricultural, industrial or other legitimate purpose; and

(iv) What impact the proposed operation will have on:

(A) Sediment yields from the disturbed area;

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(B) acidity, total suspended and dissolved solids, and other important water quality parameters of local impact;

(C) flooding or stream flow alteration;

(D) ground water and surface water availability; and

(E) other characteristics as required by the regulatory authority.

(4) An application for a permit revision shall be reviewed by the regulatory authority to determine whether a new or updated PHC determination shall be required.

(g) *Cumulative hydrologic impact assessment.* (1) The regulatory authority shall provide an assessment of the probable cumulative hydrologic impacts (CHIA) of the proposed operation and all anticipated mining upon surface- and ground-water systems in the cumulative impact area. The CHIA shall be sufficient to determine, for purposes of permit approval, whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The regulatory authority may allow the applicant to submit data and analyses relevant to the CHIA with the permit application.

(2) An application for a permit revision shall be reviewed by the regulatory authority to determine whether a new or updated CHIA shall be required.

(h) *Hydrologic reclamation plan.* The application shall include a plan, with maps and descriptions, indicating how the relevant requirements of Part 816 of this Chapter, including Sections 816.41 to 816.43, will be met. The plan shall be specific to the local hydrologic conditions. It shall contain the steps to be taken during mining and reclamation through bond release to minimize disturbances to the hydrologic balance within the permit and adjacent areas; to prevent material damage outside the permit area; to meet applicable Federal and State water quality laws and regulations; and to protect the rights of present water users. The plan shall include the measures to be taken to: Avoid acid or toxic drainage; prevent, to the extent possible using the best technology currently available, additional contributions of suspended solids to stream flow; provide water-treatment facilities when needed; control drainage; restore approximate premining recharge capacity; and protect or replace rights of present water users. The plan shall specifically address any potential adverse hydrologic consequences identified in the PHC determination prepared under Paragraph (f) of this Section and shall include preventive and remedial measures.

(i) *Ground-water monitoring plan.* (1) The application shall include a ground-water monitoring plan based upon the PHC determination required under Paragraph (f) of this Section and the analysis of all baseline hydrologic, geologic, and other information in the permit application. The plan shall provide for the monitoring of parameters that relate to the suitability of the ground water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance set forth in Paragraph (h) of this Section. It shall identify the quantity and quality parameters to be monitored, sampling frequency, and site locations. It shall describe how the data may be used to determine the impacts of the operation upon the hydrologic balance. At a minimum, total dissolved solids or specific conductance corrected to 25°C, pH, total iron, total manganese, and water levels

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shall be monitored and data submitted to the regulatory authority at least every 3 months for each monitoring location. The regulatory authority may require additional monitoring.

(2) If an applicant can demonstrate by the use of the PHC determination and other available information that a particular water-bearing stratum in the proposed permit and adjacent areas is not one which serves as an aquifer which significantly ensures the hydrologic balance within the cumulative impact area, then monitoring of that stratum may be waived by the regulatory authority.

(j) *Surface-water monitoring plan.* (1) The applicant shall include a surface-water monitoring plan based upon the PHC determination required under Paragraph (f) of this Section and the analysis of all baseline hydrologic, geologic, and other information in the permit application. The plan shall provide for the monitoring of parameters that relate to the suitability of the surface water for current and approved post mined land uses and to the objectives for protection of the hydrologic balance as set forth in Paragraph(h) of this Section, as well as the effluent limitations found at 40 CFR Part 434.

(2) The plan shall identify the surface-water quantity and quality parameters to be monitored, sampling frequency, and site locations. It shall describe how the data may be used to determine the impacts of the operation upon the hydrologic balance.

(i) At all monitoring locations in the surface-water bodies such as streams, lakes, and impoundments that are potentially impacted or into which water will be discharged and at upstream monitoring locations, the total dissolved solids or specific conductance corrected to 25°C, total suspended solids, pH, total iron, total manganese, and flow shall be monitored.

(ii) For point-source discharges, monitoring shall be conducted in accordance with 40 CFR Parts 122, 123 and 434 and as required by the National Pollutant Discharge Elimination System permitting authority.

(3) The monitoring reports shall be submitted to the regulatory authority every 3 months. The regulatory authority may require additional monitoring.

Title 30 Code of Federal Regulations Section 816.42 (*Water Quality Standards and Effluent Limitations*)

Discharges of water from areas disturbed by surface mining activities shall be made in compliance with all applicable State and Federal water-quality laws and regulations and with the effluent limitations for coal mining promulgated by the U.S. Environmental Protection Agency set forth in 40 CFR Part 434.

Applicable Policies

See references on Session 2 writeup.

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Aquatic **Session:** 2

Issue: How do SMCRA regulatory programs and associated guidance address the issue of protecting aquatic resources

Regulatory and Associated Guidance Include: Mitigation, restoration, and reclamation activities; cumulative impacts of aquatic resources; protection sensitive and threatened aquatic species; protection of watersheds; protection of groundwater; criteria for determining when to allow the placement of fill in streams; and minimizing the impacts to headwater streams.

Summary of Effects of Relevant Statutes, Regulations, and Policies

SMCRA and the implementing regulations address the impacts to the quantity and quality of surface and ground water. The SMCRA program requirements also address the impacts to plant and animals associated with and dependent on water resources, and private and public water supplies.

The adverse impacts to aquatic resources are addressed through the design of the mining and reclamation operation by the permit applicant to minimize the effects, review by the SMCRA regulatory and others during the permit application process, and the mandatory requirement of the permittee to implement the mining and reclamation plan per the permit design and to comply with various performance standards.

In addition, aquatic resources if deemed significant are protected by the SMCRA's lands unsuitable for mining process. Mining may be prohibited by a designation by Congress (eg designating area as a National Park) or by petitioning the SMCRA authority for designation.

Applicable Statutory Provisions

Permitting Requirements

SMCRA section 507(b) The permit application shall be submitted in a manner satisfactory to the regulatory authority and shall contain, among other things --

(10) the name of the watershed and location of the surface stream or tributary into which surface and pit drainage will be discharged;

(11) a determination of the probable hydrologic consequences of the mining and reclamation operations, both on and off the mine site, with respect to the hydrologic regime, quantity and quality of water in surface and ground water systems including the dissolved and suspended solids under seasonal flow conditions and the collection of sufficient data for the mine site and surrounding areas so that an assessment can be made by the regulatory authority of the probable cumulative impacts of

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all anticipated mining in the area upon the hydrology of the area and particularly upon water availability: Provided, however, That this determination shall not be required until such time as hydrologic information on the general area prior to mining is made available from an appropriate Federal or State agency: Provided further, That the permit shall not be approved until such information is available and is incorporated into the application;

(14) cross-sections, maps or plans of land to be affected, including the actual area to be mined, prepared by or under the direction of and certified by a qualified registered professional engineer, or professional geologist, with assistance from experts in related fields such as land surveying and landscape architecture, showing pertinent elevation and location of test borings or core samplings and depicting the following information: the nature and depth of the various strata of overburden; the location of subsurface water, if encountered, and its quality; the nature and thickness of any coal or rider seam above the coal seam to be mined; the nature of the stratum immediately beneath the coal seam to be mined; all mineral crop lines and the strike and dip of the coal to be mined, within the area of land to be affected; existing or previous surface mining limits; the location and extent of known workings of any underground mines, including mine openings to the surface; the location of aquifers; the estimated elevation of the water table; the location of spoil, waste, or refuse areas and top-soil preservation areas; the location of all impoundments for waste or erosion control; any settling or water treatment facility; constructed or natural drainways and the location of any discharges to any surface body of water on the area of land to be affected or adjacent thereto; and profiles at appropriate cross sections of the anticipated final surface configuration that will be achieved pursuant to the operator's proposed reclamation plan;

Reclamation Plan Requirements

SMCRA section 508(a)

Each reclamation plan submitted as part of a permit application pursuant to any approved State program or a Federal program under the provisions of this Act shall include, in the degree of detail necessary to demonstrate that reclamation required by the State or Federal program can be accomplished, a statement of:

(9) the steps to be taken to comply with applicable air and water quality laws and regulations and any applicable health and safety standards;

(12) the results of test boring which the applicant has made at the area to be covered by the permit, or other equivalent information and data in a form satisfactory to the regulatory authority, including the location of subsurface water, and an analysis of the chemical properties including acid forming properties of the mineral and overburden: Provided, That information which pertains only to the analysis of the chemical and physical properties of the coal (excepting information regarding such mineral or elemental contents which is potentially toxic in the environment) shall be kept confidential and not made a matter of public record;

(13) a detailed description of the measures to be taken during the mining and reclamation process to assure the protection of:

- (A) the quality of surface and ground water systems, both on- and off-site, from adverse effects of the mining and reclamation process;
- (B) the rights of present users to such water; and

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(C) the quantity of surface and ground water systems, both on-and off-site, from adverse effects of the mining and reclamation process or to provide alternative sources of water where such protection of quantity cannot be assured;

(14) such other requirements as the regulatory authority shall prescribe by regulations.

General Performance Standards

SMCRA section 515(b)

General performance standards shall be applicable to all surface coal mining and reclamation operations and shall require the operation as a minimum to --

(2) restore the land affected to a condition capable of supporting the uses which it was capable of supporting prior to any mining, or higher or better uses of which there is reasonable likelihood, so long as such use or uses do not present any actual or probable hazard to public health or safety or pose any actual or probable threat of water diminution or pollution, and the permit applicants' declared proposed land use following reclamation is not deemed to be impractical or unreasonable, inconsistent with applicable land use policies and plans, involves unreasonable delay in implementation, or is violative of Federal, State, or local law;

(3) except as provided in subsection (c) with respect to all surface coal mining operations backfill, compact (where advisable to insure stability or to prevent leaching of toxic materials), and grade in order to restore the approximate original contour of the land with all highwalls, spoil piles, and depressions eliminated (unless small depressions are needed in order to retain moisture to assist revegetation or as otherwise authorized pursuant to this Act): Provided, however, That in surface coal mining which is carried out at the same location over a substantial period of time where the operation transects the coal deposit, and the thickness of the coal deposits relative to the volume of the overburden is large and where the operator demonstrates that the overburden and other spoil and waste materials at a particular point in the permit area or otherwise available from the entire permit area is insufficient, giving due consideration to volumetric expansion, to restore the approximate original contour, the operator, at a minimum, shall backfill, grade, and compact (where advisable) using all available overburden and other spoil and waste materials to attain the lowest practicable grade but not more than the angle of repose, to provide adequate drainage and to cover all acid-forming and other toxic materials, in order to achieve an ecologically sound land use compatible with the surrounding region: And provided further, That in surface coal mining where the volume of overburden is large relative to the thickness of the coal deposit and where the operator demonstrates that due to volumetric expansion the amount of overburden and other spoil and waste materials removed in the course of the mining operation is more than sufficient to restore the approximate original contour, the operator shall after restoring the approximate contour, backfill, grade, and compact (where advisable) the excess overburden and other spoil and waste materials to attain the lowest grade but not more than the angle of repose, and to cover all acid-forming, and other toxic materials, in order to achieve an ecologically sound land use compatible with the surrounding region and that such overburden or spoil shall be shaped and graded in such a way as to prevent slides, erosion, and water pollution and is revegetated in accordance with the requirements of this Act;

(4) stabilize and protect all surface areas including spoil piles affected by the surface coal mining and reclamation operation to effectively control erosion and attendant air and water pollution;

(10) minimize the disturbances to the prevailing hydrologic balance at the mine-site and in associated offsite areas and to the quality and quantity of water in surface and ground water systems both during and after surface coal mining operations and during reclamation by -

- (D) avoiding acid or other toxic mine drainage by such measures as, but not limited to -
 - (i) preventing or removing water from contact with toxic producing deposits;
 - (ii) treating drainage to reduce toxic content which adversely affects downstream water upon being released to water courses;
 - (iii) casing, sealing, or otherwise managing boreholes, shafts, and wells and keep acid or other toxic drainage from entering ground and surface waters;
- (E) (i) conducting surface coal mining operations so as to prevent, to the extent possible using the best technology currently available, additional contributions of suspended solids to streamflow, or runoff outside the permit area, but in no event shall contributions be in excess of requirements set by applicable State or Federal law;
 - (ii) constructing any siltation structures pursuant to subparagraph (B)(i) of this subsection prior to commencement of surface coal mining operations, such structures to be certified by a qualified registered engineer or a qualified registered professional land surveyor in any State which authorizes land surveyors to prepare and certify such maps or plans to be constructed as designed and as approved in the reclamation plan;
- (C) cleaning out and removing temporary or large settling ponds or other siltation structures from drainways after disturbed areas are revegetated and stabilized; and depositing the silt and debris at a site and in a manner approved by the regulatory authority;
- (D) restoring recharge capacity of the mined area to approximate premining conditions;
- (E) avoiding channel deepening or enlargement in operations requiring the discharge of water from mines;
- (F) preserving throughout the mining and reclamation process the essential hydrologic functions of alluvial valley floors in the arid and semiarid areas of the country; and
- (G) such other actions as the regulatory authority may prescribe;

(12) refrain from surface coal mining within five hundred feet from active and abandoned underground mines in order to prevent breakthroughs and to protect health or safety of miners: Provided, That the regulatory authority shall permit an operator to mine near, through or partially through an abandoned underground mine or closer to an active underground mine if (A) the nature, timing, and sequencing of the approximate coincidence of specific surface mine activities with specific underground mine activities are jointly approved by the regulatory authorities concerned with surface mine regulation and the health and safety of underground miners, and (B) such operations will result in improved resource recovery, abatement of water pollution, or elimination of hazards to the health and safety of the public;

(14) insure that all debris, acid-forming materials, toxic materials, or materials constituting a fire hazard are treated or buried and compacted or otherwise disposed of in a manner designed to prevent contamination of ground or surface waters and that contingency plans are developed to prevent sustained combustion;

(17) insure that the construction, maintenance, and postmining conditions of access roads into and across the site of operations will control or prevent erosion and siltation, pollution of water, damage to fish or wildlife or their habitat, or public or private property;

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(18) refrain from the construction of roads or other access ways up a stream bed or drainage channel or in such proximity to such channel so as to seriously alter the normal flow of water;

(24) to the extent possible using the best technology currently available, minimize disturbances and adverse impacts of the operation on fish, wildlife, and related environmental values, and achieve enhancement of such resources where practicable;

Specific Performance Standards for Mountaintop Removal Mining Operations

SMCRA section 515(c)

(1) Each State program may and each Federal program shall include procedures pursuant to which the regulatory authority may permit surface mining operations for the purposes set forth in paragraph

(3) of this subsection.

(2) Where an applicant meets the requirements of paragraphs (3) and (4) of this subsection a permit without regard to the requirement to restore to approximate original contour set forth in subsection 515(b)(3) or 515(d)(2) and (3) of this section may be granted for the surface mining of coal where the mining operation will remove an entire coal seam or seams running through the upper fraction of a mountain, ridge, or hill (except as provided in subsection (c)(4)(A) hereof) by removing all of the overburden and creating a level plateau or a gently rolling contour with no highwalls remaining, and capable of supporting postmining uses in accord with the requirements of this subsection.

(4) In granting any permit pursuant to this subsection the regulatory authority shall require that -

- (A) the toe of the lowest coal seam and the overburden associated with it are retained in place as a barrier to slides and erosion;
- (B) the reclaimed area is stable;
- (C) the resulting plateau or rolling contour drains inward from the out slopes except at specified points;
- (D) no damage will be done to natural watercourses;
- (E) spoil will be placed on the mountaintop bench as is necessary to achieve the planned postmining land use: Provided, That all excess spoil material not retained on the mountaintop shall be placed in accordance with the provisions of subsection (b)(22) of this section;
- (F) insure stability of the spoil retained on the mountaintop and meet the other requirements of this Act;

Applicable Regulations

Permit Application Requirements Pertaining to Aquatic Resources

Title 30 Code of Federal Regulations Section 779.19 (*Vegetation Information*)

- (a) The permit application shall, if required by the regulatory authority, contain a map that delineates existing vegetative types and a description of the plant communities within the

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proposed permit area and within any proposed reference area. This description shall include information adequate to predict the potential for reestablishing vegetation.

(b) When a map or aerial photograph is required, sufficient adjacent areas shall be included to allow evaluation of vegetation as important habitat for fish and wildlife for those species of fish and wildlife identified under 30CFR 780.16.

Title 30 Code of Federal Regulations Section 779.24 (*General Map Requirements*)

The permit application shall include maps showing—

(c) The boundaries of all areas proposed to be affected over the estimated total life of the proposed surface mining activities, with a description of size, sequence, and timing of the mining of subareas for which it is anticipated that additional permits will be sought;

(g) The location of water supply intakes for current users of surface water flowing into, out of, and within a hydrologic area defined by the regulatory authority, and those surface waters which will receive discharges from affected areas in the proposed permit area;

(k) Any land within the proposed permit area which is within the boundaries of any units of the National System of Trails or the Wild and Scenic Rivers System, including study rivers designated under Section 5(a) of the Wild and Scenic Rivers Act; and

(1) Other relevant information required by the regulatory authority.

Title 30 Code of Federal Regulations Section 779.25 (*Cross sections, Map and Plans*)

(a) The application shall include cross sections, maps, and plans showing—

(2) Elevations and locations of monitoring stations used to gather data for water quality and quantity, fish and wildlife, and air quality, if required, in preparation of the application;

(3) Nature, depth, and thickness of the coal seams to be mined, any coal or rider seams above the seam to be mined, each stratum of the overburden, and the stratum immediately below the lowest coal seam to be mined;

(4) All coal crop lines and the strike and dip of the coal to be mined within the proposed permit area;

(5) Location and extent of known workings of active, inactive, or abandoned underground mines, including mine openings to the surface within the proposed permit and adjacent areas;

(6) Location and extent of subsurface water, if encountered, within the proposed permit or adjacent areas;

(7) Location of surface water bodies such as streams, lakes, ponds, springs, constructed or natural drains, and irrigation ditches within the proposed permit and adjacent areas;

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(8) Location and extent of existing or previously surface-mined areas within the proposed permit area;

(9) Location and dimensions of existing areas of spoil, waste, and noncoal waste disposal, dams, embankments, other impoundments, and water treatment and air pollution control facilities within the proposed permit area;

(10) Location, and depth if available, of gas and oil wells within the proposed permit area and water wells in the permit area and adjacent area;

(b) Cross Sections, maps, and plans included in a permit application as required by this Section shall be prepared by, or under the direction of, and certified by a qualified, registered, professional engineer, a professional geologist, or in any State which authorizes land surveyors to prepare and certify such cross Sections, maps, and plans, a qualified, registered, professional, land surveyor, with assistance from experts in related fields such as landscape architecture, and shall be updated as required by the regulatory authority.

Title 30 Code of Federal Regulations Section 780.16 (*Fish and Wildlife Information*)

(a) *Resource Information.* Each application shall include fish and wildlife resource information for the permit area and adjacent area.

(1) The scope and level of detail for such information shall be determined by the regulatory authority in consultation with State and Federal agencies with responsibilities for fish and wildlife and shall be sufficient to design the protection and enhancement plan required under paragraph (b) of this section.

(2) Site-specific resource information necessary to address the respective species or habitats shall be required when the permit area or adjacent area is likely to include:

(i) Listed or proposed endangered or threatened species of plants or animals or their critical habitats listed by the Secretary under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), or those species or habitats protected by similar State statutes;

(ii) Habitats of unusually high value for fish and wildlife such as important streams, wetlands, riparian areas, cliffs supporting raptors, areas offering special shelter or protection, migration routes, or reproduction and wintering areas; or

(iii) Other species or habitats identified through agency consultation as requiring special protection under State or Federal law.

(b) *Protection and enhancement plan.* Each application shall include a description of how, to the extent possible using the best technology currently available, the operator will minimize disturbances and adverse impacts on fish and wildlife and related environmental values, including compliance with the Endangered Species Act, during the surface coal mining and reclamation operations and how enhancement of these resources will be achieved where practicable. This description shall –

- (1) Be consistent with the requirements of Sec. 816.97 of this chapter;
- (2) Apply, at a minimum, to species and habitats identified under paragraph(a) of this section; and
- (3) Include –
 - (i) Protective measures that will be used during the active mining phase of operation. Such measures may include the establishment of buffer zones, the selective location and special design of haul roads and power lines, and the monitoring of surface water quality and quantity; and
 - (ii) Enhancement measures that will be used during the reclamation and postmining phase of operation to develop aquatic and terrestrial habitat. Such measures may include restoration of streams and other wetlands, retention of ponds and impoundments, establishment of vegetation for wildlife food and cover, and the replacement of perches and nest boxes. Where the plan does not include enhancement measures, a statement shall be given explaining why enhancement is not practicable.
 - (c) *Fish and Wildlife Service review.* Upon request, the regulator authority shall provide the resource information required under paragraph (a) of this section and the protection and enhancement plan required under paragraph (b) of this section to the U.S. Department of the Interior, Fish and Wildlife Service Regional or Field Office for their review. This information shall be provided within 10 days of receipt of the request from the Service.

Title 30 Code of Federal Regulations Section 780.18 (*Reclamation Plan - General Requirements*)

- (a) Each application shall contain a plan for reclamation of the lands within the proposed permit area, showing how the applicant will comply with Section 515 of the Act, Subchapter K of this Chapter, and the environmental protection performance standards of the regulatory program. The plan shall include, at a minimum, all information required under Sections 780.18-780.37 of this Chapter.
- (b) Each plan shall contain the following information for the proposed permit area–
 - (7) A description of measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed of in accordance with Sections 816.89 and 816.102 of this Chapter and a description of the contingency plans which have been developed to preclude sustained combustion of such materials;
 - (8) A description, including appropriate cross Sections and maps, of the measures to be used to seal or manage mine openings, and to plug, case, or manage exploration holes, other bore holes, wells, and other openings within the proposed permit area, in accordance with Sections 816.13-816.15 of this Chapter; and
 - (9) A description of steps to be taken to comply with the requirements of the Clean Air Act (42 U.S.C. 7401 et seq.), the Clean Water Act (33 U.S.C. 1251 et seq.), and other applicable air and water quality laws and regulations and health and safety standards.

Title 30 Code of Federal Regulations Section 780.21 (*Hydrologic Information*)

(a) *Sampling and analysis methodology.* All water-quality analyses performed to meet the requirements of this Section shall be conducted according to the methodology in the 15th edition of "Standard Methods for the Examination of Water and Wastewater," which is incorporated by reference, or the methodology in 40 CFR Parts 136 and 434. Water quality sampling performed to meet the requirements of this Section shall be conducted according to either methodology listed above when feasible. "Standard Methods for the Examination of Water and Wastewater" is a joint publication of the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation and is available from the American Public Health Association, 1015 15th Street, NW., Washington, DC 20036. This document is also available for inspection at the Office of the Federal Register Information Center, Room 8301, 1100 L Street, NW., Washington, D.C.; at the Office of the OSM Administrative Record, U.S. Department of the Interior, Room 5315, 1100 L Street, NW., Washington, D.C.; at the OSM Eastern Technical Center, U.S. Department of the Interior, Building 10, Parkway Center, Pittsburgh, Pa.; and at the OSM Western Technical Center, U.S. Department of the Interior, Brooks Tower, 1020 15th Street, Denver, Colo. This incorporation by reference was approved by the Director of the Federal Register on October 26, 1983. This document is incorporated as it exists on the date of the approval, and a notice of any change in it will be published in the Federal Register.

(b) *Baseline information.* The application shall include the following baseline hydrologic information, and any additional information required by the regulatory authority.

(1) *Ground-water information.* The location and ownership for the permit and adjacent areas of existing wells, springs, and other ground-water resources, seasonal quality and quantity of ground water, and usage. Water quality descriptions shall include, at a minimum, total dissolved solids or specific conductance corrected to 25° C, pH, total iron, and total manganese. Ground-water quantity descriptions shall include, at a minimum, approximate rates of discharge or usage and depth to the water in the coal seam, and each water bearing stratum above and potentially impacted stratum below the coal seam.

(2) *Surface-water information.* The name, location, ownership, and description of all surface-water bodies such as streams, lakes, and impoundments, the location of any discharge into any surface-water body in the proposed permit and adjacent areas, and information on surface-water quality and quantity sufficient to demonstrate seasonal variation and water usage. Water quality descriptions shall include, at a minimum, baseline information on total suspended solids, total dissolved solids or specific conductance corrected to 25° C, pH, total iron, and total manganese. Baseline acidity and alkalinity information shall be provided if there is a potential for acid drainage from the proposed mining operation. Water-quantity descriptions shall include, at a minimum, baseline information on seasonal flow rates.

(3) *Supplemental information.* If the determination of the probable hydrologic consequences (PHC) required by Paragraph (f) of this Section indicates that adverse impacts on or off the proposed permit area may occur to the hydrologic balance, or that acid-forming or toxic-forming material is present that may result in the contamination of ground-water or surface-water supplies, then information supplemental to that required under Paragraphs (b)(1) and (b)(2) of this Section shall be provided to

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evaluate such probable hydrologic consequences and to plan remedial and reclamation activities. Such supplemental information may be based upon drilling, aquifer tests, hydrogeologic analysis of the water-bearing strata, flood flows, or analysis of other water-quality or quantity characteristics.

(c) *Baseline cumulative impact area information.* (1) Hydrologic and geologic information for the cumulative impact area necessary to assess the probable cumulative hydrologic impacts of the proposed operation and all anticipated mining on surface- and ground-water systems as required by Paragraph (g) of this Section shall be provided to the regulatory authority if available from appropriate Federal or State agencies.

(2) If the information is not available from such agencies, then the applicant may gather and submit this information to the regulatory authority as part of the permit application.

(3) The permit shall not be approved until the necessary hydrologic and geologic information is available to the regulatory authority.

(d) *Modeling.* The use of modeling techniques, interpolation, or statistical techniques may be included as part of the permit application, but actual surface- and ground-water information may be required by the regulatory authority for each site even when such techniques are used.

(e) *Alternative water-source information.* If the PHC determination required by Paragraph (f) of this Section indicates that the proposed mining operation may proximately result in contamination, diminution, or interruption of an underground or surface source of water within the proposed permit or adjacent areas which is used for domestic, agricultural, industrial or other legitimate purpose, then the application shall contain information on water availability and alternative water sources, including the suitability of alternative water sources for existing premining uses and approved post mining land uses.

(f) *Probable hydrologic consequences determination.* (1) The application shall contain a determination of the probable hydrologic consequences (PHC) of the proposed operation upon the quality and quantity of surface and groundwater under seasonal flow conditions for the proposed permit and adjacent areas.

(2) The PHC determination shall be based on baseline hydrologic, geologic and other information collected for the permit application and may include data statistically representative of the site.

(3) The PHC determination shall include findings on:

(i) Whether adverse impacts may occur to the hydrologic balance;

(ii) Whether acid-forming or toxic-forming materials are present that could result in the contamination of surface or ground water supplies;

(iii) Whether the proposed operation may proximately result in contamination, diminution or interruption of an underground or surface source of water within the proposed permit or adjacent areas which is used for domestic, agricultural, industrial or other legitimate purpose; and

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(iv) What impact the proposed operation will have on:

- (A) Sediment yields from the disturbed area;
- (B) acidity, total suspended and dissolved solids, and other important water quality parameters of local impact;
- (C) flooding or stream flow alteration;
- (D) ground water and surface water availability; and
- (E) other characteristics as required by the regulatory authority.

(4) An application for a permit revision shall be reviewed by the regulatory authority to determine whether a new or updated PHC determination shall be required.

(g) *Cumulative hydrologic impact assessment.* (1) The regulatory authority shall provide an assessment of the probable cumulative hydrologic impacts (CHIA) of the proposed operation and all anticipated mining upon surface- and ground-water systems in the cumulative impact area. The CHIA shall be sufficient to determine, for purposes of permit approval, whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The regulatory authority may allow the applicant to submit data and analyses relevant to the CHIA with the permit application.

(2) An application for a permit revision shall be reviewed by the regulatory authority to determine whether a new or updated CHIA shall be required.

(h) *Hydrologic reclamation plan.* The application shall include a plan, with maps and descriptions, indicating how the relevant requirements of Part 816 of this Chapter, including Sections 816.41 to 816.43, will be met. The plan shall be specific to the local hydrologic conditions. It shall contain the steps to be taken during mining and reclamation through bond release to minimize disturbances to the hydrologic balance within the permit and adjacent areas; to prevent material damage outside the permit area; to meet applicable Federal and State water quality laws and regulations; and to protect the rights of present water users. The plan shall include the measures to be taken to: Avoid acid or toxic drainage; prevent, to the extent possible using the best technology currently available, additional contributions of suspended solids to stream flow; provide water-treatment facilities when needed; control drainage; restore approximate premining recharge capacity; and protect or replace rights of present water users. The plan shall specifically address any potential adverse hydrologic consequences identified in the PHC determination prepared under Paragraph (f) of this Section and shall include preventive and remedial measures.

(i) *Ground-water monitoring plan.* (1) The application shall include a ground-water monitoring plan based upon the PHC determination required under Paragraph (f) of this Section and the analysis of all baseline hydrologic, geologic, and other information in the permit application. The plan shall provide for the monitoring of parameters that relate to the suitability of the ground water for current and approved postmining land uses and to the

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objectives for protection of the hydrologic balance set forth in Paragraph (h) of this Section.

It shall identify the quantity and quality parameters to be monitored, sampling frequency, and site locations. It shall describe how the data may be used to determine the impacts of the operation upon the hydrologic balance. At a minimum, total dissolved solids or specific conductance corrected to 25oC, pH, total iron, total manganese, and water levels shall be monitored and data submitted to the regulatory authority at least every 3 months for each monitoring location. The regulatory authority may require additional monitoring.

(2) If an applicant can demonstrate by the use of the PHC determination and other available information that a particular water-bearing stratum in the proposed permit and adjacent areas is not one which serves as an aquifer which significantly ensures the hydrologic balance within the cumulative impact area, then monitoring of that stratum may be waived by the regulatory authority.

(j) *Surface-water monitoring plan.* (1) The applicant on shall include a surface-water monitoring plan based upon the PHC determination required under Paragraph (f) of this Section and the analysis of all baseline hydrologic, geologic, and other information in the permit application. The plan shall provide for the monitoring of parameters that relate to the suitability of the surface water for current and approved post mined land uses and to the objectives for protection of the hydrologic balance as set forth in Paragraph(h) of this Section, as well as the effluent limitations found at 40 CFR Part 434.

(2) The plan shall identify the surface-water quantity and quality parameters to be monitored, sampling frequency, and site locations. It shall describe how the data may be used to determine the impacts of the operation upon the hydrologic balance.

(i) At all monitoring locations in the surface-water bodies such as streams, lakes, and impoundments that are potentially impacted or into which water will be discharged and at upstream monitoring locations, the total dissolved solids or specific conductance corrected to 25oC, total suspended solids, pH, total iron, total manganese, and flow shall be monitored.

(ii) For point-source discharges, monitoring shall be conducted in accordance with 40 CFR Parts 122, 123 and 434 and as required by the National Pollutant Discharge Elimination System permitting authority.

(3) The monitoring reports shall be submitted to the regulatory authority every 3 months. The regulatory authority may require additional monitoring.

Title 30 Code of Federal Regulations Section 780.22 (*Geologic Information*)

(a) General. Each application shall include geologic information in sufficient detail to assist in determining—

(1) The probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface- and ground-water monitoring is necessary;

(2) All potentially acid- or toxic-forming strata down to and including the stratum immediately below the lowest coal seam to be mined; and

(3) Whether reclamation as required by this Chapter can be accomplished and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area.

(b) Geologic information shall include, at a minimum, the following:

(1) A description of the geology of the proposed permit and adjacent areas down to and including the deeper of either the stratum immediately below the lowest coal seam to be mined or any aquifer below the lowest coal seam to be mined which may be adversely impacted by mining. The description shall include the areal and structural geology of the permit and adjacent areas and other parameters which influence the required reclamation, and the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground waters. It shall be based on--

- (i) The cross Sections, maps, and plans required by Section 779.25 of this Chapter;
- (ii) The information obtained under Paragraphs (b)(2) and (c) of this Section; and
- (iii) Geologic literature and practices.

(2) Analyses of samples collected from test borings; drill cores; or fresh, unweathered, uncontaminated samples from rock outcrops from the permit area, down to and including the deeper of either the stratum immediately below the lowest coal seam to be mined or any aquifer below the lowest seam to be mined which may be adversely impacted by mining. The analyses shall result in the following:

- (i) Logs showing the lithologic characteristics including physical properties and thickness of each stratum and location of ground water where occurring;
- (ii) Chemical analyses identifying those strata that may contain acid- or toxic-forming or alkalinity-producing materials and to determine their content, except that the regulatory authority may find that the analysis for alkalinity-producing materials is unnecessary; and
- (iii) Chemical analyses of the coal seam for acid- or toxic-forming materials, including the total sulfur and pyritic sulfur, except that the regulatory authority may find that the analysis of pyritic sulfur content is unnecessary.

(c) If determined to be necessary to protect the hydrologic balance or to meet the performance standards of this Chapter, the regulatory authority may require the collection, analysis, and description of geologic information in addition to that required by Paragraph (b) of this Section.

(d) An applicant may request the regulatory authority to waive in whole or in part the requirements of Paragraph (b)(2) of this Section. The waiver maybe granted only if the regulatory authority finds in writing that the collection and analysis of such data are unnecessary because other equivalent information is available to the regulatory authority in a satisfactory form.

Title 30 Code of Federal Regulations Section 780.29 (*Diversions*)

Each application shall contain descriptions, including maps and cross sections, of stream-channel diversions and other diversions to be constructed within the proposed permit area to achieve compliance with Section 816.43 of this Chapter.

Title 30 Code of Federal Regulations Section 780.37 (*Road System*)

(a) *Plans and drawings.* Each applicant for a surface coal mining and reclamation permit shall submit plans and drawings for each road, as defined in Sec. 701.5 of this chapter, to be constructed, used, or maintained within the proposed permit area. The plans and drawings shall -

- (1) Include a map, appropriate cross sections, design drawings and specifications for road widths, gradients, surfacing materials, cuts, fill embankments, culverts, bridges, drainage ditches, low-water crossings, and drainage structures;
- (2) Contain the drawings and specifications of each proposed road that is located in the channel of an intermittent or perennial stream, as necessary for approval of the road by the regulatory authority in accordance with Sec. 816.150(d)(1) of this chapter;
- (3) Contain the drawings and specifications for each proposed ford of perennial or intermittent streams that is used as a temporary route, as necessary for approval of the ford by the regulatory authority in accordance with Sec. 816.151(c)(2) of this chapter;
- (4) Contain a description of measures to be taken to obtain approval of the regulatory authority for alteration or relocation of a natural stream channel under Sec. 816.151(d)(5) of this chapter;
- (5) Contain the drawings and specifications for each low-water crossing of perennial or intermittent stream channels so that the regulatory authority can maximize the protection of the stream in accordance with Sec. 816.151(d)(6) of this chapter; and
- (6) Describe the plans to remove and reclaim each road that would not be retained under an approved post mining land use, and the schedule for this removal and reclamation.

(b) *Primary road certification.* The plans and drawings for each primary road shall be prepared by, or under the direction of, and certified by a qualified registered professional engineer, or in any State which authorizes land surveyors to certify the design of primary roads a qualified registered professional land surveyor, with experience in the design and construction of roads, as meeting the requirements of this chapter; current, prudent engineering practices; and any design criteria established by the regulatory authority.

Permanent Program Performance Standards Pertinent to Aquatic Resources

Title 30 Code of Federal Regulations Section 810.2 (*General Objectives*)

The objective of this Subchapter is to ensure that coal exploration and surface coal mining and reclamation operations are conducted in a manner that is compatible with the environmental, social, and esthetic needs of the Nation. Accordingly, the performance standards and design requirements in this Subchapter will provide for—

- (a) Protection of the health, safety, and general welfare of mine workers and the public;
- (b) Maximum use and conservation of the solid fuel resource being recovered so that re-affecting the land through future surface coal mining operations can be minimized;
- (c) Prompt reclamation of all affected areas to conditions that are capable of supporting the premining land uses or higher or better land uses;
- (d) Reclamation of land affected by surface coal mining operations as contemporaneously as practicable with mining operations;
- (e) Minimizing, to the extent possible using the best technology currently available, disturbances and adverse impacts on fish, wildlife, and other related environmental values, and enhancement of such resources where practicable;
- (f) Revegetation which achieves a prompt vegetative cover and recovery of productivity levels compatible with approved land uses;
- (g) Minimum disturbance to the prevailing hydrologic balance at the mine site and in associated offsite areas, and to the quality and quantity of water in surface- and ground-water systems;
- (h) Protection of fragile and historic lands where surface coal mining operations could result in significant damage to important historic, cultural, scientific, or esthetic values and natural systems;
 - (i) Confinement of surface coal mining and reclamation operations including, but not limited to, the location of spoil disposal areas to lands within the permit area; and
 - (j) Striking a balance between protection of the environment and agricultural productivity and the Nation's need for coal as an essential source of energy.
- (k) Protection of endangered and threatened species and their critical habitats as determined by the Endangered Species Act of 1973 (16 USC 1531, et seq.).

Title 30 Code of Federal Regulations Section 816.41 (*Hydrologic Protection*)

- (a) *General.* All surface mining and reclamation activities shall be conducted to minimize disturbance of the hydrologic balance within the permit and adjacent areas, to prevent material damage to the hydrologic balance outside the permit area, to assure the protection or replacement of water rights, and to support approved post mining land uses in accordance with the terms and conditions of the approved permit and the performance standards of this part. The regulatory authority may require additional preventative, remedial, or monitoring

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measures to assure that material damage to the hydrologic balance outside the permit area is prevented. Mining and reclamation practices that minimize water pollution and changes in flow shall be used in preference to water treatment.

(b) *Ground-water protection.* In order to protect the hydrologic balance, surface mining activities shall be conducted according to the plan approved under Section 780.21(h) of this Chapter and the following:

(1) Ground-water quality shall be protected by handling earth materials and runoff in a manner that minimizes acidic, toxic, or other harmful infiltration to ground-water systems and by managing excavations and other disturbances to prevent or control the discharge of pollutants into the ground water.

(2) Ground-water quantity shall be protected by handling earth materials and runoff in a manner that will restore the approximate premining recharge capacity of the reclaimed area as a whole, excluding coal mine waste disposal areas and fills, so as to allow the movement of water to the ground-water system.

(c) *Ground-water monitoring.* (1) Ground-water monitoring shall be conducted according to the ground-water monitoring plan approved under Section 780.21(i) of this Chapter. The regulatory authority may require additional monitoring when necessary.

(2) Ground-water monitoring data shall be submitted every 3 months to the regulatory authority or more frequently as prescribed by the regulatory authority. Monitoring reports shall include analytical results from each sample taken during the reporting period. When the analysis of any ground-water sample indicates noncompliance with the permit conditions, then the operator shall promptly notify the regulatory authority and immediately take the actions provided for in Sections 773.17(e) and 780.21(h) of this Chapter.

(3) Ground-water monitoring shall proceed through mining and continue during reclamation until bond release. Consistent with the procedures of Section 744.13 of this Chapter, the regulatory authority may modify the monitoring requirements, including the parameters covered and the sampling frequency, if the operator demonstrates, using the monitoring data obtained under this Paragraph, that--

(i) The operation has minimized disturbance to the hydrologic balance in the permit and adjacent areas and prevented material damage to the hydrologic balance outside the permit area; water quantity and quality are suitable to support approved post mining land uses; and the water rights of other users have been protected or replaced; or

(ii) Monitoring is no longer necessary to achieve the purposes set forth in the monitoring plan approved under Section 780.21(i) of this Chapter.

(4) Equipment, structures, and other devices used in conjunction with monitoring the quality and quantity of ground water onsite and offsite shall be properly installed, maintained, and operated and shall be removed by the operator when no longer needed.

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(d) *Surface-water protection.* In order to protect the hydrologic balance, surface mining activities shall be conducted according to the plan approved under Section 780.21(h) of this Chapter, and the following:

(1) Surface-water quality shall be protected by handling earth materials, ground-water discharges, and runoff in a manner that minimizes the formation of acidic or toxic drainage; prevents, to the extent possible using the best technology currently available, additional contribution of suspended solids to stream flow outside the permit area; and otherwise prevents water pollution. If drainage control, restabilization and revegetation of disturbed areas, diversion of runoff, mulching, or other reclamation and remedial practices are not adequate to meet the requirements of this Section and Section 816.42, the operator shall use and maintain the necessary water-treatment facilities or water quality controls.

(2) Surface-water quality and flow rates shall be protected by handling earth materials and runoff in accordance with the steps outlined in the plan approved under Section 780.21 (h) of this Chapter.

(e) *Surface-water monitoring.* (1) Surface-water monitoring shall be conducted according to the surface-water monitoring plan approved under Section 780.21(j) of this Chapter. The regulatory authority may require additional monitoring when necessary.

(2) Surface-water monitoring data shall be submitted every 3 months to the regulatory authority or more frequently as prescribed by the regulatory authority. Monitoring reports shall include analytical results from each sample taken during the reporting period. When the analysis of any surface-water sample indicates noncompliance with the permit conditions, the operator shall promptly notify the regulatory authority and immediately take the actions provided for in Sections 773.17(e) and 780.21(h) of this Chapter. The reporting requirements of this Paragraph do not exempt the operator from meeting any National Pollutant Discharge Elimination System (NPDES) reporting requirements.

(3) Surface-water monitoring shall proceed through mining and continue during reclamation until bond release. Consistent with Section 774.13 of this Chapter, the regulatory authority may modify the monitoring requirements, except those required by the NPDES permitting authority, including the parameters covered and sampling frequency if the operator demonstrates, using the monitoring data obtained under this Paragraph, that--

(i) The operation has minimized disturbance to the hydrologic balance in the permit and adjacent areas and prevented material damage to the hydrologic balance outside the permit area; water quantity and quality are suitable to support approved post mining land uses; and the water rights of other users have been protected or replaced; or

(ii) Monitoring is no longer necessary to achieve the purposes set forth in the monitoring plan approved under Section 780.21(j) of this Chapter. (4) Equipment, structures, and other devices used in conjunction with monitoring the quality and quantity of surface water onsite and offsite shall be properly installed, maintained, and operated and shall be removed by the operator when no longer needed.

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(f) *Acid- and toxic-forming materials.* (1) Drainage from acid- and toxic-forming materials into surface water and ground water shall be avoided by--

(i) Identifying and burying and/or treating, when necessary, materials which may adversely affect water quality, or be detrimental to vegetation or to public health safety if not buried and/or treated, and

(ii) Storing materials in a manner that will protect surface water and ground water by preventing erosion, the formation of polluted runoff, and the infiltration of polluted water. Storage shall be limited to the period until burial and/or treatment first become feasible, and so long as storage will not result in any risk of water pollution or other environmental damage.

(2) Storage, burial or treatment practices shall be consistent with other material handling disposal provisions of this Chapter.

(g) *Transfer of wells.* Before final release of bond, exploratory or monitoring wells shall be sealed in a safe and environmentally sound manner in accordance with Sections 816.13-816.15. With the prior approval of the regulatory authority, wells may be transferred to another party for further use. At a minimum, the conditions of such transfer shall comply with State and local law and the permittee shall remain responsible for the proper management of the well until bond release in accordance with Sections 816.13-816.15.

(h) *Water rights and replacement.* Any person who conducts surface mining activities shall replace the water supply of an owner of interest in real property who obtains all or part of his or her supply of water for domestic, agricultural, industrial, or other legitimate use from an underground or surface source, where the water supply has been adversely impacted by contamination, diminution, or interruption proximately resulting from the surface mining activities. Baseline hydrologic information required in Sections 780.21 and 780.22 of this Chapter shall be used to determine the extent of the impact of mining upon ground water and surface water. (i) Discharges into an underground mine.

(1) Discharges into an underground mine are prohibited, unless specifically approved by the regulatory authority after a demonstration that the discharge will--

(i) Minimize disturbance to the hydrologic balance on the permit area, prevent material damage outside the permit area and otherwise eliminate public hazards resulting from surface mining activities;

(ii) Not result in a violation of applicable water quality standards or effluent limitations;

(iii) Be at a known rate and quality which shall meet the effluent limitations of Section 816.42 for pH and total suspended solids, except that the pH and total suspended-solids limitations may be exceeded, if approved by the regulatory authority; and

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(iv) Meet with the approval of the Mine Safety and Health Administration.

(2) Discharges shall be limited to the following:

- (i) Water;
- (ii) Coal processing waste;
- (iii) Fly ash from a coal-fired facility;
- (iv) Sludge from an acid-mine-drainage treatment facility;
- (v) Flue-gas desulfurization sludge;
- (vi) Inert materials used for stabilizing underground mines; and
- (vii) Underground mine development wastes.

Title 30 Code of Federal Regulations Section 816.42 (*Water Quality Standards and Effluent Limitations*)

Discharges of water from areas disturbed by surface mining activities shall be made in compliance with all applicable State and Federal water-quality laws and regulations and with the effluent limitations for coal mining promulgated by the U.S. Environmental Protection Agency set forth in 40 CFR Part 434.

Title 30 Code of Federal Regulations Section 816.43 (*Diversions*)

(a) *General requirements.* (1) With the approval of the regulatory authority, any flow from mined areas abandoned before May 3, 1978, and any flow from undisturbed areas or reclaimed areas, after meeting the criteria of Section 816.46 for siltation structure removal, may be diverted from disturbed areas by means of temporary or permanent diversions. All diversions shall be designed to minimize adverse impacts to the hydrologic balance within the permit and adjacent areas, to prevent material damage outside the permit area and to assure the safety of the public. Diversions shall not be used to divert water into underground mines without approval of the regulatory authority under Section 816.41(i).

(2) The diversion and its appurtenant structures shall be designed, located, constructed, maintained and used to--

- (i) Be stable;
- (ii) Provide protection against flooding and resultant damage to life and property;

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- (iii) Prevent, to the extent possible using the best technology currently available, additional contributions of suspended solids to stream flow outside the permit area; and
- (iv) Comply with all applicable local, State, and Federal laws and regulations.
- (3) Temporary diversions shall be removed promptly when no longer needed to achieve the purpose for which they were authorized. The land disturbed by the removal process shall be restored in accordance with this part. Before diversions are removed, downstream water-treatment facilities previously protected by the diversion shall be modified or removed, as necessary, to prevent overtopping or failure of the facilities. This requirement shall not relieve the operator from maintaining water-treatment facilities as otherwise required. A permanent diversion or a stream channel reclaimed after the removal of a temporary diversion shall be designed and constructed so as to restore or approximate the premining characteristics of the original stream channel including the natural riparian vegetation to promote the recovery and the enhancement of the aquatic habitat.
- (4) The regulatory authority may specify design criteria for diversions to meet the requirements of this Section.
- (b) *Diversion of perennial and intermittent streams.* (1) Diversion of perennial and intermittent streams within the permit area may be approved by the regulatory authority after making the finding relating to stream buffer zones that the diversion will not adversely affect the water quantity and quality and related environmental resources of the stream.
- (2) The design capacity of channels for temporary and permanent stream channel diversions shall be at least equal to the capacity of the unmodified stream channel immediately upstream and downstream from the diversion.
- (3) The requirements of Paragraph (a)(2)(ii) of this Section shall be met when the temporary and permanent diversions for perennial and intermittent streams are designed so that the combination of channel, bank and flood-plain configuration is adequate to pass safely the peak runoff of a 10-year, 6-hour precipitation event for a temporary diversion and a 100-year, 6-hour precipitation event for a permanent diversion.
- (4) The design and construction of all stream channel diversions of perennial and intermittent streams shall be certified by a qualified registered professional engineer as meeting the performance standards of this part and any design criteria set by the regulatory authority.
- (c) *Diversion of miscellaneous flows.* (1) Miscellaneous flows, which consist of all flows except for perennial and intermittent streams, may be diverted away from disturbed areas if required or approved by the regulatory authority. Miscellaneous flows shall include ground-water discharges and ephemeral streams.
- (2) The design, location, construction, maintenance, and removal of diversions of miscellaneous flows shall meet all of the performance standards set forth in Paragraph (a) of this Section: (3) The requirements of Paragraph (a)(2)(ii) of this Section shall be met when the temporary and permanent diversions for miscellaneous flows are designed so that the combination of channel, bank and flood-

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plain configuration is adequate to pass safely the peak runoff of a 2-year, 6-hour precipitation event for a temporary diversion and a 10-year, 6-hour precipitation event for a permanent diversion.

Title 30 Code of Federal Regulations Section 816.46 (*Sediment Control Structures*)

(a) Appropriate sediment control measures shall be designed, constructed, and maintained using the best technology currently available to:

- (1) Prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area,
- (2) Meet the more stringent of applicable State or Federal effluent limitations,
- (3) Minimize erosion to the extent possible.

(b) Sediment control measures include practices carried out within and adjacent to the disturbed area. The sedimentation storage capacity of practices in and downstream from the disturbed area shall reflect the degree to which successful mining and reclamation techniques are applied to reduce erosion and control sediment. Sediment control measures consist of the utilization of proper mining and reclamation methods and sediment control practices, singly or in combination. Sediment control methods include but are not limited to--

- (1) Disturbing the smallest practicable area at any one time during the mining operation through progressive backfilling, grading, and prompt revegetation as required in Section 816.111(b);
- (2) Stabilizing the backfill material to promote a reduction in the rate and volume of runoff, in accordance with the requirements of Section 816.102;
- (3) Retaining sediment within disturbed areas;
- (4) Diverting runoff away from disturbed areas;
- (5) Diverting runoff using protected channels or pipes through disturbed areas so as not to cause additional erosion;
- (6) Using straw dikes, riprap, check dams, mulches, vegetative sediment filters, dugout ponds, and other measures that reduce overland flow velocity, reduce runoff volume, or trap sediment; and
- (7) Treating with chemicals.

Title 30 Code of Federal Regulations Section 816.45 (*Siltation Structures*)

(a) For the purpose of this section only, disturbed areas shall not include those areas--

- (1) In which the only surface mining activities include diversion ditches, siltation structures, or roads that are designed constructed and maintained in accordance with this part; and

(2) For which the upstream area is not otherwise disturbed by the operator.

(b) *General requirements.* (1) Additional contributions of suspended solids sediment to stream flow or runoff outside the permit area shall be prevented to the extent possible using the best technology currently available.[Ed. note: Paragraph (b)(2) of Section 816.46 is suspended. (51 FR 41952(41960), 11/20/86)]

(2) All surface drainage from the disturbed area shall be passed through a siltation structure before leaving the permit area, except as provided in Paragraph (b)(5) or (e) of this Section.

(3) Siltation structures for an area shall be constructed before beginning any surface mining activities in that area, and upon construction shall be certified by a qualified registered professional engineer, or in any State which authorizes land surveyors to prepare and certify plans in accordance with Sec. 780.25(a) of this chapter a qualified registered professional land surveyor, to be constructed as designed and as approved in the reclamation plan.

(4) Any siltation structure which impounds water shall be designed, constructed and maintained in accordance with Section 816.49 of this Chapter.

(5) Siltation structures shall be maintained until removal is authorized by the regulatory authority and the disturbed area has been stabilized and revegetated. In no case shall the structure be removed sooner than 2 years after the last augmented seeding.

(6) When siltation structure is removed, the land on which the siltation structure was located shall be regraded and revegetated in accordance with the reclamation plan and Sections 816.111-816.116 of this Chapter. Sedimentation ponds approved by the regulatory authority for retention as permanent impoundments maybe exempted from this requirement.

(c) *Sedimentation ponds.* (1) When used, sedimentation ponds shall--

(i) Be used individually or in series;

(ii) Be located as near as possible to the disturbed area and out of perennial streams unless approved by the regulatory authority, and

(iii) Be designed, constructed, and maintained to--

- (A) Provide adequate sediment storage volume;
- (B) Provide adequate detention time to allow the effluent from the ponds to meet State and Federal effluent limitations;
- (C) Contain or treat the 10-year, 24-hour precipitation event ("design event") unless a lesser design event is approved by the regulatory authority based on terrain, climate, other site-specific conditions and on a demonstration by the operator that the effluent limitations of Section 816.42 will be met;
- (D) Provide a nonclogging dewatering device adequate to maintain the detention time required under Paragraph (c)(1)(iii)(B) of this Section;

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- (E) Minimize, to the extent possible, short circuiting;
- (F) Provide periodic sediment removal sufficient to maintain adequate volume for the design event;
- (G) Ensure against excessive settlement;
- (H) Be free of sod, large roots, frozen soil, and acid- or toxic-forming coal-processing waste; and
- (I) Be compacted properly.

(2) **Spillways.** A sedimentation pond shall include either a combination of principal and emergency spillways or single spillway configured as specified in Sec. 816.49(a)(9).

(d) *Other treatment facilities.* (1) Other treatment facilities shall be designed to treat the 10-year, 24-hour precipitation event unless a lesser design event is approved by the regulatory authority based on terrain, climate, other site-specific conditions and a demonstration by the operator that the effluent limitations of Section 816.42 will be met.

(2) Other treatment facilities shall be designed in accordance with the applicable requirements of Paragraph(c) of this Section.

(e) *Exemptions.* Exemptions to the requirements of this Section may be granted if--

(1) The disturbed drainage area within the total disturbed area is small; and

(2) The operator demonstrates that siltation structures and alternate sediment control measures are not necessary for drainage from the disturbed area to meet the effluent limitations under Section 816.42 and the applicable State and Federal water quality standards for the receiving waters.

Title 30 Code of Federal Regulations Section 816.47 (*Discharge Structures*)

Discharge from sedimentation ponds, permanent and temporary impoundments, coal processing waste dams and embankments, and diversions shall be controlled, by energy dissipators, riprap channels, and other devices, where necessary, to reduce erosion, to prevent deepening or enlargement of stream channels, and to minimize disturbance of the hydrologic balance. Discharge structures shall be designed according to standard engineering-design procedures.

Title 30 Code of Federal Regulations Section 816.57 (*Stream Buffer Zones*)

(a) No land within 100 feet of a perennial stream or an intermittent stream shall be disturbed by surface mining activities, unless the regulatory authority specifically authorizes surface mining activities closer to, or through, such a stream. The regulatory authority may authorize such activities only upon finding that--

(1) Surface mining activities will not cause or contribute to the violation of applicable State or Federal water quality standards, and will not adversely affect the water quantity and quality or other environmental resources of the stream; and

(2) ~~If there will be a temporary or permanent stream-channel diversion, it will comply with Section 816.43.~~

(b) The area not to be disturbed shall be designated as a buffer zone, and the operator shall mark it as specified in Section 816.11.

Title 30 Code of Federal Regulations Section 816.71 (*General Requirements Excess Spoil Disposal*)

(a) General. Excess spoil shall be placed in designated disposal areas within the permit area, in a controlled manner to-- (1) Minimize the adverse effects of leachate and surface water runoff from the fill on surface and ground waters;

(4) No permanent impoundments are allowed on the completed fill. Small depressions may be allowed by the regulatory authority if the year needed to retain moisture, minimize erosion, create and enhance wildlife habitat, or assist revegetation; and if they are not incompatible with the stability of the fill.

(5) Excess spoil that is acid- or toxic-forming or combustible shall be adequately covered with nonacid, nontoxic and noncombustible material, or treated, to control the impact on surface and ground water in accordance with Section 816.41, to prevent sustained combustion, and to minimize adverse effects on plant growth and the approved post mining land use.

(f) *Drainage control.* (1) If the disposal area contains springs, natural or manmade water courses, or wet weather seeps, the fill design shall include diversions and underdrains as necessary to control erosion, prevent water infiltration into the fill, and ensure stability.

(2) Diversions shall comply with the requirements of Section 816.43.

(3) Underdrains shall consist of durable rock or pipe, be designed and constructed using current, prudent engineering practices and meet any design criteria established by the regulatory authority. The underdrain system shall be designed to carry the anticipated seepage of water due to rainfall away from the excess spoil fill and from seeps and springs in the foundation of the disposal area and shall be protected from piping and contamination by an adequate filter. Rock underdrains shall be constructed of durable, nonacid-, nontoxic-forming rock (e.g., natural sand and gravel, sandstone, limestone, or other durable rock) that does not slake in water or degrade to soil material, and which is free of coal, clay or other nondurable material. Perforated pipe underdrains shall be corrosion resistant and shall have characteristics consistent with the long-term life of the fill.

(g) *Surface area stabilization.* Slope protection shall be provided to minimize surface erosion at the site. All disturbed areas, including diversion channels that are not riprapped or otherwise protected, shall be revegetated upon completion of construction.

Title 30 Code of Federal Regulations Section 816.72 (*Valley Fills / Head of Hollow Fills*)

Valley fills and head-of-hollow fills shall meet the requirements of Section 816.71 and the additional requirements of this Section.

(a) *Drainage control.* (1) The top surface of the completed fill shall be graded such that the final slope after settlement will be toward properly designed drainage channels. Uncontrolled surface drainage may not be directed over the outslope of the fill.

(2) Runoff from areas above the fill and runoff from the surface of the fill shall be diverted into stabilized diversion channels designed to meet the requirements of Section 816.43 and, in addition, to safely pass the runoff from a 100-year, 6-hour precipitation event.

(b) *Rock-core chimney drains.* A rock-core chimney drain may be used in ahead-of-hollow fill, instead of the underdrain and surface diversion system normally required, as long as the fill is not located in an area containing intermittent or perennial streams. A rock-core chimney drain may be used in a valley fill if the fill does not exceed 250,000 cubic yards of material and upstream drainage is diverted around the fill. The alternative rock-core chimney drain system shall be incorporated into the design and construction of the fill as follows.

(1) The fill shall have, along the vertical projection of the main buried stream channel or rill, a vertical core of durable rock at least 16 feet thick which shall extend from the toe of the fill to the head of the fill, and from the base of the fill to the surface of the fill. A system of lateral rock under drains shall connect this rock core to each area of potential drainage for seepage in the disposal area. The under drain system and rock core shall be designed to carry the anticipated seepage of water due to rainfall away from the excess spoil fill and from seeps and springs in the foundation of the disposal area. Rocks used in the rock core and under drains shall meet the requirements of Section 816.71(f).

(2) A filter system to ensure the proper long-term functioning of the rock core shall be designed and constructed using current, prudent engineering practices.

(3) Grading may drain surface water away from the outslope of the fill and toward the rock core. In no case, however, may intermittent or perennial streams be diverted into the rock core. The maximum slope of the top of the fill shall be 33h:1v (3 percent). A drainage pocket may be maintained at the head of the fill during and after construction, to intercept surface runoff and discharge the runoff through or over the rock drain, if stability of the fill is not impaired. In no case shall this pocket or sump have a potential capacity for impounding more than 10,000 cubic feet of water. Terraces on the fill shall be graded with a 3 to 5 percent grade toward the fill and a 1 percent slope toward the rock core.

Title 30 Code of Federal Regulations Section 816.73 (*Durable Rock Fills*)

The regulatory authority may approve the alternative method of disposal of excess durable rock spoil by gravity placement in single or multiple lifts, provided the following conditions are met:

(a) Except as provided in this Section, the requirements of Section 816.71 are met.

(b) The excess spoil consists of at least 80 percent, by volume, durable, nonacid- and nontoxic-forming rock (e.g., sandstone or limestone) that does not slake in water and will not

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degrade to soil material. Where used, noncemented clay shale, clay spoil, soil or other nondurable excess spoil materials shall be mixed with excess durable rock spoil in a controlled manner such that no more than 20 percent of the fill volume, as determined by tests performed by a registered engineer and approved by the regulatory authority, is not durable rock.

(c) A qualified registered professional engineer certifies that the design will ensure the stability of the fill and meet all other applicable requirements.

(d) The fill is designed to attain a minimum long-term static safety factor of 1.5, and an earthquake safety factor of 1.1.

(e) The under drain system may be constructed simultaneously with excess spoil placement by the natural segregation of dumped materials, provided the resulting under drain system is capable of carrying anticipated seepage of water due to rainfall away from the excess spoil fill and from seeps and springs in the foundation of the disposal area and the other requirements for drainage control are met.

(f) Surface water runoff from areas adjacent to and above the fill is not allowed to flow onto the fill and is diverted into stabilized diversion channels designed to meet the requirements of Section 816.43 and to safely pass the runoff from a 100-year, 6-hour precipitation event.

Title 30 Code of Federal Regulations Section 816.95 (*Stabilization of Surface Areas*)

(a) All exposed surface areas shall be protected and stabilized to effectively control erosion and air pollution attendant to erosion.

(b) Rills and gullies, which form in areas that have been regraded and topsoiled and which either:

(1) Disrupt the approved post mining land use or the reestablishment of the vegetative cover, or

(2) Cause or contribute to a violation of water-quality standards for receiving streams; shall be filled, regraded, or otherwise stabilized; topsoil shall be replaced; and the areas shall be reseeded or replanted.

Title 30 Code of Federal Regulations Section 816.97 (*Protection of Fish, Wildlife, and Related Values*)

(a) The operator shall, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts on fish, wildlife, and related environmental values and shall achieve enhancement of such resources where practicable.

(b) Endangered and threatened species. No surface mining activity shall be conducted which is likely to jeopardize the continued existence of endangered or threatened species listed by the Secretary or which is likely to result in the destruction or adverse modification of designated critical habitats of such species in violation of the Endangered Species Act of

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1973, as amended (16 U.S.C. 1531 et seq.). The operator shall promptly report to the regulatory authority any State- or federally-listed endangered or threatened species within the permit area of which the operator becomes aware. Upon notification, the regulatory authority shall consult with appropriate State and Federal fish and wildlife agencies and, after consultation, shall identify whether, and under what conditions, the operator may proceed.

(d) Nothing in this Chapter shall authorize the taking of an endangered or threatened species or a bald or golden eagle, its nest, or any of its eggs in violation of the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq., or the Bald Eagle Protection Act, as amended, 16 U.S.C. 668 et seq.

(e) Each operator shall, to the extent possible using the best technology currently available--

(2) Locate and operate haul and access roads so as to avoid or minimize impacts on important fish and wildlife species or other species protected by State or Federal law;

(f) *Wetlands and habitats of unusually high value for fish and wildlife.* The operator conducting surface mining activities shall avoid disturbances to, enhance where practicable, restore, or replace, wetlands, and riparian vegetation along rivers and streams and bordering ponds and lakes. Surface mining activities shall avoid disturbances to, enhance where practicable, or restore, habitats of unusually high value for fish and wildlife.

(g) Where fish and wildlife habitat is to be a post mining land use, the plant species to be used on reclaimed areas shall be selected on the basis of the following criteria:

- (1) Their proven nutritional value for fish or wildlife.
- (2) Their use as cover for fish or wildlife.

(3) Their ability to support and enhance fish or wildlife habitat after the release of performance bonds. The selected plants shall be grouped and distributed in a manner which optimizes edge effect, cover, and other benefits to fish and wildlife.

Title 30 Code of Federal Regulations Section 816.102 (*Backfilling and Grading - General Requirements*)

(a) Disturbed areas shall be backfilled and graded to--

(1) Achieve the approximate original contour, except as provided in Paragraph (k) of this Section;

(2) Eliminate all highwalls, spoil piles, and depressions, except as provided in Paragraph (h) (small depressions) and in Paragraph (k)(3)(iii) (previously mined highwalls) of this Section;

(3) Achieve a post mining slope that does not exceed either the angle of repose or such lesser slope as is necessary to achieve a minimum long-term static safety factor of 1.3 and to prevent slides;

(4) Minimize erosion and water pollution both on and off the site; and (5) Support the approved post mining land use.

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(b) Spoil, except excess spoil disposed of in accordance with Sections 816.71-816.74, shall be returned to the mined-out area.

(c) Spoil and waste materials shall be compacted where advisable to ensure stability or to prevent leaching of toxic materials.

(f) Exposed coal seams, acid- and toxic-forming materials, and combustible materials exposed, used, or produced during mining shall be adequately covered with nontoxic and noncombustible material, or treated, to control the impact on surface and ground water in accordance with Section 816.41, to prevent sustained combustion, and to minimize adverse effects on plant growth and the approved post mining land use.

Applicable Policies

1. OSM Directive TSR-3, "Sediment Control Using the Best Technology Currently Available"
 2. OSM Directive TSR-6, "Drainage Control on Valley and Durable Rock Fills"
 3. OSM Directive TSR-9, "Construction Certification of Siltation Structures"
 4. OSM Internet Publication "OSM's Role in Protecting Water During Coal Mining (This document is available on the internet at "www.osmre.gov/h20start.htm")
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Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Aquatic **Session:** 3

Issue: How to address procedural and permitting requirements for protecting aquatic resources as they implement their programs.

Areas to be considered include: Coordination of permitting and reclamation activities; and how to streamline the process. This session would also cover issues like staffing , training, and enforcement.

Summary of Effects of Relevant Statutes, Regulations, and Policies

Presented in the following are the procedural aspects of protecting aquatic resources, particularly those statutes and regulations that mandate coordination among SMCRA and non-SMCRA agencies and those that afford public input into the mining decisions. Also presented are those statutes/regulations that require affirmative finding by the regulatory authority during permitting process that aquatic resources will be protected.

Applicable Statutory Provisions

Consideration of Other Relevant Laws

SMCRA section 508(a)

Each reclamation plan submitted as part of a permit application pursuant to any approved State program or a Federal program under the provisions of this Act shall include, in the degree of detail necessary to demonstrate that reclamation required by the State or Federal program can be accomplished, a statement of:

(9) the steps to be taken to comply with applicable air and water quality laws and regulations and any applicable health and safety standards;

SMCRA section 702

(a) Nothing in this Act shall be construed as superseding, amending, modifying, or repealing the Mining and Minerals Policy Act of 1970 (30 U.S.C. 21a), the National Environmental Policy Act of 1969 (42 U.S.C. 4321-47), or any of the following Acts or with any rule or regulation promulgated thereunder, including, but not limited to -

- (1) The Federal Metal and Nonmetallic Mine Safety Act (30 U.S.C. 721-740).
- (2) The Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742).
- (3) The Federal Water Pollution Control Act (79 Stat. 903), as amended (33 U.S.C. 1151-1175), the State laws enacted pursuant thereto, or other Federal laws relating to preservation of water quality.
- (4) The Clean Air Act, as amended (42 U.S.C. 1857 et seq.).
- (5) The Solid Waste Disposal Act (42 U.S.C. 3251-3259).
- (6) The Refuse Act of 1899 (33 U.S.C. 407).

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- (7) The Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-666c).
- (8) The Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.).

(b) Nothing in this Act shall affect in any way the authority of the Secretary or the heads of other Federal agencies under other provisions of law to include in any lease, license, permit, contract, or other instrument such conditions as may be appropriate to regulate surface coal mining and reclamation operations on land under their jurisdiction.

(c) To the greatest extent practicable each Federal agency shall cooperate with the Secretary and the States in carrying out the provisions of this Act.

(d) Approval of the State programs, pursuant to section 503(b), promulgation of Federal programs, pursuant to section 504, and implementation of the Federal lands programs, pursuant to section 523 of this Act, shall not constitute a major action within the meaning of section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332). Adoption of regulations under section 501(b) shall constitute a major action within the meaning of section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332).

Affirmative Findings by the Regulatory Authority

SMCRA section 510(b)

No permit or revision application shall be approved unless the application affirmatively demonstrates and the regulatory authority finds in writing on the basis of the information set forth in the application or from information otherwise available which will be documented in the approval, and made available to the applicant, that -

(3) the assessment of the probable cumulative impact of all anticipated mining in the area on the hydrologic balance specified in section 507(b) has been made by the regulatory authority and the proposed operation thereof has been designed to prevent material damage to hydrologic balance outside permit area;

Consideration of Suggestions from the Public and Other Agencies

SMCRA section 513

(a) At the time of submission of an application for a surface coal mining and reclamation permit, or revision of an existing permit, pursuant to the provisions of this Act or an approved State program, the applicant shall submit to the regulatory authority a copy of his advertisement of the ownership, precise location, and boundaries of the land to be affected. At the time of submission such advertisement shall be placed by the applicant in a local newspaper of general circulation in the locality of the proposed surface mine at least once a week for four consecutive weeks. The regulatory authority shall notify various local governmental bodies, planning agencies, and sewage and water treatment authorities, of water companies in the locality in which the proposed surface mining will take place, notifying them of the operator's intention to surface mine a particularly described tract of land and indicating the application's permit number and where a copy of the proposed mining and

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reclamation plan may be inspected. These local bodies, agencies, authorities, or companies may submit written comments within a reasonable period established by the regulatory authority on the mining applications with respect to the effect of the proposed operation on the environment which are within their area of responsibility. Such comments shall immediately be transmitted to the applicant by the regulatory authority and shall be made available to the public at the same locations as are the mining applications.

(b) Any person having an interest which is or may be adversely affected or the officer or head of any Federal, State, or local governmental agency or authority shall have the right to file written objections to the proposed initial or revised application for a permit for surface coal mining and reclamation operation with the regulatory authority within thirty days after the last publication of the above notice. Such objections shall immediately be transmitted to the applicant by the regulatory authority and shall be made available to the public. If written objections are filed and an informal conference requested, the regulatory authority shall then hold an informal conference in the locality of the proposed mining, if requested within a reasonable time of the receipt of such objections or request. The date, time and location of such informal conference shall be advertised by the regulatory authority in a newspaper of general circulation in the locality at least two weeks prior to the scheduled conference date. The regulatory authority may arrange with the applicant upon request by any party to the administrative proceeding access to the proposed mining area for the purpose of gathering information relevant to the proceeding. An electronic or stenographic record shall be made of the conference proceeding, unless waived by all parties. Such record shall be maintained and shall be accessible to the parties until final release of the applicant's performance bond. In the event all parties requesting the informal conference stipulate agreement prior to the requested informal conference and withdraw their request, such informal conference need not be held.

Coordination of Regulation and Inspection Activities

SMCRA section 713

(a) The President shall, to the extent appropriate, and in keeping with the particular enforcement requirements of each Act referred to herein, insure the coordination of regulatory and inspection activities among the departments, agencies, and instrumentalities to which such activities are assigned by this Act, by the Clean Air Act, by the Water Pollution Control Act, by the Department of Energy Organization Act, and by existing or subsequently enacted Federal mine safety and health laws, except that no such coordination shall be required with respect to mine safety and health inspections, advance notice of which is or may be prohibited by existing or subsequently enacted Federal mine safety and health laws.

(b) The President may execute the coordination required by this section by means of an Executive order, or by any other mechanism he determines to be appropriate.

Designating Areas Unsuitable for Surface Coal Mining

SMCRA section 522

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(a)(1) To be eligible to assume primary regulatory authority pursuant to section 503, each State shall establish a planning process enabling objective decisions based upon competent and scientifically sound data and information as to which, if any, land areas of a State are unsuitable for all or certain types of surface coal mining operations pursuant to the standards set forth in paragraphs (2) and (3) of this subsection but such designation shall not prevent the mineral exploration pursuant to the Act of any area so designated.

(2) Upon petition pursuant to subsection (c) of this section, the State regulatory authority shall designate an area as unsuitable for all or certain types of surface coal mining operations if the State regulatory authority determines that reclamation pursuant to the requirements of this Act is not technologically and economically feasible.

(3) Upon petition pursuant to subsection (c) of this section, a surface area may be designated unsuitable for certain types of surface coal mining operations if such operations will -

- (B) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and esthetic values and natural systems; or
- (C) affect renewable resource lands in which such operations could result in a substantial loss or reduction of long-range productivity of water supply or of food or fiber products, and such lands to include aquifers and aquifer recharge areas; or
- (D) affect natural hazard lands in which such operations could substantially endanger life and property, such lands to include areas subject to frequent flooding and areas of unstable geology.

(4) To comply with this section, a State must demonstrate it has developed or is developing a process which includes -

- (A) a State agency responsible for surface coal mining lands review;
- (B) a data base and an inventory system which will permit proper evaluation of the capacity of different land areas of the State to support and permit reclamation of surface coal mining operations;
- (C) a method or methods for implementing land use planning decisions concerning surface coal mining operations; and
- (D) proper notice, opportunities for public participation, including a public hearing prior to making any designation or redesignation, pursuant to this section.

(5) Determinations of the unsuitability of land for surface coal mining, as provided for in this section, shall be integrated as closely as possible with present and future land use planning and regulation processes at the Federal, State, and local levels.

(6) The requirements of this section shall not apply to lands on which surface coal mining operations are being conducted on the date of enactment of this Act or under a permit issued pursuant to this Act, or where substantial legal and financial commitments in such operation were in existence prior to January 4, 1977.

(b) The Secretary shall conduct a review of the Federal lands to determine, pursuant to the standards set forth in paragraphs (2) and (3) of subsection (a) of this section, whether there are areas on Federal lands which are unsuitable for all or certain types of surface coal mining operations: Provided, however, That the Secretary may permit surface coal mining on Federal lands prior to the completion of this review. When the Secretary determines an area on Federal lands to be unsuitable for all or certain types of surface coal mining operations, he shall withdraw such area or condition any mineral leasing or mineral entries in a manner so as to limit surface coal mining operations on such area. Where a Federal program has been implemented in a State pursuant to section 504, the Secretary shall implement a process for designation of areas unsuitable for surface coal mining for non-Federal lands within such State and such process shall incorporate the standards and procedures of this section. Prior to designating Federal lands unsuitable for such mining, the Secretary shall consult with the appropriate State and local agencies.

(c) Any person having an interest which is or may be adversely affected shall have the right to petition the regulatory authority to have an area designated as unsuitable for surface coal mining operations, or to have such a designation terminated. Such a petition shall contain allegations of facts with supporting evidence which would tend to establish the allegations. Within ten months after receipt of the petition the regulatory authority shall hold a public hearing in the locality of the affected area, after appropriate notice and publication of the date, time, and location of such hearing. After a person having an interest which is or may be adversely affected has filed a petition and before the hearing, as required by this subsection, any person may intervene by filing allegations of facts with supporting evidence which would tend to establish the allegations. Within sixty days after such hearing, the regulatory authority shall issue and furnish to the petitioner and any other party to the hearing, a written decision regarding the petition, and the reasons therefore. In the event that all the petitioners stipulate agreement prior to the requested hearing, and withdraw their request, such hearing need not be held.

(d) Prior to designating any land areas as unsuitable for surface coal mining operations, the regulatory authority shall prepare a detailed statement on (i) the potential coal resources of the area, (ii) the demand for coal resources, and (iii) the impact of such designation on the environment, the economy, and the supply of coal.

(e) After the enactment of this Act and subject to valid existing rights no surface coal mining operations except those which exist on the date of enactment of this Act shall be permitted

(1) on any lands within the boundaries of units of the National Park System, the National Wildlife Refuge Systems, the National System of Trails, the National Wilderness Preservation System, the Wild and Scenic Rivers System, including study rivers designated under section 5(a) of the Wild and Scenic Rivers Act and National Recreation Areas designated by Act of Congress;

Protection of Water Rights and Supplies

SMCRA section 717

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(a) Nothing in this Act shall be construed as affecting in any way the right of any person to enforce or protect, under applicable law, his interest in water resources affected by a surface coal mining operation.

(b) The operator of a surface coal mine shall replace the water supply of an owner of interest in real property who obtains all or part of his supply of water for domestic, agricultural, industrial, or other legitimate use from an underground or surface source where such supply has been affected by contamination, diminution, or interruption proximately resulting from such surface coal mine operation.

Applicable Regulations

Areas Where Mining is Limited or Prohibited

Title 30 Code of Federal Regulations Section 761.11

You may not conduct surface coal mining operations on the following lands unless you either have valid existing rights, as determined under Sec. 761.16, or qualify for the exception for existing operations under Sec. 761.12: (a) Any lands within the boundaries of: (1) The National Park System; (2) The National Wildlife Refuge System; (3) The National System of Trails; (4) The National Wilderness Preservation System; (5) The Wild and Scenic Rivers System, including study rivers designated under section 5(a) of the Wild and Scenic Rivers Act, 16 U.S.C. 1276(a), or study rivers or study river corridors established in any guidelines issued under that Act; or (6) National Recreation Areas designated by Act of Congress.

Criteria for Designating Lands Unsuitable for Mining

Title 30 Code of Federal Regulations Section 762.11

(a) Upon petition an area shall be designated as unsuitable for all or certain types of surface coal mining operations, if the regulatory authority determines that reclamation is not technologically and economically feasible under the Act, this Chapter, or an approved State program.

(b) Upon petition an area may be (but is not required to be) designated as unsuitable for certain types of surface coal mining operations, if the operations will-- (1) Be incompatible with existing State or local land use plans or programs; (2) Affect fragile or historic lands in which the operations could result in significant damage to important historic, cultural, scientific, or esthetic values or natural systems; (3) Affect renewable resource lands in which the operations could result in a substantial loss or reduction of long-range productivity of water supply or of food or fiber products (*refer to the definitions in the session 1 writeup*)

Regulatory Coordination with the Requirements under Other Laws

Title 30 Code of Federal Regulations Section 773.5

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Each regulatory program shall, to avoid duplication, provide for the coordination of review and issuance of permits for surface coal mining and reclamation operations with applicable requirements of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.); the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661 et seq.); the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703 et seq.); The National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.); the Bald Eagle Protection Act, as amended (16 U.S.C. 668a); for Federal programs only, the Archeological and Historic Preservation Act of 1974 (16 U.S.C. 469 et seq.); and the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa et seq) where Federal and Indian lands covered by that Act are involved.

Opportunity for Public and Agency Participation in the Permitting Process

Title 30 Code of Federal Regulations Section 773.6(3)

(3) Upon receipt of an administratively complete application for a permit, a significant revision to a permit under Section 774.13, or a renewal of a permit under Section 774.15, the regulatory authority shall issue written notification indicating the applicant's intention to mine the described tract of land, the application number or other identifier, the location where the copy of the application may be inspected, and the location where comments on the application may be submitted. The notification shall be sent to—

(i) Local governmental agencies with jurisdiction over or an interest in the area of the proposed surface coal mining and reclamation operation, including but not limited to planning agencies, sewage and water treatment authorities, water companies; and

(ii) All Federal or State governmental agencies with authority to issue permits and licenses applicable to the proposed surface coal mining and reclamation operation and which are part of the permit coordinating process developed in accordance with Section 503(a)(6) or 504(h) of the Act, or Section 773.12; or those agencies with an interest in the proposed operation, including the U.S. Department of Agriculture Soil Conservation Service district office, the local U.S. Army Corps of Engineers district engineer, the National Park Service, State and Federal fish and wildlife agencies, and the historic preservation officer.

Comments and Objections on Permit Application

Title 30 Code of Federal Regulations Section 773.13(b)

(1) Within a reasonable time established by the regulatory authority, written comments or objections on an application for a permit, significant revision to a permit under Section 774.13, or renewal of a permit under Section 774.15 may be submitted to the regulatory authority by public entities notified under Paragraph (a)(3) of this Section with respect to the effects of the proposed mining operations on the environment within their areas of responsibility.

(2) Written objections to an application for a permit, significant revision to a permit under Section 774.13, or renewal of a permit under Section 774.15 may be submitted to the regulatory authority

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by any person having an interest which is or may be adversely affected by the decision on the application, or by an officer or head of any Federal, State, or local government agency or authority, within 30 days after the last publication of the newspaper notice required by Paragraph (a) of this Section.

- (3) The regulatory authority shall, upon receipt of such written comments or objections—
- (i) Transmit a copy of the comments or objections to the applicants; and
 - (ii) File a copy for public inspection at the same public office where the application is filed.

Informal Conferences

Title 30 Code of Federal Regulations Section 773.6(c)

(1) Any person having an interest which is or may be adversely affected by the decision on the application, or an officer or head of a Federal, State, or local government agency, may request in writing that the regulatory authority hold an informal conference on the application for a permit, significant revision to a permit under Section 774.13, or renewal of a permit under Section 774.15. The request shall—

- (i) Briefly summarize the issues to be raised by the requestor at the conference;
- (ii) State whether the requestor desires to have the conference conducted in the locality of the proposed operation; and
- (iii) Be filed with the regulatory authority no later than 30 days after the last publication of the newspaper advertisement required under Paragraph (a) of this Section.

(2) Except as provided in Paragraph (c)(3) of this Section, if an informal conference is requested in accordance with Paragraph (c)(1) of this Section, the regulatory authority shall hold an informal conference within a reasonable time following the receipt of the request. The informal conference shall be conducted as follows:

- (i) If requested under Paragraph (c)(1)(ii) of this Section, it shall be held in the locality of the proposed surface coal mining and reclamation operation.
- (ii) The date, time, and location of the informal conference shall be sent to the applicant and other parties to the conference and advertised by the regulatory authority in a newspaper of general circulation in the locality of the proposed surface coal mining and reclamation operation at least 2 weeks before the scheduled conference.
- (iii) If requested in writing by a conference requestor at a reasonable time before the conference, the regulatory authority may arrange with the applicant to grant parties to the conference access to the proposed permit area and, to the extent that the applicant has the right to grant access to it, to the adjacent area prior to the established date of the conference for the purpose of gathering information relevant to the conference.

Written Findings by the Regulatory Authority

No permit application or application for a significant revision of a permit shall be approved unless the application affirmatively demonstrates and the regulatory authority finds, in writing, on the basis of information set forth in the application or from information otherwise available that is documented in the approval, the following:

(1) The application is complete and accurate and the applicant has complied with all requirements of the Act and the regulatory program.

(2) The applicant has demonstrated that reclamation as required by the Act and the regulatory program can be accomplished under the reclamation plan contained in the permit application.

(3) The proposed permit area is--

(i) Not within an area under study or administrative proceedings under a petition, filed pursuant to Parts 764 and 769 of this Chapter, to have an area designated as unsuitable for surface coal mining operations, unless the applicant demonstrates that before January 4, 1977, he had made substantial legal and financial commitments in relation to the operation covered by the permit application; or

(ii) Not within an area designated as unsuitable for mining pursuant to Parts 762, 764, and 769 of this Chapter or subject to the prohibitions or limitations of Section 761.11 of this Chapter.

(5) The regulatory authority has made an assessment of the probable cumulative impacts of all anticipated coal mining on the hydrologic balance in the cumulative impact area and has determined that the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area.

(10) The operation would not affect the continued existence of endangered or threatened species or result in destruction or adverse modification of their critical habitats, as determined under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.).

(12) For a proposed remining operation where the applicant intends to reclaim in accordance with the requirements of Secs. 816.106 or 817.106 of this chapter, the site of the operation is a previously mined area as defined in Sec. 701.5 of this chapter.

(13) For permits to be issued under Sec. 785.25 of this chapter, the permit application must contain:

(i) Lands eligible for remining;

(ii) An identification of the potential environmental and safety problems related to prior mining activity which could reasonably be anticipated to occur at the site; and

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(iii) Mitigation plans to sufficiently address these potential environmental and safety problems so that reclamation as required by the applicable requirements of the regulatory program can be accomplished.

Reporting of Technical Data

Title 30 Code of Federal Regulations Section 777.13

(a) All technical data submitted in the application shall be accompanied by the names of persons or organizations that collected and analyzed the data, dates of the collection and analysis of the data, and descriptions of the methodology used to collect and analyze the data.

(b) Technical analyses shall be planned by or under the direction of a professional qualified in the subject to be analyzed.

Coordination with the US Fish and Wildlife Service

Title 30 Code of Federal Regulations Section 780.16 (*Fish and Wildlife Information*)

(a) *Resource Information.* Each application shall include fish and wildlife resource information for the permit area and adjacent area.

(1) The scope and level of detail for such information shall be determined by the regulatory authority in consultation with State and Federal agencies with responsibilities for fish and wildlife and shall be sufficient to design the protection and enhancement plan required under paragraph (b) of this section.

(2) Site-specific resource information necessary to address the respective species or habitats shall be required when the permit area or adjacent area is likely to include:

(i) Listed or proposed endangered or threatened species of plants or animals or their critical habitats listed by the Secretary under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), or those species or habitats protected by similar State statutes;

(ii) Habitats of unusually high value for fish and wildlife such as important streams, wetlands, riparian areas, cliffs supporting raptors, areas offering special shelter or protection, migration routes, or reproduction and wintering areas; or

(iii) Other species or habitats identified through agency consultation as requiring special protection under State or Federal law.

(b) *Protection and enhancement plan.* Each application shall include a description of how, to the extent possible using the best technology currently available, the operator will minimize disturbances and adverse impacts on fish and wildlife and related environmental values, including compliance with the Endangered Species Act, during the surface coal

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mining and reclamation operations and how enhancement of these resources will be achieved where practicable. This description shall –

- (1) Be consistent with the requirements of Sec. 816.97 of this chapter;
- (2) Apply, at a minimum, to species and habitats identified under paragraph(a) of this section; and
- (3) Include –
 - (i) Protective measures that will be used during the active mining phase of operation. Such measures may include the establishment of buffer zones, the selective location and special design of haul roads and power lines, and the monitoring of surface water quality and quantity; and
 - (ii) Enhancement measures that will be used during the reclamation and postmining phase of operation to develop aquatic and terrestrial habitat. Such measures may include restoration of streams and other wetlands, retention of ponds and impoundments, establishment of vegetation for wildlife food and cover, and the replacement of perches and nest boxes. Where the plan does not include enhancement measures, a statement shall be given explaining why enhancement is not practicable.
- (c) *Fish and Wildlife Service review.* Upon request, the regulator authority shall provide the resource information required under paragraph (a) of this section and the protection and enhancement plan required under paragraph (b) of this section to the U.S. Department of the Interior, Fish and Wildlife Service Regional or Field Office for their review. This information shall be provided within 10 days of receipt of the request from the Service.

Title 30 Code of Federal Regulations Section 816.97 (*Protection of Fish, Wildlife, and Related Values*)

- (a) The operator shall, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts on fish, wildlife, and related environmental values and shall achieve enhancement of such resources where practicable.
- (b) Endangered and threatened species. No surface mining activity shall be conducted which is likely to jeopardize the continued existence of endangered or threatened species listed by the Secretary or which is likely to result in the destruction or adverse modification of designated critical habitats of such species in violation of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The operator shall promptly report to the regulatory authority any State- or federally-listed endangered or threatened species within the permit area of which the operator becomes aware. Upon notification, the regulatory authority shall consult with appropriate State and Federal fish and wildlife agencies and, after consultation, shall identify whether, and under what conditions, the operator may proceed.

Applicable Policies

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Please refer to the Session 2.

Agency Involved: Environmental Protection Agency

Domain: Terrestrial Issues

Issue: What are the short and long-term effects of individual mountaintop mining operations and associated valley fills on forests and other ecological resources within and adjacent to the mined and filled areas?

Values identified: (1) Forest health, (2) Connectivity, (3) Function, and (4) Species composition

Summary of Effects of Relevant Statutes, Regulations and Policies

Section 404(b)(1) Guidelines constitute the substantive environmental criteria used in evaluating proposals to discharge dredged or fill materials (such as valley fills) in waters of the U.S. under Section 404 of the Clean Water Act. The Corps of Engineers and EPA develop and interpret environmental criteria used in evaluating applications. EPA reviews and comments on individual permit applications, and has authority to veto proposed dredged material or fill disposal sites under Section 404(c).

Under part 230.10 of the guidelines, no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Significant degradation includes biological, physical, and chemical processes connected to wildlife dependent on aquatic ecosystems. Under part 230.11 factual determinations, broad ecosystem functions are discussed that are to be included in determination of potential short-term and long-term effects of proposed discharge of dredged or fill material. These provisions could potentially be used to protect ecological resources.

Applicable Statutory Provisions

Clean Water Act Section 404: Permits for Dredged and Fill Material

(a) Discharge into navigable waters at specified disposal sites.

The Secretary [of the Army] may issue permits, after notice and opportunity for public hearings for the discharge of dredged or fill material into the navigable waters at specified disposal sites. . .

(b) Specification for disposal sites.

Subject to subsection (c) of this section, each such disposal site shall be specified for each such permit by the Secretary:

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(1) through the application of guidelines developed by the Administrator, in conjunction with the Secretary, which guidelines shall be based upon criteria comparable to the criteria applicable to the territorial seas, the contiguous zone, and the ocean under section 403(c), and

(2) in any case where such guidelines under clause (1) alone would prohibit the specification of a site, through the application additionally of the economic impact of the site on navigation and anchorage.

C) Denial or restriction of use of defined areas as disposal sites.

The Administrator is authorized to prohibit . . . any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area . . . as a disposal site, whenever he determines, . . . that the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. Before making such determination, the Administrator shall consult with the Secretary. . .

(e) General permits on State, regional, or nationwide basis

(1) . . . the Secretary may . . . issue general permits on a State, regional, or nationwide basis for any category of activities involving discharges of dredged or fill material if the Secretary determines that the activities in such category are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will have only minimal cumulative adverse effects on the environment. Any general permit issued under this subsection shall

(A) be based on the guidelines described in subsection (b)(1) of this section, and . . .

(2) No general permit issued . . . shall be for a period of more than five years after the date of its issuance . . . and such general permit may be revoked or modified by the Secretary if, after opportunity for public hearing, the Secretary determines that the activities authorized by such general permit have an adverse impact on the environment or such activities are more appropriately authorized by individual permits.

Relevant Regulations

Part 230, Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material

230.1 Purpose and policy.

(a) The purpose of these Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material.

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(b) Congress has expressed a number of policies in the Clean Water Act. These Guidelines are intended to be consistent with and to implement those policies.

(c) Fundamental to these Guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern.

230.10 Restrictions on discharge.

Note: Because other laws may apply to particular discharges and because the Corps of Engineers or State 404 agency may have additional procedural and substantive requirements, a discharge complying with the requirement of these Guidelines will not automatically receive a permit. Although all requirements in section 230.10 must be met, the compliance evaluation procedures will vary to reflect the seriousness of the potential for adverse impacts on the aquatic ecosystems posed by specific dredged or fill material discharge activities.

(C) Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by subparts B and G, after consideration of subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in those subparts. Under these Guidelines, effects contributing to significant degradation considered individually or collectively, include:

(2) Significantly adverse effects of the discharge of pollutants on life stages of aquatic life and **other wildlife dependent on aquatic ecosystems**, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes;

230.11 Factual determinations.

The permitting authority shall determine in writing the potential short-term or long-term effects of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment in light of subparts C through F. Such factual determinations shall be used in section 230.12 in making findings of compliance or non-compliance with the restrictions on discharge in section 230.10. The evaluation and testing procedures described in section 230.60 and section 230.61 of subpart G shall be used as necessary to make, and shall be described in, such determination. The determinations of effects of each proposed discharge shall include the following:

(E) Aquatic ecosystem and organism determinations. Determine the nature and degree of effect that the proposed discharge will have, **both individually and cumulatively, on the structure and function of the aquatic ecosystem and organisms**. Consideration shall be given to the effect at the proposed disposal site of potential changes in substrate characteristics and elevation, water or substrate chemistry, nutrients, currents, circulation, fluctuation, and salinity, on the recolonization and existence of indigenous aquatic

organisms or communities. Possible loss of environmental values (section 230.31), and actions to minimize impacts (subpart H) shall be examined. Tests as described in section 230.61 (Evaluation and Testing), may be required to provide information on the effect of the discharge material on communities or populations of organisms expected to be exposed to it.

- (E) Determination of cumulative effects on the aquatic ecosystem.
 - (1) Cumulative impacts are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems.
 - (2) Cumulative effects attributable to the discharge of dredged or fill material in waters of the United States should be predicted to the extent reasonable and practical. The permitting authority shall collect information and solicit information from other sources about the cumulative impacts on the aquatic ecosystem. This information shall be documented and considered during the decision-making process concerning the evaluation of individual permit applications, the issuance of a General permit, and monitoring and enforcement of existing permits.

- (H) Determination of secondary effects on the aquatic ecosystem.
 - (1) Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final section 404 action is taken by permitting authorities.

 - (2) Some examples of secondary effects on an aquatic ecosystem are fluctuating water levels in an impoundment and downstream associated with the operation of a dam, septic tank leaching and surface runoff from residential or commercial developments on fill, and leachate and runoff from a sanitary landfill located in waters of the U.S. Activities to be conducted on fast land created by the discharge of dredged or fill material in waters of the United States may have secondary impacts within those waters which should be considered in evaluating the impact of creating those fast lands.

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TERRESTRIAL: EPA PROGRAMMATIC REVIEW

Agency Involved: Environmental Protection Agency

Domain: Terrestrial issues

Issue: What are the short and long-term effects of individual mountaintop mining operations and associated valley fills on the terrestrial habitats and wildlife populations (with emphasis on migratory birds and mammals) within and adjacent to the mined and filled areas?

Values identified: (1) large mammals, (2) birds, (3) Small mammals, reptiles, insects, and amphibians, and (4) endangered and threatened species

Summary of Effects of Relevant Statutes, Regulations and Policies

Section 404(b)(1) Guidelines constitute the substantive environmental criteria used in evaluating proposals to discharge dredged or fill material (such as valley fills) in waters of the U.S. under Section 404 of the Clean Water Act. The Corps of Engineers and EPA develop and interpret environmental criteria used in evaluating applications. EPA reviews and comments on individual permit applications, and has authority to veto permit decisions under Section 404(c).

Under part 230.10 of the guidelines, no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Significant degradation includes effects to wildlife, and loss of fish and wildlife habitat. Part 230.30 covers threatened and endangered species. Part 230.32 covers other wildlife and important requirements for wildlife survival. These provisions could potentially be used to protect terrestrial habitats and wildlife populations.

Applicable Statutory Provisions

Clean Water Act, Section 404: Permits for Dredged or Fill Material

(a) Discharge into navigable waters at specified disposal sites.

The Secretary [of the Army] may issue permits, after notice and opportunity for public hearings for the discharge of dredged or fill material into the navigable waters at specified disposal sites. . .

(b) Specification for disposal sites.

Subject to subsection (c) of this section, each such disposal site shall be specified for each such permit by the Secretary:

(1) through the application of guidelines developed by the Administrator, in conjunction with the Secretary, which guidelines shall be based upon criteria comparable to the criteria applicable to the territorial seas, the contiguous zone, and the ocean under section 403(c), and

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(2) in any case where such guidelines under clause (1) alone would prohibit the specification of a site, through the application additionally of the economic impact of the site on navigation and anchorage.

C) Denial or restriction of use of defined areas as disposal sites.

The Administrator is authorized to prohibit . . . any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area . . . as a disposal site, whenever he determines, . . . that the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. Before making such determination, the Administrator shall consult with the Secretary. . .

(e) General permits on State, regional, or nationwide basis

(1) . . . the Secretary may . . . issue general permits on a State, regional, or nationwide basis for any category of activities involving discharges of dredged or fill material if the Secretary determines that the activities in such category are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will have only minimal cumulative adverse effects on the environment. Any general permit issued under this subsection shall

(A) be based on the guidelines described in subsection (b)(1) of this section, and . . .

(2) No general permit issued . . . shall be for a period of more than five years after the date of its issuance . . . and such general permit may be revoked or modified by the Secretary if, after opportunity for public hearing, the Secretary determines that the activities authorized by such general permit have an adverse impact on the environment or such activities are more appropriately authorized by individual permits.

Part 230 Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material

230.1 Purpose and policy.

(a) The purpose of these Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material.

(b) Congress has expressed a number of policies in the Clean Water Act. These Guidelines are intended to be consistent with and to implement those policies.

(c) Fundamental to these Guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern.

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230.10 Restrictions on discharge.

Note: Because other laws may apply to particular discharges and because the Corps of Engineers or State 404 agency may have additional procedural and substantive requirements, a discharge complying with the requirement of these Guidelines will not automatically receive a permit.

Although all requirements in section 230.10 must be met, the compliance evaluation procedures will vary to reflect the seriousness of the potential for adverse impacts on the aquatic ecosystems posed by specific dredged or fill material discharge activities.

C) Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by subparts B and G, after consideration of subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in those subparts. Under these Guidelines, effects contributing to significant degradation considered individually or collectively, include:

- (1) Significantly adverse effects of the discharge of pollutants on human health or welfare, including but not limited to effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites.
- (2) Significantly adverse effects of the discharge of pollutants on life stages of aquatic life and **other wildlife dependent on aquatic ecosystems**, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes;
- (3) Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy; or

230.30 Threatened and endangered species.

(a) An endangered species is a plant or animal in danger of extinction throughout all or a significant portion of its range. A threatened species is one in danger of becoming an endangered species in the foreseeable future throughout all or a significant portion of its range. Listings of threatened and endangered species as well as critical habitats are maintained by some individual States and by the U.S. Fish and Wildlife Service of the Department of the Interior (codified annually at 50 CFR 17.11). The Department of Commerce has authority over some threatened and endangered marine mammals, fish and reptiles.

(b) Possible loss of values: The major potential impacts on threatened or endangered species from the discharge of dredged or fill material include:

- (1) Covering or otherwise directly killing species;

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(2) The impairment or destruction of habitat to which these species are limited. Elements of the aquatic habitat which are particularly crucial to the continued survival of some threatened or endangered species include adequate good quality water, spawning and maturation areas, nesting areas, protective cover, adequate and reliable food supply, and resting areas for migratory species. Each of these elements can be adversely affected by changes in either the normal water conditions for clarity, chemical content, nutrient balance, dissolved oxygen, pH, temperature, salinity, current patterns, circulation and fluctuation, or the physical removal of habitat; and

(3) Facilitating incompatible activities.

(c) Where consultation with the Secretary of the Interior occurs under section 7 of the Endangered Species Act, the conclusions of the Secretary concerning the impact(s) of the discharge on threatened and endangered species and their habitat shall be considered final.

230.32 Other Wildlife.

(a) Wildlife associated with aquatic ecosystems are resident and transient mammals, birds, reptiles, and amphibians.

(b) Possible loss of values: The discharge of dredged or fill material can result in the loss or change of breeding and nesting areas, escape cover, travel corridors, and preferred food sources for resident and transient wildlife species associated with the aquatic ecosystem. These adverse impacts upon wildlife habitat may result from changes in water levels, water flow and circulation, salinity, chemical content, and substrate characteristics and elevation. Increased water turbidity can adversely affect wildlife species which rely upon sight to feed, and disrupt the respiration and feeding of certain aquatic wildlife and food chain organisms. The availability of contaminants from the discharge of dredged or fill material may lead to the bioaccumulation of such contaminants in wildlife. Changes in such physical and chemical factors of the environment may favor the introduction of undesirable plant and animal species at the expense of resident species and communities. In some aquatic environments lowering plant and animal species diversity may disrupt the normal functions of the ecosystem and lead to reductions in overall biological productivity.

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TERRESTRIAL: EPA PROGRAMMATIC REVIEW

Agency Involved: Environmental Protection Agency

Domain: Terrestrial Issues

Issue: What are the short and long-term effects of individual mountaintop mining operations and associated valley fills on the visual landscape (geomorphology) within and adjacent to the mined and filled areas?

Values identified: (1) Scenic or Significant Land Forms, and Overall Geomorphological Features

Summary of Effects of Relevant Statutes, Regulations and Policies

Section 404(b)(1) Guidelines constitute the substantive environmental criteria used in evaluating proposals to discharge dredged or fill material (including valley fills) into waters of the U.S. regulated under Section 404 of the Clean Water Act. The Corps of Engineers, as the permitting authority, and EPA develop and interpret environmental criteria used in evaluating applications. EPA reviews and comments on individual permit applications, and has authority to veto proposed sites for disposal of dredged or fill material under Section 404(c).

Under part 230.10 of the guidelines, no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Under the guidelines, effects contributing to significant degradation include those discharges of pollutants that adversely effect aesthetic values. It is possible that aesthetic values could include visual resources.

Applicable Statutory Provisions

Clean Water Act, Section 404: Permits for Dredged and Fill Material

(a) Discharge into navigable waters at specified disposal sites.

The Secretary [of the Army] may issue permits, after notice and opportunity for public hearings for the discharge of dredged or fill material into the navigable waters at specified disposal sites. . .

(b) Specification for disposal sites.

Subject to subsection (c) of this section, each such disposal site shall be specified for each such permit by the Secretary:

(1) through the application of guidelines developed by the Administrator, in conjunction with the Secretary, which guidelines shall be based upon criteria comparable to the criteria applicable to the territorial seas, the contiguous zone, and the ocean under section 403(c), and

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(2) in any case where such guidelines under clause (1) alone would prohibit the specification of a site, through the application additionally of the economic impact of the site on navigation and anchorage.

(c) Denial or restriction of use of defined areas as disposal sites.

The Administrator is authorized to prohibit . . . any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area . . . as a disposal site, whenever he determines, . . . that the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. Before making such determination, the Administrator shall consult with the Secretary. . .

(e) General permits on State, regional, or nationwide basis

(1) . . . the Secretary may . . . issue general permits on a State, regional, or nationwide basis for any category of activities involving discharges of dredged or fill material if the Secretary determines that the activities in such category are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will have only minimal cumulative adverse effects on the environment. Any general permit issued under this subsection shall

(A) be based on the guidelines described in subsection (b)(1) of this section, and . . .

(2) No general permit issued . . . shall be for a period of more than five years after the date of its issuance . . . and such general permit may be revoked or modified by the Secretary if, after opportunity for public hearing, the Secretary determines that the activities authorized by such general permit have an adverse impact on the environment or such activities are more appropriately authorized by individual permits.

Relevant Regulations

Part 230_section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material

230.1 Purpose and policy.

(a) The purpose of these Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material.

(b) Congress has expressed a number of policies in the Clean Water Act. These Guidelines are intended to be consistent with and to implement those policies.

(c) Fundamental to these Guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in

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combination with known and/or probable impacts of other activities affecting the ecosystems of concern.

230.10 Restrictions on discharge.

Note: Because other laws may apply to particular discharges and because the Corps of Engineers or State 404 agency may have additional procedural and substantive requirements, a discharge complying with the requirement of these Guidelines will not automatically receive a permit.

Although all requirements in section 230.10 must be met, the compliance evaluation procedures will vary to reflect the seriousness of the potential for adverse impacts on the aquatic ecosystems posed by specific dredged or fill material discharge activities.

(c) Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by subparts B and G, after consideration of subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in those subparts. Under these Guidelines, effects contributing to significant degradation considered individually or collectively, include:

(3) Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy; or

(4) Significantly adverse effects of discharge of pollutants on recreational, aesthetic, and economic values.

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APPENDIX B

TERRESTRIAL: OSM PROGRAMMATIC REVIEW

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Terrestrial

Issue: How can our regulations, policies, guidance mitigate disturbance to forests and other ecological resources?

Value(s) Identified: Ecological resources include forest health, connectivity, function, and natural species diversity.

Summary of Effects of Relevant Statutes, Regulations, and Policies

SMCRA provides for the protection of forests by comprehensive and detailed permitting requirements and performance standards.

Applicable Statutory Provisions

General Provisions

SMCRA section 101. The Congress finds and declares that

(c) many surface mining operations result in disturbances of surface areas that burden and adversely affect commerce and the public welfare by destroying or diminishing the utility of land for commercial, industrial, residential, recreational, agricultural, and forestry purposes,, . . . ;

(d) the expansion of coal mining to meet the Nation's energy needs makes even more urgent the establishment of appropriate standards to minimize damage to the environment and to productivity of the soil and to protect the health and safety of the public;

(e) surface mining and reclamation technology are now developed so that effective and reasonable regulation of surface coal mining operations by the States and by the Federal Government in accordance with the requirements of this Act is an appropriate and necessary means to minimize so far as practicable the adverse social, economic, and environmental effects of such mining operations;

Reclamation Plan Requirements

SMCRA section 508(a)

Each reclamation plan submitted as part of a permit application pursuant to any approved State program or a Federal program under the provisions of this Act shall include, in the degree of detail necessary to demonstrate that reclamation required by the State or Federal program can be accomplished, a statement of:

- (1) the identification of the lands subject to surface coal mining operations over the estimated life of those operations and the size, sequence, and timing of the subareas for which it is anticipated that individual permits for mining will be sought;
- (2) the condition of the land to be covered by the permit prior to any mining including:
 - (A) the uses existing at the time of the application, and if the land has a history of previous mining, the uses which preceded any mining; and
 - (B) the capability of the land prior to any mining to support a variety of uses giving consideration to soil and foundation characteristics, topography, and vegetative cover, and, if applicable, a soil survey prepared pursuant to section 507(b)(16); and
 - (C) the productivity of the land prior to mining, including appropriate classification as prime farm lands, as well as the average yield of food, fiber, forage, or wood products from such lands obtained under high levels of management;
- (3) the use which is proposed to be made of the land following reclamation, including a discussion of the utility and capacity of the reclaimed land to support a variety of alternative uses and the relationship of such use to existing land use policies and plans, and the comments of any owner of the surface, State and local governments or agencies thereof which would have to initiate, implement, approve or authorize the proposed use of the land following reclamation;
- (4) a detailed description of how the proposed post mining land use is to be achieved and the necessary support activities which may be needed to achieve the proposed land use;
- (5) the engineering techniques proposed to be used in mining and reclamation and a description of the major equipment; a plan for the control of surface water drainage and of water accumulation; a plan, where appropriate, for backfilling, soil stabilization, and compacting, grading, and appropriate revegetation; a plan for soil reconstruction, replacement, and stabilization, pursuant to the performance standards in section 515(b)(7)(A), (B), (C), and (D), for those food, forage, and forest lands identified in sections 515(b)(7); an estimate of the cost per acre of the

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reclamation, including a statement as to how the permittee plans to comply with each of the requirements set out in section 515;

(6) the consideration which has been given to maximize the utilization and conservation of the solid fuel resource being recovered so that re-affecting the land in the future can be minimized;

(7) a detailed estimated timetable for the accomplishment of each major step in the reclamation plan;

Performance Standards

SMCRA section 515(b)

General performance standards shall be applicable to all surface coal mining and reclamation operations and shall require the operation as a minimum to --

(1) conduct surface coal mining operations so as to maximize the utilization and conservation of the solid fuel resource being recovered so that re-affecting the land in the future through surface coal mining can be minimized;

(2) restore the land affected to a condition capable of supporting the uses which it was capable of supporting prior to any mining, or higher or better uses of which there is reasonable likelihood, so long as such use or uses do not present any actual or probable hazard to public health or safety or pose any actual or probable threat of water diminution or pollution, and the permit applicants' declared proposed land use following reclamation is not deemed to be impractical or unreasonable, inconsistent with applicable land use policies and plans, involves unreasonable delay in implementation, or violates Federal, State, or local law;

(5) remove the topsoil from the land in a separate layer, replace it on the backfill area, or if not utilized immediately, segregate it in a separate pile from other spoil and when the topsoil is not replaced on a backfill area within a time short enough to avoid deterioration of the topsoil, maintain a successful cover by quick growing plant or other means thereafter so that the topsoil is preserved from wind and water erosion, remains free of any contamination by other acid or toxic material, and is in a usable condition for sustaining vegetation when restored during reclamation, except if topsoil is of insufficient quantity or of poor quality for sustaining vegetation, or if other strata can be shown to be more suitable for vegetation requirements, then the operator shall remove, segregate, and preserve in a like manner such other strata which is best able to support vegetation;

(6) restore the topsoil or the best available subsoil which is best able to support vegetation;

Applicable Regulations

Definitions

Title 30 Code of Federal Regulations Section 701.5

Land use means specific uses or management-related activities, rather than the vegetation or cover of the land. Land uses may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the use. Changes of land use from one of the following categories to another shall be considered as a change to an alternative land use which is subject to approval by the regulatory authority.

- (a) Cropland. Land used for the production of adapted crops for harvest, alone or in rotation with grasses and legumes, that include row crops, small grain crops, hay crops, nursery crops, orchard crops, and other similar crops.
- (b) Pastureland or land occasionally cut for hay. Land used primarily for the long-term production of adapted, domesticated forage plants to be grazed by livestock or occasionally cut and cured for livestock feed.
- (c) Grazingland. Land used for grasslands and forest lands where the indigenous vegetation is actively managed for grazing, browsing, or occasional hay production.
- (d) Forestry. Land used or managed for the long-term production of wood, wood fiber, or wood-derived products.
- (e) Residential. Land used for single- and multiple-family housing, mobile home parks, or other residential lodgings.
- (f) Industrial/Commercial. Land used for-- (1) Extraction or transformation of materials for fabrication of products, wholesaling of products, or long-term storage of products. This includes all heavy and light manufacturing facilities. (2) Retail or trade of goods or services, including hotels, motels, stores, restaurants, and other commercial establishments.
- (g) Recreation. Land used for public or private leisure-time activities, including developed recreation facilities such as parks, camps, and amusement areas, as well as areas for less intensive uses such as hiking, canoeing, and other undeveloped recreational uses.
- (h) Fish and wildlife habitat. Land dedicated wholly or partially to the production, protection, or management of species of fish or wildlife.
- (i) Developed water resources. Land used for storing water for beneficial uses, such as stock ponds, irrigation, fire protection, flood control, and water supply.

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(j) **Undeveloped land or no current use or land management.** Land that is undeveloped or, if previously developed, land that has been allowed to return naturally to an undeveloped state or has been allowed to return to forest through natural succession.

Reference area means a land unit maintained under appropriate management for the purpose of measuring vegetation ground cover, productivity, and plant species diversity that are produced naturally or by crop production methods approved by the regulatory authority. Reference areas must be representative of geology, soil, slope, and vegetation in the permit area.

Title 30 Code of Federal Regulations Section 761.5

Significant forest cover means an existing plant community consisting predominantly of trees and other woody vegetation.

Application Information - Vegetation

Title 30 Code of Federal Regulations Section 779.19

(a) The permit application shall, if required by the regulatory authority, contain a map that delineates existing vegetative types and a description of the plant communities within the proposed permit area and within any proposed reference area. This description shall include information adequate to predict the potential for reestablishing vegetation.

(b) When a map or aerial photograph is required, sufficient adjacent areas shall be included to allow evaluation of vegetation as important habitat for fish and wildlife for those species of fish and wildlife identified under 30CFR 780.16.

Maps: General requirements

Title 30 Code of Federal Regulations Section 779.24

The permit application shall include maps showing . . . (f) The location and boundaries of any proposed reference areas for determining the success of revegetation;

Fish and Wildlife Information Protection and Enhancement Plan

Title 30 Code of Federal Regulations Section 780.16(b)

Each application shall include a description of how, to the extent possible using the best technology currently available, the operator will minimize disturbances and adverse impacts on fish and wildlife and related environmental values, including compliance with the Endangered Species Act, during the surface coal mining and reclamation operations and how enhancement of these resources will be achieved where practicable. This description shall –

(1) Be consistent with the requirements of Sec. 816.97 of this chapter;

(2) Apply, at a minimum, to species and habitats identified under paragraph(a) of this section; and

(3) Include -- (i) Protective measures that will be used during the active mining phase of operation. Such measures may include the establishment of buffer zones, the selective location and special design of haul roads and power lines, and the monitoring of surface water quality and quantity; and (ii) Enhancement measures that will be used during the reclamation and post mining phase of operation to develop aquatic and terrestrial habitat. Such measures may include restoration of streams and other wetlands, retention of ponds and impoundments, establishment of vegetation for wildlife food and cover, and the replacement of perches and nest boxes. Where the plan does not include enhancement measures, a statement shall be given explaining why enhancement is not practicable.

Reclamation plan: General requirements

Title 30 Code of Federal Regulations Section 780.18(b)

Each plan shall contain the following information for the proposed permit area--

- (1) A detailed timetable for the completion of each major step in the reclamation plan;
- (2) A detailed estimate of the cost of reclamation of the proposed operations required to be covered by a performance bond under Subchapter J of this Chapter, with supporting calculations for the estimates;
- (3) A plan for backfilling, soil stabilization, compacting, and grading, with contour maps or cross Sections that show anticipated final surface configuration of the proposed permit area, in accordance with Sections 816.102-816.107 of this Chapter;
- (4) A plan for removal, storage, and redistribution of topsoil, subsoil, and other material to meet the requirements of Section 816.22 of this Chapter. A demonstration of the suitability of topsoil substitutes or supplements under Section 816.22(b) of this Chapter shall be based upon analysis of the thickness of soil horizons, total depth, texture, percent coarse fragments, pH, and areal extent of the different kinds of soils. The regulatory authority may require other chemical and physical analyses, field-site trials, or greenhouse tests if determined to be necessary or desirable to demonstrate the suitability of the topsoil substitutes or supplements.
- (5) A plan for revegetation as required in Sections 816.111-816.116 of the Chapter, including, but not limited to, descriptions of the-- (i) Schedule of revegetation; (ii) Species and amounts per acre of seeds and seedlings to be used; (iii) Methods to be used in planting and seeding; (iv) Mulching techniques; (v) Irrigation, if appropriate, and pest and disease control measures, if any; and (vi) Measures proposed to be used to determine the success of revegetation as required in Section 816.116 of this Chapter. (vii) A soil testing plan for evaluation of the results of topsoil handling and reclamation procedures related to revegetation.

Performance Bonds

Title 30 Code of Federal Regulations Section 800.13(a)(1)

Performance bond liability shall be for the duration of the surface coal mining and reclamation operation and for a period which is coincident with the operator's period of extended responsibility for successful revegetation provided in Section 816.116 or 817.116 of this Chapter or until achievement of the reclamation requirements of the Act, regulatory programs, and permit, whichever is later.

Performance Standards - General

Title 30 Code of Federal Regulations Section 810.2

The objective of this Subchapter is to ensure that coal exploration and surface coal mining and reclamation operations are conducted in a manner that is compatible with the environmental, social, and esthetic needs of the Nation. Accordingly, the performance standards and design requirements in this Subchapter will provide for—

- (a) Protection of the health, safety, and general welfare of mine workers and the public;
- (b) Maximum use and conservation of the solid fuel resource being recovered so that re-affecting the land through future surface coal mining operations can be minimized;
- (c) Prompt reclamation of all affected areas to conditions that are capable of supporting the premining land uses or higher or better land uses;
- (d) Reclamation of land affected by surface coal mining operations as contemporaneously as practicable with mining operations;
- (e) Minimizing, to the extent possible using the best technology currently available, disturbances and adverse impacts on fish, wildlife, and other related environmental values, and enhancement of such resources where practicable;
- (f) Revegetation which achieves a prompt vegetative cover and recovery of productivity levels compatible with approved land uses;

Performance Standards - Topsoil and Subsoil

Title 30 Code of Federal Regulations Section 816.22

(a) Removal.

- (1)(i) All topsoil shall be removed as a separate layer from the area to be disturbed, and segregated. (ii) Where the topsoil is of insufficient quantity or poor quality for sustaining vegetation, the materials approved by the regulatory authority in accordance with Paragraph (b) of this Section shall be removed as a separate layer from the area to be disturbed, and segregated.

(2) If topsoil is less than 6 inches thick, the operator may remove the topsoil and the unconsolidated materials immediately below the topsoil and treat the mixture as topsoil.

(3) The regulatory authority may choose not to require the removal of topsoil for minor disturbances which-- (i) Occur at the site of small structures, such as power poles, signs, or fence lines; or (ii) Will not destroy the existing vegetation and will not cause erosion.

(4) Timing. All material to be removed under this Section shall be removed after the vegetative cover that would interfere with its salvage is cleared from the area to be disturbed, but before any drilling, blasting, mining, or other surface disturbance takes place.

(b) Substitutes and supplements.

Selected overburden materials may be substituted for, or used as a supplement to topsoil if the operator demonstrates to the regulatory authority that the resulting soil medium is equal to, or more suitable for sustaining vegetation than, the existing topsoil, and the resulting soil medium is the best available in the permit area to support revegetation.

(c) Storage.

(1) Materials removed under Paragraph (a) of this Section shall be segregated and stockpiled when it is impractical to redistribute such materials promptly on regraded areas.

(2) Stockpiled materials shall-- (i) Be selectively placed on a stable site within the permit area; (ii) Be protected from contaminants and unnecessary compaction that would interfere with revegetation; (iii) Be protected from wind and water erosion through prompt establishment and maintenance of an effective, quick growing vegetative cover or through other measures approved by the regulatory authority; and (iv) Not be moved until required for redistribution unless approved by the regulatory authority.

(3) Where long-term surface disturbances will result from facilities such as support facilities and preparation plants and where stockpiling of materials removed under Paragraph (a)(1) of this Section would be detrimental to the quality or quantity of those materials, the regulatory authority may approve the temporary distribution of the soil materials so removed to an approved site within the permit area to enhance the current use of that site until needed for later reclamation, provided that-- (i) Such action will not permanently diminish the capability of the topsoil of the host site; and (ii) The material will be retained in a condition more suitable for redistribution than if stockpiled.

(d) Redistribution.

(1) Topsoil materials removed under Paragraph (a) of this Section shall be redistributed in a manner that-- (i) Achieves an approximately uniform, stable thickness consistent with the approved post mining land use, contours, and surface-water drainage systems; (ii) Prevents excess compaction of the materials; and (iii) Protects the materials from wind and water erosion before and after seeding and planting.

(2) Before redistribution of the material removed under Paragraph (a) of this Section, the regraded land shall be treated if necessary to reduce potential slippage of the redistributed material and to promote root penetration. If no harm will be caused to the redistributed material and reestablished vegetation, such treatment may be conducted after such material is replaced.

(3) The regulatory authority may choose not to require the redistribution of topsoil or topsoil substitutes on the approved post mining embankments of permanent impoundments or of roads if it determines that-- (i) Placement of topsoil or topsoil substitutes on such embankments is inconsistent with the requirement to use the best technology currently available to prevent sedimentation, and (ii) Such embankments will be otherwise stabilized.

(4) Nutrients and soil amendments. Nutrients and soil amendments shall be applied to the initially redistributed material when necessary to establish the vegetative cover.

(e) Subsoil segregation. The regulatory authority may require that the B horizon, C horizon, or other underlying strata, or portions thereof, be removed and segregated, stockpiled, and redistributed as subsoil in accordance with the requirements of Paragraphs (c) and (d) of this Section if it finds that such subsoil layers are necessary to comply with the revegetation requirements of Sections 816.111, 816.113, 816.114, and 816.116 of this Chapter.

Title 30 Code of Federal Regulations Section 816.41(f)(1)

Drainage from acid- and toxic-forming materials into surface water and ground water shall be avoided by-- (i) Identifying and burying and/or treating, when necessary, materials which may adversely affect water quality, or be detrimental to vegetation or to public health safety if not buried and/or treated,

Title 30 Code of Federal Regulations Section 816.45

(a) Appropriate sediment control measures shall be designed, constructed, and maintained using the best technology currently available to:

(1) Prevent, to the extent possible, additional contributions of sediment to stream flow or to runoff outside the permit area,

(2) Meet the more stringent of applicable State or Federal effluent limitations, (3) Minimize erosion to the extent possible.

(b) Sediment control measures include practices carried out within and adjacent to the disturbed area. The sedimentation storage capacity of practices in and downstream from the disturbed area shall reflect the degree to which successful mining and reclamation techniques are applied to reduce erosion and control sediment. Sediment control measures consist of the utilization of proper mining and reclamation methods and sediment control practices, singly or in combination. Sediment control methods include but are not limited to--

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- (1) Disturbing the smallest practicable area at any one time during the mining operation through progressive backfilling, grading, and prompt revegetation as required in Section 816.111(b);

Title 30 Code of Federal Regulations Section 816.71(a)

General. Excess spoil shall be placed in designated disposal areas within the permit area, in a controlled manner to . . . (3) Ensure that the final fill is suitable for reclamation and revegetation compatible with the natural surroundings and the approved post mining land use.

Title 30 Code of Federal Regulations Section 816.100

Reclamation efforts, including but not limited to backfilling, grading, topsoil replacement, and revegetation, on all land that is disturbed by surface mining activities shall occur as contemporaneously as practicable with mining operations, except when such mining operations are conducted in accordance with a variance for concurrent surface and underground mining activities issued under Section 785.18 of this Chapter.

Title 30 Code of Federal Regulations Section 816.111

(a) The permittee shall establish on regraded areas and on all other disturbed areas except water areas and surface areas of roads that are approved as part of the post mining land use, a vegetative cover that is in accordance with the approved permit and reclamation plan and that is

- (1) Diverse, effective, and permanent;
- (2) Comprised of species native to the area, or of introduced species where desirable and necessary to achieve the approved post mining land use and approved by the regulatory authority;
- (3) At least equal in extent of cover to the natural vegetation of the area; and
- (4) Capable of stabilizing the soil surface from erosion.

(b) The reestablished plant species shall—

- (1) Be compatible with the approved post mining land use;
- (2) Have the same seasonal characteristics of growth as the original vegetation;
- (3) Be capable of self-regeneration and plant succession;
- (4) Be compatible with the plant and animal species of the area; and
- (5) Meet the requirements of applicable State and Federal seed, poisonous and noxious plant, and introduced species laws or regulations.

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(c) The regulatory authority may grant exception to the requirements of Paragraphs (b)(2) and (b)(3) of this Section when the species are necessary to achieve a quick-growing, temporary, stabilizing cover, and measures to establish permanent vegetation are included in the approved permit and reclamation plan.

(d) When the regulatory authority approves a cropland post mining land use, the regulatory authority may grant exception to the requirements of Paragraphs(a)(1), (a)(3), (b)(2), and (b)(3) of this Section. The requirements of Part 823 of this Chapter apply to areas identified as prime farmland.

Title 30 Code of Federal Regulations Section 816.113

Disturbed areas shall be planted during the first normal period for favorable planting conditions after replacement of the plant-growth medium. The normal period for favorable planting is that planting time generally accepted locally for the type of plant materials selected.

Title 30 Code of Federal Regulations Section 816.114

Suitable mulch and other soil stabilizing practices shall be used on all areas that have been regraded and covered by topsoil or topsoil substitutes. The regulatory authority may waive this requirement if seasonal, soil, or slope factors result in a condition where mulch and other soil stabilizing practices are not necessary to control erosion and to promptly establish an effective vegetative cover.

Title 30 Code of Federal Regulations Section 816.116

(a) Success of revegetation shall be judged on the effectiveness of the vegetation for the approved post mining land use, the extent of cover compared to the cover occurring in natural vegetation of the area, and the general requirements of Section 816.111.

(1) Standards for success and statistically valid sampling techniques for measuring success shall be selected by the regulatory authority and included in an approved regulatory program.

(2) Standards for success shall include criteria representative of unmined lands in the area being reclaimed to evaluate the appropriate vegetation parameters of ground cover, production, or stocking. Ground cover, production, or stocking shall be considered equal to the approved success standard when they are not less than 90 percent of the success standard. The sampling techniques for measuring success shall use a 90-percent statistical confidence interval (i.e., one-sided test with a 0.10 alpha error).

(b) Standards for success shall be applied in accordance with the approved post mining land use and, at a minimum, the following conditions:

(1) For areas developed for use as grazing land or pasture land, the groundcover and production of living plants on the revegetated area shall be at least equal to that of a reference area or such other success standards approved by the regulatory authority.

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(2) For areas developed for use as cropland, crop production on the revegetated area shall be at least equal to that of a reference area or such other success standards approved by the regulatory authority.

(3) For areas to be developed for fish and wildlife habitat, recreation, shelter belts, or forest products, success of vegetation shall be determined on the basis of tree and shrub stocking and vegetative ground cover. Such parameters are described as follows:

(i) Minimum stocking and planting arrangements shall be specified by the regulatory authority on the basis of local and regional conditions and after consultation with and approval by the State agencies responsible for the administration of forestry and wildlife programs. Consultation and approval may occur on either a programwide or a permit-specific basis.

(ii) Trees and shrubs that will be used in determining the success of stocking and the adequacy of the plant arrangement shall have utility for the approved post mining land use. Trees and shrubs counted in determining such success shall be healthy and have been in place for not less than two growing seasons. At the time of bond release, at least 80 percent of the trees and shrubs used to determine such success shall have been in place for 60 percent of the applicable minimum period of responsibility.

(iii) Vegetative ground cover shall not be less than that required to achieve the approved post mining land use.

(4) For areas to be developed for industrial, commercial, or residential use less than 2 years after regrading is completed, the vegetative groundcover shall not be less than that required to control erosion.

(5) For areas previously disturbed by mining that were not reclaimed to the requirements of this Subchapter and that are remined or otherwise redisturbed by surface coal mining operations, as a minimum, the vegetative ground cover shall be not less than the ground cover existing before redisturbance and shall be adequate to control erosion.

(c)(1) The period of extended responsibility for successful revegetation shall begin after the last year of augmented seeding, fertilizing, irrigation, or other work, excluding husbandry practices that are approved by the regulatory authority in accordance with Paragraph (c)(4) of this Section.

(2) In areas of more than 26.0 inches of annual average precipitation, the period of responsibility shall continue for a period of not less than: (i) Five full years, except as provided in paragraph (c)(2)(ii) of this section. The vegetation parameters identified in paragraph (b) of this section for grazing land, pasture land, or cropland shall equal or exceed the approved success standard during the growing season of any 2 years of the responsibility period, except the first year. Areas approved for the other uses identified in paragraph (b) of this section shall equal or exceed the applicable success standard during the growing season of the last year of the responsibility period. (ii) Two full years for lands eligible for remining included in permits issued before September 30, 2004, or any renewals thereof. To the extent that the success standards are established by paragraph

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(b)(5) of this section, the lands shall equal or exceed the standards during the growing season of the last year of the responsibility period.

(3) In areas of 26.0 inches or less average annual precipitation, the period of responsibility shall continue for a period of not less than:

(i) Ten full years, except as provided in paragraph (c)(3) (ii) below. Vegetation parameters identified in paragraph (b) of this section shall equal or exceed the approved success standard for at least the last two consecutive years of the responsibility period.

(ii) Five full years for lands eligible for remining included in permits issued before September 30, 2004, or any renewals thereof. To the extent that the success standards are established by paragraph (b)(5) of this section, the lands shall equal or exceed the standards during the growing seasons of the last two consecutive years of the responsibility period.

(4) The regulatory authority may approve selective husbandry practices, excluding augmented seeding, fertilization, or irrigation, provided it obtains prior approval from the Director in accordance with Sec. 732.17 of this chapter that the practices are normal husbandry practices, without extending the period of responsibility for revegetation success and bond liability, if such practices can be expected to continue as part of the post mining land use or if discontinuance of the practices after the liability period expires will not reduce the probability of permanent revegetation success. Approved practices shall be normal husbandry practices within the region for unmined lands having land uses similar to the approved post mining land use of the disturbed area, including such practices as disease, pest, and vermin control; and any pruning, reseeding, and transplanting specifically necessitated by such actions.

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Title 30 Code of Federal Regulations Section 816.200

The following interpretations or rules promulgated in Part 816 of this Chapter have been adopted by the Office of Surface Mining Reclamation and Enforcement . . . (c) Interpretation of Section 816.22(e) Topsoil removal

(1) Results of physical and chemical analyses of overburden and topsoil to demonstrate that the resulting soil medium is equal to or more suitable for sustaining revegetation than the available topsoil, provided that trials, and tests are certified by an approved laboratory in accordance with Section 816.22(e)(1)(ii), may be obtained from any one or a combination of the following sources: (i) U. S. Department of Agriculture Soil Conservation Service published data based on established soil series; (ii) U. S. Department of Agriculture Soil Conservation Service Technical Guides; (iii) State agriculture agency, university, Tennessee Valley Authority, Bureau of Land Management or U. S. Department of Agriculture Forest Service published data based on soil series properties and behavior, or (iv) Results of physical and chemical analyses, field site trials, or greenhouse tests of the topsoil and overburden materials (soil series) from the permit area.

(2) If the operator demonstrates through soil survey or other data that the topsoil and unconsolidated material are insufficient and substitute materials will be used, only the substitute materials must be analyzed in accordance with Section 816.22(e)(1)(i).

Applicable Policies

None

Programmatic Review

Deliverable Form

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Terrestrial

Issue: How can our regulations, policies, guidance minimize the impact to and enhance the protection of terrestrial biota affected by mountaintop mining operations and valley fills?

Value(s) Identified: Terrestrial biota include large mammals, birds, small mammals, reptiles, insects, and amphibians and their respective habitat; and unique native plants. Special consideration should be given to threatened and endangered species.

Summary of Effects of Relevant Statutes, Regulations, and Policies

Terrestrial biota are protected in four principles ways under SMCRA. The habitat for unique or threatened and endangered species may be protected from mining by prohibiting or limiting mining in a given area. This may be accomplished by delineating certain areas as a National Wildlife Refuge, a National Wilderness Preservation Area, or other such protected areas or by designating the lands unsuitable for mining via the SMCRA petitioning process.

SMCRA compels coordination among the SMCRA regulatory agency and State and Federal fish and wildlife agencies during the permit review process and coordination among the agencies to avoid duplication and comply with various laws applicable to the protection of terrestrial biota.. It also establishes detailed permit application requirements and performance standards to minimize the adverse effects of mining on terrestrial biota..

Applicable Statutory Provisions

General Provisions

SMCRA section 101. The Congress finds and declares that

(c) many surface mining operations result in disturbances of surface areas that burden and adversely affect commerce and the public welfare by . . . destroying fish and wildlife habitats,

(d) the expansion of coal mining to meet the Nation's energy needs makes even more urgent the establishment of appropriate standards to minimize damage to the environment and to productivity of the soil and to protect the health and safety of the public;

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(e) surface mining and reclamation technology are now developed so that effective and reasonable regulation of surface coal mining operations by the States and by the Federal Government in accordance with the requirements of this Act is an appropriate and necessary means to minimize so far as practicable the adverse social, economic, and environmental effects of such mining operations;

Mining Permit Decision

SMCRA section 510 (b)

No permit or revision application shall be approved unless the application affirmatively demonstrates and the regulatory authority finds in writing on the basis of the information set forth in the application or from information otherwise available which will be documented in the approval, and made available to the applicant, that

(4) the area proposed to be mined is not included within an area designated unsuitable for surface coal mining pursuant to section 522 of this Act or is not within an area under study for such designation in an administrative proceeding commenced pursuant to section 522(a)(4)(D) or section 522(c) (unless in such an area as to which an administrative proceeding has commenced pursuant to section 522(a)(4)(D) of this Act, the operator making the permit application demonstrates that, prior to January 1, 1977, he has made substantial legal and financial commitments in relation to the operation for which he is applying for a permit);

Lands Unsuitable for Mining

SMCRA section 522

(a) . . . (3) Upon petition pursuant to subsection (c) of this section, a surface area may be designated unsuitable for certain types of surface coal mining operations if such operations will -

(A) be incompatible with existing State or local land use plans or programs; or

(B) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and esthetic values and natural systems;

(e) After the enactment of this Act and subject to valid existing rights no surface coal mining operations except those which exist on the date of enactment of this Act shall be permitted - (1) on any lands within the boundaries of units of the National Park System, the National Wildlife Refuge Systems, the National System of Trails, the National Wilderness Preservation System, the Wild and Scenic Rivers System, including study rivers designated under section 5(a) of the Wild and Scenic Rivers Act and National Recreation Areas designated by Act of Congress;

Environmental Protection Performance Standards

SMCRA section 515(b)

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General performance standards shall be applicable to all surface coal mining and reclamation operations and shall require the operation as a minimum to . . . (17) insure that the construction, maintenance, and post mining conditions of access roads into and across the site of operations will control or prevent erosion and siltation, pollution of water, damage to fish or wildlife or their habitat, or public or private property;

(24) to the extent possible using the best technology currently available, minimize disturbances and adverse impacts of the operation on fish, wildlife, and related environmental values, and achieve enhancement of such resources where practicable;

SMCRA Effect on Other Federal Laws

SMCRA section 702

(a) Nothing in this Act shall be construed as superseding, amending, modifying, or repealing the Mining and Minerals Policy Act of 1970 (30 U.S.C. 21a), the National Environmental Policy Act of 1969 (42 U.S.C. 4321-47), or any of the following Acts or with any rule or regulation promulgated thereunder, including, but not limited to . . .

- (1) The Federal Metal and Nonmetallic Mine Safety Act (30 U.S.C. 721-740).
- (2) The Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742).
- (3) The Federal Water Pollution Control Act (79 Stat. 903), as amended (33 U.S.C. 1151-1175), the State laws enacted pursuant thereto, or other Federal laws relating to preservation of water quality.
- (4) The Clean Air Act, as amended (42 U.S.C. 1857 et seq.).
- (5) The Solid Waste Disposal Act (42 U.S.C. 3251-3259).
- (6) The Refuse Act of 1899 (33 U.S.C. 407).
- (7) The Fish and Wildlife Coordination Act of 1934 (16 U.S.C. 661-666c).

Applicable Regulations

Definitions

Title 30 Code of Federal Regulations Section 700.5

Person having an interest which is or may be adversely affected or person with a valid legal interest shall include any person-- (a) Who uses any resource of economic, recreational, esthetic, or environmental value that may be adversely affected by coal exploration or surface coal mining and reclamation operations or any related action of the Secretary or the State regulatory authority; or (b) Whose property is or may be adversely affected by coal exploration or surface coal mining and reclamation operations or any related action of the Secretary or the State regulatory authority.

Title 30 Code of Federal Regulations Section 701.5

Best technology currently available means equipment, devices, systems, methods, or techniques which will (a) prevent, to the extent possible, additional contributions of suspended solids to stream flow or runoff outside the permit area, but in no event result in contributions of suspended solids in excess of requirements set by applicable State or Federal laws; and (b) minimize, to the

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extent possible, disturbances and adverse impacts on fish, wildlife and related environmental values, and achieve enhancement of those resources where practicable. The term includes equipment, devices, systems, methods, or techniques which are currently available anywhere as determined by the Director, even if they are not in routine use. The term includes, but is not limited to, construction practices, siting requirements, vegetative selection and planting requirements, animal stocking requirements, scheduling of activities and design of sedimentation ponds in accordance with Parts 816 and 817 of this Chapter. Within the constraints of the permanent program, the regulatory authority shall have the discretion to determine the best technology currently available on a case-by-case basis, as authorized by the Act and this Chapter.

Land use means specific uses or management-related activities, rather than the vegetation or cover of the land. Land uses may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the use. Changes of land use from one of the following categories to another shall be considered as a change to an alternative land use which is subject to approval by the regulatory authority. . . (h) Fish and wildlife habitat. Land dedicated wholly or partially to the production, protection, or management of species of fish or wildlife.

Title 30 Code of Federal Regulations Section 761.5

Significant recreational, timber, economic, or other values incompatible with surface coal mining operations means those values to be evaluated for their significance which could be damaged by and are not capable of existing together with, surface coal mining operations because of the undesirable effects mining would have on those values, either on the area included in the permit application or on other affected areas. Those values to be evaluated for their importance include: . . . Scenic, historic, archeologic, esthetic, fish, wildlife, plants, or cultural interests.

Title 30 Code of Federal Regulations Section 762.5

Fragile lands means areas containing natural, ecologic, scientific, or esthetic resources that could be significantly damaged by surface coal mining operations. Examples of fragile lands include valuable habitats for fish or wildlife, critical habitats for endangered or threatened species of animals or plants, uncommon geologic formations, paleontological sites, National Natural Landmarks, areas where mining may result in flooding, environmental corridors containing a concentration of ecologic and esthetic features, and areas of recreational value due to high environmental quality.

Areas Where Mining Is Prohibited or Limited

Title 30 Code of Federal Regulations Section 761.11

You may not conduct surface coal mining operations on the following lands unless you either have valid existing rights, as determined under Sec. 761.16, or qualify for the exception for existing operations under Sec. 761.12: (a) Any lands within the boundaries of: (1) The National Park System; (2) The National Wildlife Refuge System; (3) The National System of Trails; (4) The National Wilderness Preservation System; (5) The Wild and Scenic Rivers System, including study rivers designated under section 5(a) of the Wild and Scenic Rivers Act, 16 U.S.C. 1276(a), or study rivers or study river corridors established in any guidelines issued under that Act; or (6) National Recreation Areas designated by Act of Congress.

Permit Review and Coordination

Title 30 Code of Federal Regulations Section 780.16 (c)

Fish and Wildlife Service review. Upon request, the regulatory authority shall provide the resource information required under paragraph (a) of this section and the protection and enhancement plan required under paragraph (b) of this section to the U.S. Department of the Interior, Fish and Wildlife Service Regional or Field Office for their review. This information shall be provided within 10 days of receipt of the request from the Service.

Designating Lands Unsuitable for Mining

Title 30 Code of Federal Regulations Section 762.11(a)

Upon petition an area shall be designated as unsuitable for all or certain types of surface coal mining operations, if the regulatory authority determines that reclamation is not technologically and economically feasible under the Act, this Chapter, or an approved State program. (b) Upon petition an area may be (but is not required to be) designated as unsuitable for certain types of surface coal mining operations, if the operations will-- (1) Be incompatible with existing State or local land use plans or programs; (2) Affect fragile or historic lands in which the operations could result in significant damage to important historic, cultural, scientific, or esthetic values or natural systems;

Data Base and Inventory Maintenance

Title 30 Code of Federal Regulations Section 764.21

(a) The regulatory authority shall develop a data base and inventory system which will permit evaluation of whether reclamation is feasible in areas covered by petitions.

(b) The regulatory authority shall include in the system information relevant to the criteria in Section 762.11 of this Chapter, including, but not limited to, information received from the U.S. Fish and Wildlife Service, the State Historic Preservation Officer, and the agency administering Section 127 of the Clean Air Act, as amended (42 U.S.C. 7470 et seq.).

Regulatory Coordination with Requirements under Other Laws

Title 30 Code of Federal Regulations Section 773.12

Each regulatory program shall, to avoid duplication, provide for the coordination of review and issuance of permits for surface coal mining and reclamation operations with applicable requirements of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.); the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661 et seq.); the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. 703 et seq.); The National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.); the Bald Eagle Protection Act, as amended (16 U.S.C. 668a); for Federal programs only, the Archeological and Historic Preservation Act of 1974

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(16 U.S.C. 469 et seq.); and the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa et seq) where Federal and Indian lands covered by that Act are involved.

Application Requirements

Title 30 Code of Federal Regulations Section 779.19

(a) The permit application shall, if required by the regulatory authority, contain a map that delineates existing vegetative types and a description of the plant communities within the proposed permit area and within any proposed reference area. This description shall include information adequate to predict the potential for reestablishing vegetation. (b) When a map or aerial photograph is required, sufficient adjacent areas shall be included to allow evaluation of vegetation as important habitat for fish and wildlife for those species of fish and wildlife identified under 30CFR 780.16.

Title 30 Code of Federal Regulations Section 779.25(a)(2)

Elevations and locations of monitoring stations used to gather data for water quality and quantity, fish and wildlife, and air quality, if required, in preparation of the application;

Title 30 Code of Federal Regulations Section 780.16

(a) Resource Information

Each application shall include fish and wildlife resource information for the permit area and adjacent area.

(1) The scope and level of detail for such information shall be determined by the regulatory authority in consultation with State and Federal agencies with responsibilities for fish and wildlife and shall be sufficient to design the protection and enhancement plan required under paragraph (b) of this section.

(2) Site-specific resource information necessary to address the respective species or habitats shall be required when the permit area or adjacent area is likely to include: (i) Listed or proposed endangered or threatened species of plants or animals or their critical habitats listed by the Secretary under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), or those species or habitats protected by similar State statutes; (ii) Habitats of unusually high value for fish and wildlife such as important streams, wetlands, riparian areas, cliffs supporting raptors, areas offering special shelter or protection, migration routes, or reproduction and wintering areas; or (iii) Other species or habitats identified through agency consultation as requiring special protection under State or Federal law.

(b) Protection and enhancement plan.

Each application shall include a description of how, to the extent possible using the best technology currently available, the operator will minimize disturbances and adverse impacts on

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fish and wildlife and related environmental values, including compliance with the Endangered Species Act, during the surface coal mining and reclamation operations and how enhancement of these resources will be achieved where practicable. This description shall –

- (1) Be consistent with the requirements of Sec. 816.97 of this chapter;
- (2) Apply, at a minimum, to species and habitats identified under paragraph (a) of this section; and
- (3) Include -- (i) Protective measures that will be used during the active mining phase of operation. Such measures may include the establishment of buffer zones, the selective location and special design of haul roads and power lines, and the monitoring of surface water quality and quantity; and (ii) Enhancement measures that will be used during the reclamation and post mining phase of operation to develop aquatic and terrestrial habitat. Such measures may include restoration of streams and other wetlands, retention of ponds and impoundments, establishment of vegetation for wildlife food and cover, and the replacement of perches and nest boxes. Where the plan does not include enhancement measures, a statement shall be given explaining why enhancement is not practicable.

Reclamation plan: Operation Plan.

Title 30 Code of Federal Regulations Section 780.14

Each application shall contain maps and plans as follows: (a) . . . (9) Each facility to be used to protect and enhance fish and wildlife and related environmental values;

Performance Standards- General

Title 30 Code of Federal Regulations Section 810.2

The objective of this Subchapter is to ensure that coal exploration and surface coal mining and reclamation operations are conducted in a manner that is compatible with the environmental, social, and esthetic needs of the Nation. Accordingly, the performance standards and design requirements in this Subchapter will provide for-- . . . (e) Minimizing, to the extent possible using the best technology currently available, disturbances and adverse impacts on fish, wildlife, and other related environmental values, and enhancement of such resources where practicable;

Performance Standards-protection of Fish, Wildlife, and Related Environmental Values

Title 30 Code of Federal Regulations Section 816.97

- (a) The operator shall, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts on fish, wildlife, and related environmental values and shall achieve enhancement of such resources where practicable.
- (b) Endangered and threatened species. No surface mining activity shall be conducted which is likely to jeopardize the continued existence of endangered or threatened species listed by the Secretary or which is likely to result in the destruction or adverse modification of designated critical habitats of such species in violation of the Endangered

Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The operator shall promptly report to the regulatory authority any State- or federally-listed endangered or threatened species within the permit area of which the operator becomes aware. Upon notification, the regulatory authority shall consult with appropriate State and Federal fish and wildlife agencies and, after consultation, shall identify whether, and under what conditions, the operator may proceed.

(c) Bald and golden eagles. No surface mining activity shall be conducted in a manner which would result in the unlawful taking of a bald or golden eagle, its nest, or any of its eggs. The operator shall promptly report to the regulatory authority any golden or bald eagle nest within the permit area of which the operator becomes aware. Upon notification, the regulatory authority shall consult with the U.S. Fish and Wildlife Service and also, where appropriate, the State fish and wildlife agency and, after consultation, shall identify whether, and under what conditions, the operator may proceed.

(d) Nothing in this Chapter shall authorize the taking of an endangered or threatened species or a bald or golden eagle, its nest, or any of its eggs in violation of the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq., or the Bald Eagle Protection Act, as amended, 16 U.S.C. 668 et seq.

(e) Each operator shall, to the extent possible using the best technology currently available-- (1) Ensure that electric power lines and other transmission facilities used for, or incidental to, surface mining activities on the permit area are designed and constructed to minimize electrocution hazards to raptors, except where the regulatory authority determines that such requirements are unnecessary; (2) Locate and operate haul and access roads so as to avoid or minimize impacts on important fish and wildlife species or other species protected by State or Federal law; (3) Design fences, overland conveyors, and other potential barriers to permit passage for large mammals, except where the regulatory authority determines that such requirements are unnecessary; and (4) Fence, cover, or use other appropriate methods to exclude wildlife from ponds which contain hazardous concentrations of toxic-forming materials.

(f) Wetlands and habitats of unusually high value for fish and wildlife. The operator conducting surface mining activities shall avoid disturbances to, enhance where practicable, restore, or replace, wetlands, and riparian vegetation along rivers and streams and bordering ponds and lakes. Surface mining activities shall avoid disturbances to, enhance where practicable, or restore, habitats of unusually high value for fish and wildlife.

(g) Where fish and wildlife habitat is to be a post mining land use, the plant species to be used on reclaimed areas shall be selected on the basis of the following criteria: (1) Their proven nutritional value for fish or wildlife. (2) Their use as cover for fish or wildlife. (3) Their ability to support and enhance fish or wildlife habitat after the release of performance bonds. The selected plants shall be grouped and distributed in a manner which optimizes edge effect, cover, and other benefits to fish and wildlife.

(h) Where cropland is to be the post mining land use, and where appropriate for wildlife- and crop-management practices, the operator shall intersperse the fields with trees,

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hedges, or fence rows throughout the harvested area to break up large blocks of monoculture and to diversify habitat types for birds and other animals.

- (i) Where residential, public service, or industrial uses are to be the post mining land use, and where consistent with the approved post mining land use, the operator shall intersperse reclaimed lands with green belts utilizing species of grass, shrubs, and trees useful as food and cover for wildlife.

Performance Standards-Revegetation

Title 30 Code of Federal Regulations Section 816.116(b)

Standards for success shall be applied in accordance with the approved post mining land use and, at a minimum, the following conditions: . . . (3) For areas to be developed for fish and wildlife habitat, recreation, shelter belts, or forest products, success of vegetation shall be determined on the basis of tree and shrub stocking and vegetative ground cover. Such parameters are described as follows: (i) Minimum stocking and planting arrangements shall be specified by the regulatory authority on the basis of local and regional conditions and after consultation with and approval by the State agencies responsible for the administration of forestry and wildlife programs. Consultation and approval may occur on either a program wide or a permit-specific basis. (ii) Trees and shrubs that will be used in determining the success of stocking and the adequacy of the plant arrangement shall have utility for the approved post mining land use. Trees and shrubs counted in determining such success shall be healthy and have been in place for not less than two growing seasons. At the time of bond release, at least 80 percent of the trees and shrubs used to determine such success shall have been in place for 60 percent of the applicable minimum period of responsibility. (iii) Vegetative ground cover shall not be less than that required to achieve the approved post mining land use.

Performance Standards-Roads

Title 30 Code of Federal Regulations Section 816.150 (b)

Each road shall be located, designed, constructed, reconstructed, used, maintained, and reclaimed so as to: . . . (3) Control or prevent additional contributions of suspended solids to stream flow or runoff outside the permit area; . . . (6) Prevent or control damage to public or private property, including the prevention or mitigation of adverse effects on lands within the boundaries of units of the National Park System, the National Wildlife Refuge System, the National System of Trails, the National Wilderness Preservation System, the Wild and Scenic Rivers System, including designated study rivers, and National Recreation Areas designated by Act of Congress;

Performance Standards-Support Facilities

Title 30 Code of Federal Regulations Section Sec. 816.181

- (a) Support facilities shall be operated in accordance with a permit issued for the mine or coal preparation operation to which it is incident or from which its operation results.
- (b) In addition to the other provisions of this part, support facilities shall be located, maintained, and used in a manner that-- (1) Prevents or controls erosion and siltation, water pollution, and damage to public or private property; and (2) To the extent possible using the best

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Appendix B

AQUATIC: OSM PROGRAMMATIC REVIEW

Applicable Policies

None

Programmatic Review

Deliverable Form

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Terrestrial

Issue: Mountaintop mining operations and valley fills affect the visual landscape (geomorphology). How can our regulations, policies, guidance lessen this impact?

Value(s) Identified: Scenic or culturally important and unique vistas and the overall geomorphological features of the premining area.

Summary of Effects of Relevant Statutes, Regulations, and Policies

Scenic and culturally important and unique vistas may be considered fragile lands and can be protected by designating the lands associated with the vistas as unsuitable for mining. The public has the right to request that fragile lands be protected by petitioning the SMCRA regulatory authority.

Regarding the overall geomorphological features of the premining area, with certain exceptions, the mined land must be reclaimed to its approximate original contour (AOC). Both the permit application requirements and the performance standards address the issue of regrading the AOC. OSM's May 26, 1987, policy clarifies the agency's interpretation of AOC but give considerable deference to the judgement of SMCRA regulatory authority on what constitutes AOC.

Applicable Statutory Provisions

General Provisions

SMCRA section 101. The Congress finds and declares that

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(c) many surface mining operations result in disturbances of surface areas that burden and adversely affect commerce and the public welfare by destroying or diminishing the utility of land for commercial, industrial, residential, recreational, agricultural, and forestry purposes, . . . by impairing natural beauty, . . . ;

(d) the expansion of coal mining to meet the Nation's energy needs makes even more urgent the establishment of appropriate standards to minimize damage to the environment and to productivity of the soil and to protect the health and safety of the public;

(e) surface mining and reclamation technology are now developed so that effective and reasonable regulation of surface coal mining operations by the States and by the Federal Government in accordance with the requirements of this Act is an appropriate and necessary means to minimize so far as practicable the adverse social, economic, and environmental effects of such mining operations;

Mining Permit Decision

SMCRA section 510 (b)

No permit or revision application shall be approved unless the application affirmatively demonstrates and the regulatory authority finds in writing on the basis of the information set forth in the application or from information otherwise available which will be documented in the approval, and made available to the applicant, that

(4) the area proposed to be mined is not included within an area designated unsuitable for surface coal mining pursuant to section 522 of this Act or is not within an area under study for such designation in an administrative proceeding commenced pursuant to section 522(a)(4)(D) or section 522(c) (unless in such an area as to which an administrative proceeding has commenced pursuant to section 522(a)(4)(D) of this Act, the operator making the permit application demonstrates that, prior to January 1, 1977, he has made substantial legal and financial commitments in relation to the operation for which he is applying for a permit);

Lands Unsuitable for Mining

SMCRA section 522(a)(3)

Upon petition pursuant to subsection (c) of this section, a surface area may be designated unsuitable for certain types of surface coal mining operations if such operations will -

(A) be incompatible with existing State or local land use plans or programs;
or

(B) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and esthetic values and natural systems;

Definitions

SMCRA section 701(2)

Approximate original contour means that surface configuration achieved by backfilling and grading of the mined area so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain, with all highwalls and spoil piles eliminated; water impoundments may be permitted where the regulatory authority determines that they are in compliance with section 515(b)(8) of this Act;

Environmental Protection Performance Standards

SMCRA section 515(b)

General performance standards shall be applicable to all surface coal mining and reclamation operations and shall require the operation as a minimum to (3) grade in order to restore the approximate original contour of the land with all highwalls, spoil piles, and depressions eliminated (unless small depressions are needed in order to retain moisture to assist revegetation or as otherwise authorized pursuant to this Act): Provided, however, That in surface coal mining which is carried out at the same location over a substantial period of time where the operation transects the coal deposit, and the thickness of the coal deposits relative to the volume of the overburden is large and where the operator demonstrates that the overburden and other spoil and waste materials at a particular point in the permit area or otherwise available from the entire permit area is insufficient, giving due consideration to volumetric expansion, to restore the approximate original contour, the operator, at a minimum, shall backfill, grade, and compact (where advisable) using all available overburden and other spoil and waste materials to attain the lowest practicable grade but not more than the angle of repose, to provide adequate drainage and to cover all acid-forming and other toxic materials, in order to achieve an ecologically sound land use compatible with the surrounding region: And provided further, That in surface coal mining where the volume of overburden is large relative to the thickness of the coal deposit and where the operator demonstrates that due to volumetric expansion the amount of overburden and other spoil and waste materials removed in the course of the mining operation is more than sufficient to restore the approximate original contour, the operator shall after restoring the approximate contour, backfill, grade, and compact (where advisable) the excess overburden and other spoil and waste materials to attain the lowest grade but not more than the angle of repose, and to cover all acid-forming, and other toxic materials, in order to achieve an ecologically sound land use compatible with the surrounding region and that such overburden or spoil shall be shaped and graded in such a way as to prevent slides, erosion, and water pollution and is revegetated in accordance with the requirements of this Act;

Permit Application Requirements

SMCRA section 507(b)

The permit application shall be submitted in a manner satisfactory to the regulatory authority and shall contain, among other things (14) cross-sections, maps or plans of land to be affected,

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including the actual area to be mined, prepared by or under the direction of and certified by a qualified registered professional engineer, or professional geologist, with assistance from experts in related fields such as land surveying and landscape architecture, showing profiles at appropriate cross sections of the anticipated final surface configuration that will be achieved pursuant to the operator's proposed reclamation plan;

Reclamation Plan Requirements

SMCRA section 508(a)

Each reclamation plan submitted as part of a permit application pursuant to any approved State program or a Federal program under the provisions of this Act shall include, in the degree of detail necessary to demonstrate that reclamation required by the State or Federal program can be accomplished, a statement of * * * (5) the engineering techniques proposed to be used in mining and reclamation and a description of the major equipment; * * * a plan, where appropriate, for backfilling, soil stabilization, and compacting, grading, and appropriate revegetation;

Applicable Regulations

Definitions

Title 30 Code of Federal Regulations Section 700.5

Person having an interest which is or may be adversely affected or person with a valid legal interest shall include any person-- (a) Who uses any resource of economic, recreational, esthetic, or environmental value that may be adversely affected by coal exploration or surface coal mining and reclamation operations or any related action of the Secretary or the State regulatory authority; or (b) Whose property is or may be adversely affected by coal exploration or surface coal mining and reclamation operations or any related action of the Secretary or the State regulatory authority.

Title 30 Code of Federal Regulations Section 701.5

Approximate original contour means that surface configuration achieved by backfilling and grading of the mined areas so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain, with all highwalls, spoil piles, and coal refuse piles eliminated. Permanent water impoundments may be permitted where the regulatory authority has determined that they comply with Sections 816.49, 816.56, and 816.133 or 817.49, 817.56, and 817.133.

Excess spoil means spoil material disposed of in a location other than the mined-out area; Provided, That spoil material used to achieve the approximate original contour or to blend the mined-out area with the surrounding terrain in accordance with Sections 816.102(d) and 817.102(d) of this Chapter in non-steep slope areas shall not be considered excess spoil.

Title 30 Code of Federal Regulations Section 762.5

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Fragile lands means areas containing natural, ecologic, scientific, or esthetic resources that could be significantly damaged by surface coal mining operations. Examples of fragile lands include valuable habitats for fish or wildlife, critical habitats for endangered or threatened species of animals or plants, uncommon geologic formations, paleontological sites, National Natural Landmarks, areas where mining may result in flooding, environmental corridors containing a concentration of ecologic and esthetic features, and areas of recreational value due to high environmental quality.

Designating Lands Unsuitable for Mining

Title 30 Code of Federal Regulations Section. 762.11(a)

Upon petition an area shall be designated as unsuitable for all or certain types of surface coal mining operations, if the regulatory authority determines that reclamation is not technologically and economically feasible under the Act, this Chapter, or an approved State program. (b) Upon petition an area may be (but is not required to be) designated as unsuitable for certain types of surface coal mining operations, if the operations will-- (1) Be incompatible with existing State or local land use plans or programs; (2) Affect fragile or historic lands in which the operations could result in significant damage to important historic, cultural, scientific, or esthetic values or natural systems;

Reclamation plan: General requirements.

Title 30 Code of Federal Regulations Section 780.18(b)

Each plan shall contain the following information for the proposed permit area. (3) A plan for backfilling, soil stabilization, compacting, and grading, with contour maps or cross sections that show anticipated final surface configuration of the proposed permit area, in accordance with Sections 816.102-816.107 of this Chapter;

Performance Standards - Backfilling and Grading: General

Title 30 Code of Federal Regulations Section 816.102

(a) Disturbed areas shall be backfilled and graded to-- (1) Achieve the approximate original contour, except as provided in Paragraph (k) of this Section; (2) Eliminate all highwalls, spoil piles, and depressions, except as provided in Paragraph (h) (small depressions) and in Paragraph (k)(3)(iii) (previously mined highwalls) of this Section; (3) Achieve a post mining slope that does not exceed either the angle of repose or such lesser slope as is necessary to achieve a minimum long-term static safety factor of 1.3 and to prevent slides; (4) Minimize erosion and water pollution both on and off the site; and (5) Support the approved post mining land use.

(b) Spoil, except excess spoil disposed of in accordance with Sections 816.71-816.74, shall be returned to the mined-out area. (c) Spoil and waste materials shall be compacted where advisable to ensure stability or to prevent leaching of toxic materials. (d) Spoil may be placed on the area outside the mined-out area in non-steep slope areas to restore the

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approximate original contour by blending the spoil into the surrounding terrain if the following requirements are met:

Applicable Policies

OSM Directive INE-26 "Approximate Original Contour dated May 26, 1987"

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Appendix B

Agency Involved: Environmental Protection Agency, States

Domain: Human and Community

Issue: Mountaintop mining operations and valley fills can affect community resources and quality of life. Can our regulations, policies, guidance be used to minimize this impact? Community resources could include social institutions (educational, religious, recreational, military, etc.), and local public services (water and sewer service, telephone, electric, etc.).

Value(s) Identified: Drinking water/ wells

Summary of Effects of Relevant Statutes, Regulations and Polices

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides EPA with authority to assess, investigate and cleanup environmental threats resulting from mining activities (42 USC Section 9601 et seq.) Section 107(C)(4) of the CERCLA provides for the recovery of damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss. Natural resources includes drinking water supplies. Under 107(f)(1), injury to ground water is a basis for a state to bring Natural Resource Damage Assessment claims against an entity.

It is possible that these provisions could be used to address damage to well water from mining activities. The damage would most likely be from hazardous materials (metals released by acid mine drainage) that emanate from the fill material. While this legal tool is available, EPA has, as a matter of policy, relied on SMCRA to deal with such matters.

Applicable Statutory Provisions

Section 107(a)(4)(C) : [liable for] “damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release;”

107(f)(1) “Natural resources liability. In the case of an injury to, destruction of, or loss of natural resources under paragraph (C) of subsection (a) of this section liability shall be to the United States Government and to any State for natural resources within the State or belonging to, manage by, controlled by, or appertaining to such State and to any Indian tribe for natural resources belonging to, managed by, controlled by, or appertaining to such Tribe or held in trust for the benefit of such tribe, or belonging to a member of such tribe if such resources are subject to a trust restriction on alienation: Provided however, that no liability to the United States or State or Indian tribe shall be imposed under subparagraph (C) of subsection (a) of this section, where the party sought to be charged has demonstrated that the damages to natural resources complained of were specifically identified as a irreversible and irretrievable commitment of natural resources in an environmental impact statement, or other comparable environment analysis, and the decision to grant a permit or license authorizes such commitment

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of natural resources, and the facility or project was otherwise operating within the terms of its permit or license, so long as, in the case of damages to an Indian tribe occurring pursuant to a Federal permit or license, the issuance of that permit or license was not inconsistent with fiduciary duty of the United States with respect to such Indian tribe. The President, or the authorized representative of any State, shall act on behalf of the public as trustee of such natural resources to recover for such damages. Sums recovered by the United States Government as trustee under this subsection shall be retained by the trustee, without further appropriation, for use only to restore, replace, or acquire the equivalent of such natural resources. Sums recovered by a State as trustee under this subsection shall be available for use only to restore, replace, or acquire the equivalent of such natural resources by the State. The measure of damages in any action under subparagraph (C) of subsection (a) of this section shall not be limited by the sums which can be used to restore or replace such resources. There shall be no double recovery under this chapter for natural resource damages, including the costs of damage assessment or restoration, rehabilitation, or acquisition for the same release and natural resource. There shall be no recovery under the authority of subparagraph (C) of subsection (a) of this section where such damages and the release of a hazardous substance from which such damages resulted have occurred wholly before December 11, 1980.

CERCLA 42 USC Section 9601.

The term "natural resources" means land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States (including the resources of the fishery conservation zone established by the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.)), any State or local government, any foreign government, any Indian tribe, or, if such resources are subject to a trust restriction on alienation, any member of an Indian tribe.

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HUMAN & COMMUNITY; ALL AGENCIES PROGRAMMATIC REVIEW
Programmatic Review

Deliverable Form

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Human and Community **Session:** 4

Issue: How do SMCRA regulatory programs and associated guidance address the issue of protecting air resources?

Areas to be considered include: Air resources include fugitive dust, global climate change, Sulfur dioxide, Volatile organic compounds.

Summary of the Effects of Relevant Statutes, Regulations and Policies

Section 515(b)(4) of SMCRA provides that “. . . all surface coal mining and reclamation operations must stabilize and protect all surface areas . . . to effectively control erosion and attendant air and water pollution.” Shortly after the passage of SMCRA, OSM determined that fugitive dust associated with surface mining activities constituted a public health and safety problem, and in 1979, promulgated rules requiring operators to control air pollution from all their mining operations. In 1980, a United States District Court struck down and remanded the rules for revision, because it determined that SMCRA’s legislative history indicates that OSM’s authority to regulate air pollution is limited to activities related to erosion [In re: Permanent Surface Mining Regulation Litigation, C.A. 79-1144 (D.D.C., May 16, 1980)].

OSM re-promulgated its rules regulating air pollution from surface coal mining and reclamation operations in 1983. The Federal performance standards at 30 CFR 816.95 require all exposed areas of surface mining operations to be protected and stabilized to effectively control erosion and air pollution attendant to erosion. This is usually accomplished through the application of mulch to reclaimed areas after backfilling and regrading and the watering of unpaved haul roads.

In 1988, the U.S. Court of Appeals reaffirmed the district court’s ruling finding that OSM’s role in controlling air pollution is limited to pollution attendant to erosion. The Appeals Court found that EPA has the authority under the Clean Air Act (CAA) to regulate fugitive dust from surface mining operations [NWF v. Hodel, C.A. 84-5743 (U.S. Court of Appeals D.C. Circuit, January 29, 1988)].

Applicable Statutory Provisions

Permit Application Requirements

SMCRA section 508(a)

Each reclamation plan submitted as part of a permit application pursuant to any approved State program or a Federal program under the provisions of this Act shall include, in the degree of detail necessary to demonstrate that reclamation required by the State or Federal program can be accomplished, a statement of:

* * *

(9) the steps to be taken to comply with applicable air and water quality laws and regulations and any applicable health and safety standards;

* * *

Performance Requirements

SMCRA section 515(b)

General performance standards shall be applicable to all surface coal mining and reclamation operations and shall require the operation as a minimum to --

* * *

(4) stabilize and protect all surface areas including spoil piles affected by the surface coal mining and reclamation operation to effectively control erosion and attendant air and water pollution;

* * *

Applicable Regulations

Permit application requirements

Title 30 Code of Federal Regulations Section 780.15

(a) For all surface mining activities with projected production rates exceeding 1,000,000 tons of coal per year and located west of the 100th meridian west longitude, the application shall contain an air pollution control plan which includes the following:

(1) An air quality monitoring program to provide sufficient data to evaluate the effectiveness of the fugitive dust control practices proposed under Paragraph (a)(2) of this Section to comply with Federal and State air quality standards; and

(2) A plan for fugitive dust control practices as required under Section 816.95 of this Chapter.

(b) For all other surface mining activities the application shall contain an air pollution control plan which includes the following:

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HUMAN & COMMUNITY: ALL AGENCIES PROGRAMMATIC REVIEW

(1) An air quality monitoring program, if required by the regulatory authority, to provide sufficient data to evaluate the effectiveness of the fugitive dust control practices under Paragraph (b)(2) of this Section to comply with applicable Federal and State air quality standards; and

(2) A plan for fugitive dust control practices, as required under Section 816.95 of this Chapter.

Performance Standards

Title 30 Code of Federal Regulations Section 816.95

(a) All exposed surface areas shall be protected and stabilized to effectively control erosion and air pollution attendant to erosion.

(b) Rills and gullies, which form in areas that have been regraded and topsoiled and which either (1) Disrupt the approved postmining land use or the reestablishment of the vegetative cover, or (2) Cause or contribute to a violation of water-quality standards for receiving streams; shall be filled, regraded, or otherwise stabilized; topsoil shall be replaced; and the areas shall be reseeded or replanted.

Applicable Policies

None

Agency Involved: All

Relevant Provision: Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

Domain: Human and Community

Issue: Mountaintop mining operations and valley fills can affect community resources and quality of life. Can our regulations, policies, guidance be used to avoid or minimize this impact? Community resources include social institutions (educational, religious, recreational, military, etc.), and local public services (water and sewer service, telephone, electric, etc.).

Values Identified: Community Resources, Quality of Life

Summary of Effects of Relevant Statutes, Regulations, and Policies

The Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations aims Federal attention on environmental and human health conditions in minority and low-income communities. The Order intends to promote nondiscrimination in Federal programs affecting human health and the environment and to provide low-income and minority communities access to public information and an opportunity

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for public participation. The Executive Memorandum accompanying the Order emphasizes the importance of preventing minority and low-income communities from being subject to disproportionately high and adverse environmental effects.

Under NEPA, each Federal Agency must analyze the environmental effects, including human health, economic, and social effects of Federal actions, on minority and low-income communities. Mitigation measures, outlined or analyzed in environmental assessments, environmental impact statements, or records of decision, should address significant and adverse environmental effects of proposed Federal actions on minority and low-income communities. Through the review of proposed actions of other Federal Agencies, EPA under section 309 of the Clean Air Act will ensure that the involved agency has fully analyzed environmental effects on minority and low-income communities, including human health, social, and economic effects.

Federal Agencies shall include diverse segments of the population in research, data collection, and analysis to determine whether their programs, policies, and activities have disproportionately high and adverse effects on minority or low-income populations. Federal Agencies will collect, maintain, and analyze information on subsistence consumption of fish and wildlife whenever practicable and appropriate.

Agency Involved: U.S. Environmental Protection Agency

Relevant Provision: Section 309 of the Clean Air Act
Policies and Procedures for the Review of Federal Actions Impacting the Environment (October 3, 1984)

Domain: Human and Community

Issue: Mountaintop mining operations and valley fills can affect community resources and quality of life. Can our regulations, policies, guidance be used to avoid or minimize this impact? Community resources include social institutions (educational, religious, recreational, military, etc.), and local public services (water and sewer service, telephone, electric, etc.).

Values Identified: Community Resources, Quality of Life

Summary of Effects of Relevant Statutes, Regulations, and Policies

Under Section 309 of the Clean Air Act, EPA has responsibility to review and comment on the environmental impact of any legislation, regulation, or major action proposed by federal agencies. If EPA determines that the legislation, regulation, or action is unsatisfactory from the standpoint of public, health or welfare or environmental quality, EPA publishes the determination and refers the matter to the Council on Environmental Quality.

The Policy and Procedures for the Review of Federal Actions Impacting the Environment establishes how EPA carries out its responsibilities to review. EPA may review and comment on Environmental Assessments. EPA must review all Environmental Impact Statements. As part of its review, EPA rates the environmental impacts of the proposed action. EPA also rates the

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adequacy of the environmental impact statement with regards to the sufficiency of the information.

General Provisions

Policies and Procedures for the Review of Federal Actions
Impacting the Environment
1640 1984 Edition (10/3/1984)

2. STATUTORY AUTHORITIES

B. Section 309 of the Clean Air Act, as amended, requires EPA to review and comment in writing on the environmental impact of any matter relating to...(1) legislation proposed by a Federal department or agency; (2) newly authorized Federal projects for construction and any major Federal action, or actions, other than a project for construction, (3) proposed regulations...In the event that the proposed legislation, action, or regulations determined to be unsatisfactory from the standpoint of public health, welfare, or environmental quality, the determination will be published and the matter referred to CEQ.

3. POLICY.

A. EPA will carry out the environmental review process in conjunction with EPA's other authorities to:

(1) Participate in interagency coordination early in the planning process to identify significant environmental issues;

(2) Conduct follow-up coordination on actions where EPA has identified significant environmental impacts to ensure a full understanding of the issues and to ensure implementation of appropriate corrective actions; and

(3) Identify environmentally unsatisfactory proposals and consult with other agencies, including the CEQ, to achieve timely resolution of the major issues and problems.

B. EPA will assist other Federal agencies in:

(1) Achieving the goals set forth in the NEPA;

(2) Meeting the objectives and complying with the requirements of the laws and regulations administered by EPA; and

(3) Developing concise, well-reasoned decision documents that identify project impacts, a range of project alternatives, and mitigation measures that avoid or minimize adverse effects.

CHAPTER 4 - REVIEW OF DRAFT ENVIRONMENTAL IMPACT STATEMENTS

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HUMAN & COMMUNITY: OSM PROGRAMMATIC REVIEW 2.00 DRAFT EIS REVIEW MANAGEMENT

B. CATEGORIZATION AND AGENCY NOTIFICATION SYSTEM FOR DEIS'S

(1) After completing the review of the DEIS, the principal reviewer will categorize or rate the EIS according to the attached alpha numeric system. The rating will generally be based on the Agency's preferred alternative. Reviewer may rate individual alternatives.

(2) Reviewer will also rate the adequacy of the DEIS.

Programmatic Review

Deliverable Form

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Human and Community

Issue: Mountaintop mining operations and valley fills can affect community resources and quality of life. Can our regulations, policies, guidance be used to minimize this impact? Community resources could include social institutions (educational, religious, recreational, military, etc.), and local public services (water and sewer service, telephone, electric, etc.).

Value(s) Identified: Community Resources, Quality of Life

Summary of Effects of Relevant Statutes, Regulations, and Policies

Congress as stated in SMCRA recognized that coal mining contributes to the Nation's energy requirements but they also recognized that the disturbances from surface coal mining burdens and adverse affects commerce and public welfare by destroying or diminishing the utility of the land, personal property, natural beauty, and the quality of life of communities. Congress stated that surface mining and technology are developed to the point that effective and reasonable regulation of surface coal mining operations in accordance with the requirements of SMCRA is an appropriate and necessary means to minimize the adverse social, economic, and environmental effects.

SMCRA established a special reclamation fund based on the fees levied on the tonnage of coal mined from active mines. This fund is used to reclaim abandoned mines, waste banks, coal mine processing and processes left in an unreclaimed condition. High priority is given to projects having an adverse upon a local community.

SMCRA and the Federal regulatory program prohibits mining within 300 feet of an occupied dwelling, a public road, parks, public buildings, schools, churches etc The Federal program also places restrictions on where and how blasting occurs to protect such structures.

Finally, in terms of regrading the mined land to the approximate original contour, a variance may be granted on "steep slope" and mountaintop mining operations if resulting land has a potential to be a higher and better use; therefore benefitting the quality of life of a community.

Applicable Statutory Provisions

General Provisions

SMCRA section 101. The Congress finds and declares that ...

(c) many surface mining operations result in disturbances of surface areas that burden and adversely affect commerce and the public welfare by destroying or diminishing the utility of land for commercial, industrial, residential, recreational, agricultural, and forestry purposes, . . . by impairing natural beauty, by damaging the property of citizens, by creating hazards dangerous to life and property by degrading the quality of life in local communities, . . . ;

(d) the expansion of coal mining to meet the Nation's energy needs makes even more urgent the establishment of appropriate standards to minimize damage to the environment and to productivity of the soil and to protect the health and safety of the public;

(e) surface mining and reclamation technology are now developed so that effective and reasonable regulation of surface coal mining operations by the States and by the Federal Government in accordance with the requirements of this Act is an appropriate and necessary means to minimize so far as practicable the adverse social, economic, and environmental effects of such mining operations;

(h) there are a substantial number of acres of land throughout major regions of the United States disturbed by surface and underground coal on which little or no reclamation was conducted, and the impacts from these unreclaimed lands impose social and economic costs on residents in nearby and adjoining areas as well as continuing to impair environmental quality;

SMCRA section 102. It is the purpose of this Act to -

(a) establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations;

(b) assure that the rights of surface landowners and other persons with a legal interest in the land or appurtenances thereto are fully protected from such operations;

(f) assure that the coal supply essential to the Nation's energy requirements, and to its economic and social well-being is provided and strike a balance between protection of the environment and agricultural productivity and the Nation's need for coal as an essential source of energy;

(h) promote the reclamation of mined areas left without adequate reclamation prior to the enactment of this Act and which continue, in their unreclaimed condition, to substantially degrade the quality of the environment, prevent or damage the beneficial use of land or water resources, or endanger the health or safety of the public;

Expenditures from the Special Reclamation Fund

SMCRA section 403 (a)

Expenditure of moneys from the fund on lands and water eligible pursuant to section 404 for the purposes of this title, except as provided for under section 411, shall reflect the following priorities in the order stated:

- (1) the protection of public health, safety, general welfare, and property from extreme danger of adverse effects of coal mining practices;
- (2) the protection of public health, safety, and general welfare from adverse effects of coal mining practices;
- (3) the restoration of land and water resources and the environment previously degraded by adverse effects of coal mining practices including measures for the conservation and development of soil, water (excluding channelization), woodland, fish and wildlife, recreation resources, and agricultural productivity;
- (4) the protection, repair, replacement, construction, or enhancement of public facilities such as utilities, roads, recreation, and conservation facilities adversely affected by coal mining practices; and
- (5) the development of publicly owned land adversely affected by coal mining practices including land acquired as provided in this title for recreation and historic purposes, conservation, and reclamation purposes and open space benefits.

Prohibition to Mining

SMCRA section 522 (e)

After the enactment of this Act and subject to valid existing rights no surface coal mining operations except those which exist on the date of enactment of this Act shall be permitted ... (5) within three hundred feet from any occupied dwelling, unless waived by the owner thereof, nor within three hundred feet of any public building, school, church, community, or institutional building, public park, or within one hundred feet of a cemetery.

Applicable Regulations

Definitions

Title 30 Code of Federal Regulations Section 761.5

Community or institutional building means any structure, other than a public building or an occupied dwelling, which is used primarily for meetings, gatherings, or functions of local civic organizations or other community groups; functions as an educational, cultural, historic, religious, scientific, correctional, mental-health, or physical-health care facility; or is used for public services, including, but not limited to, water supply, power generation, or sewage treatment.

Occupied dwelling means any building that is currently being used on a regular or temporary basis for human habitation.

Public building means any structure that is owned or leased, and principally used by a governmental agency for public business or meetings.

Public park means an area or portion of an area dedicated or designated by any Federal, State, or local agency primarily for public recreational use, whether or not such use is limited to certain times or days, including any land leased, reserved, or held open to the public because of that use.

Public road means a road-- (a) Which has been designated as a public road pursuant to the laws of the jurisdiction in which it is located; (b) Which is maintained with public funds in a manner similar to other public roads of the same classification within the jurisdiction; (c) For which there is substantial (more than incidental) public use; and (d) Which meets road construction standards for other public roads of the same classification in the local jurisdiction.

Publicly-owned park means a public park that is owned by a Federal, State, or local governmental entity.

Areas Prohibited from Mining

Title 30 Code of Federal Regulations Section 761.11

You may not conduct surface coal mining operations on the following lands unless you either have valid existing rights, as determined under Sec. 761.16, or qualify for the exception for existing operations under Sec. 761.12: (e) Within 300 feet, measured horizontally, of any occupied dwelling. This prohibition does not apply when: (1) The owner of the dwelling has provided a written waiver consenting to surface coal mining operations within the protected zone, as provided in Sec. 761.15; or (2) The part of the operation to be located closer than 300 feet to the dwelling is an access or haul road that connects with an existing public road on the side of the public road opposite the dwelling. (f) Within 300 feet, measured horizontally, of any public building, school, church, community or institutional building, or public park. (g) Within 100 feet,

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measured horizontally, of a cemetery. This prohibition does not apply if the cemetery is relocated in accordance with all applicable laws and regulations.

Mountaintop Removal Mining – Post Mining Land Use

Title 30 Code of Federal Regulations Section 785.14 (c)

The regulatory authority may issue a permit for mountaintop removal mining, without regard to the requirements of Sections 816.102, 816.104, 816.105, and 816.107 of this Chapter to restore the lands disturbed by such mining to their approximate original contour, if it first finds, in writing, on the basis of a complete application, that the following requirements are met:

(1) The proposed post mining land use of the lands to be affected will be an industrial, commercial, agricultural, residential, or public facility (including recreational facilities) use and, if–

(i) After consultation with the appropriate land-use planning agencies, if any, the proposed land use is deemed by the regulatory authority to constitute an equal or better economic or public use of the affected land compared with the pre-mining use;

(ii) The applicant demonstrates compliance with the requirements for acceptable alternative post mining land uses of Paragraphs (a)-(c) of Section 816.133 of this Chapter;

(iii) The applicant has presented specific plans for the proposed post mining land use and appropriate assurances that such use will be --

- (A) Compatible with adjacent land uses;
- (B) Obtainable according to data regarding expected need and market;
- (C) Assured of investment in necessary public facilities;
- (D) Supported by commitments from public agencies where appropriate;
- (E) Practicable with respect to private financial capability for completion of the proposed use;
- (F) Planned pursuant to a schedule attached to the reclamation plan so as to integrate the mining operation and reclamation with the post mining land use;

Steep Slope Mining – Approximate Original Contour Variance

Title 30 Code of Federal Regulations Section 785.16

(a) The regulatory authority may issue a permit for non-mountaintop removal, steep slope, surface coal mining and reclamation operations which includes a variance from the requirements to restore the disturbed areas to their approximate original contour that are contained in Secs. 816.102, 816.104, 816.105, and 816.107, or 817.102 and 817.107 of this chapter. The permit may contain such a variance only if the regulatory authority finds, in writing, that the applicant has

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demonstrated, on the basis of a complete application, that the following requirements are met: (1) After reclamation, the lands to be affected by the variance within the permit area will be suitable for an industrial, commercial, residential, or public post mining land use (including recreational facilities).

Protections from Blasting

Title 30 Code of Federal Regulations Section 816.61 (d)(1)

An anticipated blast design shall be submitted if blasting operations will be conducted within-- (i) 1,000 feet of any building used as a dwelling, public building, school, church, or community or institutional building outside the permit area;

Title 30 Code of Federal Regulations Section 816.67

(b)(1)(ii) Airblast shall not exceed the maximum limits listed below at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area, except as provided in Paragraph (e) of this Section.

Lower frequency limit of measuring system, in Hz (+/- 3 dB)	Maximum level, in dB
0.1 Hz or lower--flat response ¹	134 peak.
2 Hz or lower--flat response	133 peak.
6 Hz or lower--flat response	129 peak.
C-weighted--slow response n1	105 peak dBC.

¹ Only when approved by the regulatory authority.

(ii) If necessary to prevent damage, the regulatory authority shall specify lower maximum allowable airblast levels than those of Paragraph (b)(1)(i) of this Section for use in the vicinity of a specific blasting operation.

(d)(2)(i) The maximum ground vibration shall not exceed the following limits at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area:

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Distance (D) from the blasting site, in feet	Maximum allowable peak particle velocity (V max) for ground vibration, in inches/ second ¹	Scaled- distance factor to be applied without seismic monitoring ² (Ds)
0 to 300	1.25	50
301 to 5,000	1.00	55
5,001 and beyond	0.75	65

1 Ground vibration shall be measured as the particle velocity. Particle velocity shall be recorded in three mutually perpendicular directions. The maximum allowable peak particle velocity shall apply to each of the three measurements.

2 Applicable to the scaled-distance equation of Paragraph (d)(3)(i) of this Section.

Title 30 Code of Federal Regulations Section 816.68 (d)

Identification, direction, and distance, in feet, from the nearest blast hole to the nearest dwelling, public building, school, church, community or institutional building outside the permit area, except those described in Section 816.67(e).

Approximate Original Contour Variances

Title 30 Code of Federal Regulations Section 816.133 (d)

Approximate original contour: Criteria for variance. Surface coal mining operations that meet the requirements of this Paragraph may be conducted under a variance from the requirement to restore disturbed areas to their approximate original contour, if the following requirements are satisfied . . . (9) The surface landowner of the permit area has knowingly requested, in writing, that a variance be granted, so as to render the land, after reclamation, suitable for an industrial, commercial, residential, or public use (including recreational facilities).

Applicable Policies

None

Programmatic Review

Deliverable Form

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Human and Community

Issue: How can our regulations, policies, guidance be used to address the economic resources that are affected by mountaintop mining operations and valley fills?

Value(s) Identified: Employment, income, property values, tax or special reclamation fee revenue

Summary of Effects of Relevant Statutes, Regulations, and Policies

Congress recognized that coal mining contributes to the Nation's energy requirements. They also recognized that the disturbances from surface coal mining burdens and adversely affects commerce and public welfare by destroying or diminishing the utility of the land. They stated that surface mining and technology are developed to the point that effective and reasonable regulation of surface coal mining operations in accordance with the requirements of SMCRA is an appropriate and necessary means to minimize the adverse social, economic, and environmental effects.

SMCRA established a special reclamation fund based on the fees levied on the tonnage of coal mined from active mines. This fund is used to reclaim abandoned mines, waste banks, coal mine processing and processes left in an unreclaimed condition. High priority is given to projects having an adverse economic impact upon a local community. Funds can also be used for mine drainage abatement projects.

SMCRA also restricts coal mining on Federal lands if there is incompatibility recreational, timber, economic, or other values.

Finally, in terms of regrading the mined land to the approximate original contour, a variance may be granted on "steep slope" and mountaintop mining operations if after consultation with the land use planning agencies the resulting land has a potential use that is equal or better economically or facilitates a public use.

Applicable Statutory Provisions

General Provisions

SMCRA section 101. The Congress finds and declares that -

(b) coal mining operations presently contribute significantly to the Nation's energy requirements; surface coal mining constitutes one method of extraction of the resource; the overwhelming percentage of the Nation's coal reserves can only be extracted by underground mining methods, and it is, therefore, essential to the national interest to

insure the existence of an expanding and economically healthy underground coal mining industry;

(c) many surface mining operations result in disturbances of surface areas that burden and adversely affect commerce and the public welfare by destroying or diminishing the utility of land for commercial, industrial, residential, recreational, agricultural, and forestry purposes, . . . by damaging the property of citizens, by creating hazards dangerous to life and property by degrading the quality of life in local communities, . . . ;

(e) surface mining and reclamation technology are now developed so that effective and reasonable regulation of surface coal mining operations by the States and by the Federal Government in accordance with the requirements of this Act is an appropriate and necessary means to minimize so far as practicable the adverse social, economic, and environmental effects of such mining operations;

(g) surface mining and reclamation standards are essential in order to insure that competition in interstate commerce among sellers of coal produced in different States will not be used to undermine the ability of the several States to improve and maintain adequate standards on coal mining operations within their borders;

(h) there are a substantial number of acres of land throughout major regions of the United States disturbed by surface and underground coal on which little or no reclamation was conducted, and the impacts from these unreclaimed lands impose social and economic costs on residents in nearby and adjoining areas as well as continuing to impair environmental quality;

(j) surface and underground coal mining operations affect interstate commerce, contribute to the economic well-being, security, and general welfare of the Nation and should be conducted in an environmentally sound manner . . . ; and

SMCRA section 102. It is the purpose of this Act to

(a) establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations;

(b) assure that the rights of surface landowners and other persons with a legal interest in the land or appurtenances thereto are fully protected from such operations;

(f) assure that the coal supply essential to the Nation's energy requirements, and to its economic and social well-being is provided and strike a balance between protection of the environment and agricultural productivity and the Nation's need for coal as an essential source of energy;

(h) promote the reclamation of mined areas left without adequate reclamation prior to the enactment of this Act and which continue, in their unreclaimed condition, to substantially degrade the quality of the environment, prevent or damage the beneficial use of land or water resources, or endanger the health or safety of the public;

Special Reclamation Fund

SMCRA section 402

(a) All operators of coal mining operations subject to the provisions of this Act shall pay to the Secretary of the Interior, for deposit in the fund, a reclamation fee of 35 cents per ton of coal produced by surface coal mining and 15 cents per ton of coal produced by underground mining or 10 per centum of the value of the coal at the mine, as determined by the Secretary, whichever is less, except that the reclamation fee for lignite coal shall be at a rate of 2 per centum of the value of the coal at the mine, or 10 cents per ton, whichever is less.

(g) (1) Except as provided in subsection (h), moneys deposited into the fund shall be allocated by the Secretary to accomplish the purposes of this title as follows:

(A) 50 percent of the reclamation fees collected annually in any State (other than fees collected with respect to Indian lands) shall be allocated annually by the Secretary to the State, subject to such State having each of the following:

(i) An approved abandoned mine reclamation program pursuant to section 405.

(ii) Lands and waters which are eligible pursuant to section 404 (in the case of a State not certified under section 411(a)) or pursuant to section 411(b) (in the case of a State certified under section 411(a)).

(B) 50 percent of the reclamation fees collected annually with respect to Indian lands shall be allocated annually by the Secretary to the Indian tribe having jurisdiction over such lands, subject to such tribe having each of the following:

(i) an approved abandoned mine reclamation program pursuant to section 405.

(ii) Lands and waters which are eligible pursuant to section 404 (in the case of an Indian tribe not certified under section 411(a)) or pursuant to section 411(b) (in the case of a tribe certified under section 411(a)).

(C) The funds allocated by the Secretary under this paragraph to States and Indian tribes shall only be used for annual reclamation project construction and program administration grants.

(D) To the extent not expended within 3 years after the date of any grant award under this paragraph, such grant shall be available for expenditure by the Secretary in any area under paragraph (2), (3), (4), or (5).

(2) 20 percent of the amounts available in the fund in any fiscal year which are not allocated under paragraph (1) in that fiscal year (including that interest accruing as provided in section 401(e) and including funds available for reallocation pursuant to paragraph (1)(D)), shall be allocated to the Secretary only for the purpose of making the annual transfer to the Secretary of Agriculture under section 401(c)(2).

(3) Amounts available in the fund which are not allocated to States and Indian tribes under paragraph (1) or allocated under paragraphs (2) and (5) are authorized to be expended by the Secretary for any of the following:

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- (A) For the purpose of section 507(c), either directly or through grants to the States, subject to the limitation contained in section 401(c)(11)
- (B) For the purpose of section 410 (relating to emergencies).
- (C) For the purpose of meeting the objectives of the fund set forth in section 403(a) for eligible lands and waters pursuant to section 404 in States and on Indian lands where the State or Indian tribe does not have an approved abandoned mine reclamation program pursuant to section 405.
- (D) For the administration of this title by the Secretary.
- (4)(A) Amounts available in the fund which are not allocated under paragraphs (1), (2), and (5) or expended under paragraph (3) in any fiscal year are authorized to be expended by the Secretary under this paragraph for the reclamation or drainage abatement of lands and waters within unreclaimed sites which are mined for coal or which were affected by such mining, waste banks, coal processing or other coal mining processes and left in an inadequate reclamation status.
- (B) Funds made available under this paragraph may be used for reclamation or drainage abatement at a site referred to in subparagraph (A) if the Secretary makes either of the following findings:
- (i) A finding that the surface coal mining operation occurred during the period beginning on August 4, 1977, and ending on or before the date on which the Secretary approved a State program pursuant to section 503 for a State in which the site is located, and that any funds for reclamation or abatement which are available pursuant to a bond or other form of financial guarantee or from any other source are not sufficient to provide for adequate reclamation or abatement at the site.
 - (ii) A finding that the surface coal mining operation occurred during the period beginning on August 4, 1977, and ending on or before the date of enactment of this paragraph, and that the surety of such mining operator became insolvent during such period, and as of the date of enactment of this paragraph, funds immediately available from proceedings relating to such insolvency, or from any financial guarantee or other source are not sufficient to provide for adequate reclamation or abatement at the site.
- (C) In determining which sites to reclaim pursuant to this paragraph, the Secretary shall follow the priorities stated in paragraphs (1) and (2) of section 403(a). The Secretary shall ensure that priority is given to those sites which are in the immediate vicinity of a residential area or which have an adverse economic impact upon a local community.
- (D) Amounts collected from the assessment of civil penalties under section 518 are authorized to be appropriated to carry out this paragraph.

(E) Any State may expend grants made available under paragraphs (1) and (5) for reclamation and abatement of any site referred to in subparagraph (A) if the State, with the concurrence of the Secretary, makes either of the findings referred to in clause (i) or (ii) of subparagraph (B) and if the State determines that the reclamation priority of the site is the same or more urgent than the reclamation priority for eligible lands and waters pursuant to section 404 under the priorities stated in paragraphs (1) and (2) of section 403(a).

(F) For the purposes of the certification referred to in section 411(a), sites referred to in subparagraph (A) of this paragraph shall be considered as having the same priorities as those stated in section 403(a) for eligible lands and waters pursuant to section 404. All sites referred to in subparagraph (A) of this paragraph within any State shall be reclaimed prior to such State making the certification referred to in section 411(a).

(5) The Secretary shall allocate 40 percent of the amount in the fund after making the allocation referred to in paragraph (1) for making additional annual grants to States and Indian tribes which are not certified under section 411(a) to supplement grants received by such States and Indian tribes pursuant to paragraph (1)(C) until the priorities stated in paragraphs (1) and (2) of section 403(a) have been achieved by such State or Indian tribe. The allocation of such funds for the purpose of making such expenditures shall be through a formula based on the amount of coal historically produced in the State or from the Indian lands concerned prior to August 3, 1977. Funds allocated or expended by the Secretary under paragraphs (2), (3), or (4) of this subsection for any State or Indian tribe shall not be deducted against any allocation of funds to the State or Indian tribe under paragraph (1) or under this paragraph.

(6) Any State may receive and retain, without regard to the 3-year limitation referred to in paragraph (1)(D), up to 10 percent of the total of the grants made annually to such State under paragraphs (1) and (5) if such amounts are deposited into either-

(A) a special trust fund established under State law pursuant to which such amounts (together with all interest earned on such amounts) are expended by the State solely to achieve the priorities stated in section 403(a) after September 30, 1995, or

(B) an acid mine drainage abatement and treatment fund established under State law as provided in paragraph (7).

(7)(A) Any State may establish under State law an acid mine drainage abatement and treatment fund from which amounts (together with all interest earned on such amounts) are expended by the State to implement, in consultation with the Soil Conservation Service, acid mine drainage abatement and treatment plans approved by the Secretary. Such plans shall provide for the comprehensive abatement of the causes and treatment of the effects of acid mine drainage within qualified hydrologic units affected by coal mining practices.

(B) The plan shall include, but shall not be limited to, each of the following:

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- (i) An identification of the qualified hydrologic unit.
- (ii) The extent to which acid mine drainage is affecting the water quality and biological resources within the hydrologic unit.
- (iii) An identification of the sources of acid mine drainage within the hydrologic unit.
- (iv) An identification of individual projects and the measures proposed to be undertaken to abate and treat the causes or effects of acid mine drainage within the hydrologic unit.
- (v) The cost of undertaking the proposed abatement and treatment measures.
- (vi) An identification of existing and proposed sources of funding for such measures.
- (vii) An analysis of the cost-effectiveness and environmental benefits of abatement and treatment measures.

(C) The Secretary may approve any plan under this paragraph only after determining that such plan meets the requirements of this paragraph. In conducting an analysis of the items referred to in clauses (iv), (v), and (vii) the Director of the Office of Surface Mining shall obtain the comments of the Director of the United States Bureau of Mines. In approving plans under this paragraph, the Secretary shall give a priority to those plans which will be implemented in coordination with measures undertaken by the Secretary of Agriculture under section 406.

(D) For purposes of this paragraph, the term 'qualified hydrologic unit' means a hydrologic unit-

- (i) in which the water quality has been significantly affected by acid mine drainage from coal mining practices in a manner which adversely impacts biological resources; and
- (ii) which contains lands and waters which are-
 - (I) eligible pursuant to section 404 and include any of the priorities stated in paragraph (1), (2), or (3) of section 403(a); and
 - (II) proposed to be the subject of the expenditures by the State (from amounts available from the forfeiture of bonds required under section 509 or from other State sources) to mitigate acid mine drainage.

(8) Of the funds available for expenditure under this subsection in any fiscal year, the Secretary shall allocate annually not less than \$2,000,000 for expenditure in each State, and for each Indian tribe, having an approved abandoned mine reclamation program pursuant to section 405 and eligible lands and waters pursuant to section 404 so long as an allocation of funds to such State or such tribe is necessary to achieve the priorities stated in paragraphs (1) and (2) of section 403(a).

Note: Subsection 402(g) amended September 13, 1982, May 7, 1987 and November 5, 1990 and May 18, 1992 and October 24, 1992.

(h)(1) In the case of any fiscal year beginning on or after October 1, 1995, with respect to which fees are required to be paid under this section, the Secretary shall, as of the

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beginning of such fiscal year and before any allocation under subsection (g), make the transfer provided in paragraph (2).

(2) The Secretary shall transfer from the fund to the United Mine Workers of America Combined Benefit Fund established under section 9702 of the Internal Revenue Code of 1986 for any fiscal year an amount equal to the sum of --

(A) the amount of the interest which the Secretary estimates will be earned and paid to the Fund during the fiscal year, plus

(B) the amount by which the amount described in subparagraph (A) is less than \$70,000,000.

(3)(A) The aggregate amount which may be transferred under paragraph (2) for any fiscal year shall not exceed the amount of expenditures which the trustees of the Combined Fund estimate will be debited against the unassigned beneficiaries premium account under section 9704(e) of the Internal Revenue Code of 1986 for the fiscal year of the Combined Fund in which the transfer is made.

(B) The aggregate amount which may be transferred under paragraph (2)(B) for all fiscal years shall not exceed an amount equivalent to all interest earned and paid to the fund after September 30, 1992, and before October 1, 1995.

(4) If, for any fiscal year, the amount transferred is more or less than the amount required to be transferred, the Secretary shall appropriately adjust the amount transferred for the next fiscal year.

Note: Subsection 402(h) added October 24, 1992.

Environmental Protection Performance Standards

[30 U.S.C. 1265]

SMCRA section 515(c)

(1) Each State program may and each Federal program shall include procedures pursuant to which the regulatory authority may permit surface mining operations for the purposes set forth in paragraph (3) of this subsection.

(2) Where an applicant meets the requirements of paragraphs (3) and (4) of this subsection a permit without regard to the requirement to restore to approximate original contour set forth in subsection 515(b)(3) or 515(d)(2) and (3) of this section may be granted for the surface mining of coal where the mining operation will remove an entire coal seam or seams running through the upper fraction of a mountain, ridge, or hill (except as provided in subsection (c)(4)(A) hereof) by removing all of the overburden and creating a level plateau or a gently rolling contour with no highwalls remaining, and capable of supporting post mining uses in accord with the requirements of this subsection.

(3) In cases where an industrial, commercial, agricultural, residential or public facility (including recreational facilities) use is proposed or the post mining use of the affected land, the regulatory authority may grant a permit for a surface mining operation of the nature described in subsection (c)(2) where -

(A) after consultation with the appropriate land use planning agencies, if any, the proposed post mining land use is deemed to constitute an equal or better economic or public use of the affected land, as compared with pre-mining use;

(B) the applicant presents specific plans for the proposed post mining land use and appropriate assurances that such use will be -

(i) compatible with adjacent land uses;

(ii) obtainable according to data regarding expected need and market;

(iii) assured of investment in necessary public facilities;

(iv) supported by commitments from public agencies where appropriate;

(v) practicable with respect to private financial capability for completion of the proposed use;

(vi) planned pursuant to a schedule attached to the reclamation plan so as to integrate the mining operation and reclamation with the post mining land use; and
(vii) designed by a registered engineer in conformance with professional standards established to assure the stability, drainage, and configuration necessary for the intended use of the site;

(C) the proposed use would be consistent with adjacent land uses, and existing State and local land use plans and programs;

(d) The following performance standards shall be applicable to steep-slope surface coal mining and shall be in addition to those general performance standards required by this section: Provided, however, That the provisions of this subsection (d) shall not apply to those situations in which an operator is mining on flat or gently rolling terrain, on which an occasional steep slope is encountered through which the mining operation is to proceed, leaving a plain or predominantly flat area or where an operator is in compliance with provisions of subsection (c) hereof:

(4) For the purposes of this subsection (d), the term "steep slope" is any slope above twenty degrees or such lesser slope as may be defined by the regulatory authority after consideration of soil, climate, and other characteristics of a region or State.

(2) Where an applicant meets the requirements of paragraphs (3) and (4) of this subsection a variance from the requirement to restore to approximate original contour set forth in subsection 515(d)(2) of this section may be granted for the surface mining of coal where the owner of the surface knowingly requests in writing, as a part of the permit application that such a variance be granted so as to render the land, after reclamation, suitable for an industrial, commercial, residential, or public use (including recreational facilities) in accord with the further provisions of (3) and (4) of this subsection.

(3) (A) After consultation with the appropriate land use planning agencies, if any, the potential use of the affected land is deemed to constitute an equal or better economic or public use;

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(f) Any person with a valid legal interest which might be adversely affected by release of the bond or the responsible officer or head of any Federal, State, or local governmental agency which has jurisdiction by law or special expertise with respect to any environmental, social, or economic impact involved in the operation, or is authorized to develop and enforce environmental standards with respect to such operations shall have the right to file written objections to the proposed release from bond to the regulatory authority within thirty days after the last publication of the above notice. If written objections are filed, and a hearing requested, the regulatory authority shall inform all the interested parties, of the time and place of the hearing, and hold a public hearing in the locality of the surface coal mining operation proposed for bond release within thirty days of the request for such hearing. The date, time, and location of such public hearings shall be advertised by the regulatory authority in a newspaper of general circulation in the locality for two consecutive weeks, and shall hold a public hearing in the locality of the surface coal mining operation proposed for bond release or at the State capital at the option of the objector, within thirty days of the request for such hearing.

Applicable Regulations

Definitions

Title 30 Code of Federal Regulations Section 700.4(b)

Person having an interest which is or may be adversely affected or person with a valid legal interest shall include any person-- (a) Who uses any resource of economic, recreational, esthetic, or environmental value that may be adversely affected by coal exploration or surface coal mining and reclamation operations or any related action of the Secretary or the State regulatory authority; or (b) Whose property is or may be adversely affected by coal exploration or surface coal mining and reclamation operations or any related action of the Secretary or the State regulatory authority.

Higher or better uses means post mining land uses that have a higher economic value or non-monetary benefit to the landowner or the community than the pre-mining land uses.

Title 30 Code of Federal Regulations Section 761.5

Significant recreational, timber, economic, or other values incompatible with surface coal mining operations means those values to be evaluated for their significance which could be damaged by and are not capable of existing together with, surface coal mining operations because of the undesirable effects mining would have on those values, either on the area included in the permit application or on other affected areas. Those values to be evaluated for their importance include: . . . (d) Scenic, historic, archeologic, esthetic, . . . or cultural interests.

Title 30 Code of Federal Regulations Section 761.11

You may not conduct surface coal mining operations on the following lands unless you either have valid existing rights, as determined under Sec. 761.16, or qualify for the exception for existing operations under Sec. 761.12: (a) Any lands within the boundaries of: (1) The National Park System; (2) The National Wildlife Refuge System; (3) The National System of Trails; (4) The National Wilderness Preservation System; (5) The Wild and Scenic Rivers System, including study rivers designated under section 5(a) of the Wild and Scenic Rivers Act, 16 U.S.C. 1276(a), or study rivers or study river corridors established in any guidelines issued under that Act; or (6) National Recreation Areas designated by Act of Congress. (b) Any Federal lands within a national forest. This prohibition does not apply if the Secretary finds that there are no significant recreational, timber, economic, or other values that may be incompatible with surface coal mining operations, and: (1) Any surface operations and impacts will be incident to an underground coal mine.

Coordination with Appropriate Agencies

Title 30 Code of Federal Regulations Section 816.133 (d)

Approximate original contour: Criteria for variance. Surface coal mining operations that meet the requirements of this Paragraph may be conducted under a variance from the requirement to restore disturbed areas to their approximate original contour, if the following requirements are satisfied: (1) The regulatory authority grants the variance under a permit issued in accordance with Section 785.16 of this Chapter. (2) The alternative post mining land use requirements of Paragraph (c) of this Section are met. (3) All applicable requirements of the Act and the regulatory program, other than the requirement to restore disturbed areas to their approximate original contour, are met. (4) After consultation with the appropriate land use planning agencies, if any, the potential use is shown to constitute an equal or better economic or public use.

Title 30 Code of Federal Regulations Section 785.14

Mountaintop removal mining (a) This Section applies to any person who conducts or intends to conduct surface mining activities by mountaintop removal mining.

(b) Mountaintop removal mining means surface mining activities where the mining operation removes an entire coal seam or seams running through the upper fraction of a mountain, ridge, or hill, except as provided for in Section 824.11(a)(6) of this Chapter, by removing substantially all of the overburden off the bench and creating a level plateau or a gently rolling contour, with no

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highwalls remaining, and capable of supporting post mining land uses in accordance with the requirements of this Section.

(c) The regulatory authority may issue a permit for mountaintop removal mining, without regard to the requirements of Sections 816.102, 816.104, 816.105, and 816.107 of this Chapter to restore the lands disturbed by such mining to their approximate original contour, if it first finds, in writing, on the basis of a complete application, that the following requirements are met: (1) The proposed post mining land use of the lands to be affected will be an industrial, commercial, agricultural, residential, or public facility (including recreational facilities) use and, if-- (i) After consultation with the appropriate land-use planning agencies, if any, the proposed land use is deemed by the regulatory authority to constitute an equal or better economic or public use of the affected land compared with the pre-mining use;

Title 30 Code of Federal Regulations Section 800.40 (f)

Any person with a valid legal interest which might be adversely affected by release of the bond, or the responsible officer or head of any Federal, State, or local governmental agency which has jurisdiction by law or special expertise with respect to any environmental, social, or economic impact involved in the operation or which is authorized to develop and enforce environmental standards with respect to such operations, shall have the right to file written objections to the proposed release from bond with the regulatory authority within 30 days after the last publication of the notice required by Paragraph 800.40(a)(2) of this Section. If written objections are filed and a hearing is requested, the regulatory authority shall inform all the interested parties of the time and place of the hearing, and shall hold a public hearing within 30 days after receipt of the request for the hearing. The date, time, and location of the public hearing shall be advertised by the regulatory authority in a newspaper of general circulation in the locality for 2 consecutive weeks. The public hearing shall be held in the locality of the surface coal mining operation from which bond release is sought, at the location of the regulatory authority office, or at the State capital, at the option of the objector.

Applicable Policies

None

Programmatic Review

Deliverable Form

Agency Involved: Office of Surface Mining Reclamation and Enforcement

Domain: Human and Community

Issue: How are historical and cultural resources affected by mountaintop mining operations and valley fills?

Value(s) Identified: Historical and Cultural Values

Summary of Effects of Relevant Statutes, Regulations, and Policies

Historical and cultural values, especially those sites that are listed or eligible for listing on the State or National Register of Historical Places or National Historic Landmarks, are protected by the Federal SMCRA program in five principal ways: (1) The ability to designate important cultural and historic lands unsuitable for mining; (2) Coordination with the State Historic Preservation Officer and Federal, State, or local agencies with jurisdiction of a park or place during the permit review application process; (3) Affirmative findings by the SMCRA regulatory agency prior to permit approval that the effect of the proposed permitting action on cultural and historic sites has been taken in account by conditioning the permit, adjusting the mining plan reclamation plan, or determining that no impacts will occur; (4) Permitting requirements to describe and identify cultural, historic and archeological resources by actively soliciting information from cultural and historic experts and/or conducting field investigations and other analyses; and (5) Performance standards to ensure that surface coal mining and reclamation operations are conducted to mitigate the adverse effects to important historic and cultural features.

Applicable Statutory Provisions

Designating Historical and Cultural Lands Unsuitable for Mining

SMCRA section 522 (a)

(1) To be eligible to assume primary regulatory authority pursuant to section 503, each State shall establish a planning process enabling objective decisions based upon competent and scientifically sound data and information as to which, if any, land areas of a State are unsuitable for all or certain types of surface coal mining operations pursuant to the standards set forth in paragraphs (2) and (3) of this subsection but such designation shall not prevent the mineral exploration pursuant to the Act of any area so designated.

(2) Upon petition pursuant to subsection (c) of this section, the State regulatory authority shall designate an area as unsuitable for all or certain types of surface coal mining operations if the State regulatory authority determines that reclamation pursuant to the requirements of this Act is not technologically and economically feasible.

(3) Upon petition pursuant to subsection (c) of this section, a surface area may be designated unsuitable for certain types of surface coal mining operations if such operations will . . .

(B) affect fragile or historic lands in which such operations could result in significant damage to important historic, cultural, scientific, and esthetic values and natural systems; . . .

SMCRA section 522 (c)

(c) Any person having an interest which is or may be adversely affected shall have the right to petition the regulatory authority to have an area designated as unsuitable for surface coal mining operations, or to have such a designation terminated. Such a petition shall contain allegations of facts with supporting evidence which would tend to establish the allegations. Within ten months after receipt of the petition the regulatory authority shall hold a public hearing in the locality of the affected area, after appropriate notice and publication of the date, time, and location of such hearing. After a person having an interest which is or may be adversely affected has filed a petition and before the hearing, as required by this subsection, any person may intervene by filing allegations of facts with supporting evidence which would tend to establish the allegations. Within sixty days after such hearing, the regulatory authority shall issue and furnish to the petitioner and any other party to the hearing, a written decision regarding the petition, and the reasons therefore. In the event that all the petitioners stipulate agreement prior to the requested hearing, and withdraw their request, such hearing need not be held.

(e) After the enactment of this Act and subject to valid existing rights no surface coal mining operations except those which exist on the date of enactment of this Act shall be permitted -

(1) on any lands within the boundaries of units of the National Park System, the National Wildlife Refuge Systems, the National System of Trails, the National Wilderness Preservation System, the Wild and Scenic Rivers System, including study rivers designated under section 5(a) of the Wild and Scenic Rivers Act and National Recreation Areas designated by Act of Congress; . . .

(3) which will adversely affect any publicly owned park or places included in the National Register of Historic Sites unless approved jointly by the regulatory authority and the Federal, State, or local agency with jurisdiction over the park or the historic site;

Applicable Regulations

Coordination with Appropriate Agencies

Title 30 Code of Federal Regulations Section 700.4(b)

The Director is responsible for consulting with Federal land-managing agencies and Federal agencies with responsibility for natural and historic resources on Federal lands on actions which may have an effect on their responsibilities.

Title 30 Code of Federal Regulations Section 773.13(a)(3)

Upon receipt of an administratively complete application for a permit, a significant revision to a permit under Section 774.13, or a renewal of a permit under Section 774.15, the regulatory authority shall issue written notification indicating the applicant's intention to mine the described tract of land, the application number or other identifier, the location where the copy of the application may be inspected, and the location where comments on the application may be submitted. The notification shall be sent to . . . (ii) All Federal or State governmental agencies with authority to issue permits and licenses applicable to the proposed surface coal mining and reclamation operation and which are part of the permit coordinating process developed in accordance with Section 503(a)(6) or 504(h) of the Act, or Section 773.12; or those agencies with an interest in the proposed operation, including . . . the historic preservation officer.

Title 30 Code of Federal Regulations Section 773.12

Each regulatory program shall, to avoid duplication, provide for the coordination of review and issuance of permits for surface coal mining and reclamation operations with applicable requirements of . . . The National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.); . . . the Archeological and Historic Preservation Act of 1974 (16 U.S.C. 469 et seq.); and the Archeological Resources Protection Act of 1979 (16 U.S.C. 470aa et seq) where Federal and Indian lands covered by that Act are involved.

Requirements of State Programs to Protect Cultural and Historic Values

Title 30 Code of Federal Regulations Section 731.14

The program shall demonstrate that the State has the capability of carrying out the provisions of the Act and this Chapter and achieving their purposes by providing a complete description of the system for implementing, administering, and enforcing a State program including, at a minimum . . .

(g) Narrative descriptions, flow charts, and other appropriate documents of the proposed systems for . . .

(17) Consulting with State, Federal, and local agencies having responsibility for historic, cultural, and archeological resources, and for making decisions regarding such resources.

Amendments to State Programs Pertaining to Cultural and Historic Values

Title 30 Code of Federal Regulations Section 732.17(h)

The following procedures, . . . shall apply to State program amendments. . . (4) All State program amendments which may have an effect on historic properties shall be provided to the State Historic Preservation Officer and to the Advisory Council on Historic Preservation for comment.

Application of Other Federal Laws under a Federal or State SMCRA Program

Title 30 Code of Federal Regulations Section 736.22 (a)

In promulgating or revising any Federal program for a State, the Director shall . . . (2) Include any provisions that are necessary to implement . . . the National Historic and Preservation Act of 1966 (16 U.S.C. 470), the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. 469a), and other relevant Federal laws imposing duties upon the Secretary.

Cultural and Historical Lands Unsuitable for Mining

Title 30 Code of Federal Regulations Section 761.5

Community or institutional building means any structure, other than a public building or an occupied dwelling, which is used primarily for meetings, gatherings, or functions of local civic organizations or other community groups; functions as an educational, cultural, historic, religious, scientific, correctional, mental-health, or physical-health care facility; or is used for public services, including, but not limited to, water supply, power generation, or sewage treatment.

Significant recreational, timber, economic, or other values incompatible with surface coal mining operations means those values to be evaluated for their significance which could be damaged by and are not capable of existing together with, surface coal mining operations because of the undesirable effects mining would have on those values, either on the area included in the permit application or on other affected areas. Those values to be evaluated for their importance include: . . . (d) Scenic, historic, archeologic, esthetic, . . . or cultural interests.

Title 30 Code of Federal Regulations Section 762.5

Historic lands means areas containing historic, cultural, or scientific resources. Examples of historic lands include archeological sites, properties listed on or eligible for listing on a State or National Register of Historic Places, National Historic Landmarks, properties having religious or cultural significance to Native Americans or religious groups, and properties for which historic designation is pending.

Title 30 Code of Federal Regulations Section 762.11(b)

Upon petition an area may be (but is not required to be) designated as unsuitable for certain types of surface coal mining operations, if the operations will . . . (2) Affect fragile or historic lands in

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which the operations could result in significant damage to important historic, cultural, scientific, or esthetic values or natural systems;

Title 30 Code of Federal Regulations Section 764.21

(a) The regulatory authority shall develop a data base and inventory system which will permit evaluation of whether reclamation is feasible in areas covered by petitions.

(b) The regulatory authority shall include in the system information relevant to the criteria in Section 762.11 of this Chapter, including, but not limited to . . . the State Historic Preservation Officer, . .

Written Findings by Regulatory Agency

Title 30 Code of Federal Regulations Section 773.15 (c)

Written findings for permit application approval. No permit application or application for a significant revision of a permit shall be approved unless the application affirmatively demonstrates and the regulatory authority finds, in writing, on the basis of information set forth in the application or from information otherwise available that is documented in the approval, the following . . . (11) The regulatory authority has taken into account the effect of the proposed permitting action on properties listed on and eligible for listing on the National Register of Historic Places. This finding may be supported in part by inclusion of appropriate permit conditions or changes in the operation plan protecting historic resources, or a documented decision that the regulatory authority has determined that no additional protection measures are necessary.

Permitting Requirements under a Federal Program

Title 30 Code of Federal Regulations Section 740.13 (b)(3)

Each permit application package shall include . . . (iii) Where OSM is the regulatory authority or where the proposed operations are on lands containing leased Federal coal, the following supplemental information to ensure compliance with Federal laws and regulations other than the Act . . .

(C) A statement, including maps and ownership data as appropriate, of any cultural or historical sites listed on the National Register of Historic Places within the affected area of the proposed surface coal mining and reclamation operation.

(D) A statement of the classes of properties of potential significance within the disturbed area, and a plan for the identification and treatment, in accordance with 36 CFR Part 800, of properties significant and listed or eligible for listing on the National Register of Historic Places within the disturbed area of the proposed surface coal mining and reclamation operation.

General Permit Requirements

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Title 30 Code of Federal Regulations Section 779.12 (b)

Each application shall describe and identify . . . (1) The nature of cultural, historic and archeological resources listed or eligible for listing on the National Register of Historic Places and known archeological sites within the proposed permit and adjacent areas. The description shall be based on all available information, including, but not limited to, information from the State Historic Preservation Officer and from local archeological, historical, and cultural preservation agencies. (2) The regulatory authority may require the applicant to identify and evaluate important historic and archeological resources that may be eligible for listing on the National Register of Historic Places, through (i) Collection of additional information, (ii) Conduct of field investigations, or (iii) Other appropriate analyses.

Title 30 Code of Federal Regulations Section 779.24

The permit application shall include maps showing . . . (i) The boundaries of any public park and locations of any cultural or historical resources listed or eligible for listing in the National Register of Historic Places and known archeological sites within the permit and adjacent areas; (j) Each cemetery that is located in or within 100 feet of the proposed permit area.

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Title 30 Code of Federal Regulations Section 780.31

(a) For any publicly owned parks or any places listed on the National Register of Historic Places that may be adversely affected by the proposed operation, each plan shall describe the measures to be used (1) To prevent adverse impacts, or (2) If valid existing rights exist or joint agency approval is to be obtained under Sec. 761.17(d) of this chapter, to minimize adverse impacts.

(b) The regulatory authority may require the applicant to protect historic or archeological properties listed on or eligible for listing on the National Register of Historic Places through appropriate mitigation and treatment measures. Appropriate mitigation and treatment measures may be required to be taken after permit issuance provided that the required measures are completed before the properties are affected by any mining operation.

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Performance Standards

Title 30 Code of Federal Regulations Section 810.2

The objective of this Subchapter is to ensure that coal exploration and surface coal mining and reclamation operations are conducted in a manner that is compatible with the environmental, social, and esthetic needs of the Nation. Accordingly, the performance standards and design requirements in this Subchapter will provide for . . . (h) Protection of fragile and historic lands where surface coal mining operations could result in significant damage to important historic, cultural, scientific, or esthetic values and natural systems;

Applicable Policies

OSM Directive No. TSR-7 dated December 18, 1987 and entitled “Protecting Historic Properties” is attached.

Surface Mining Control and Reclamation Act (SMCRA)

Title V of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87, 30 USC 1201 et seq.) produced the first comprehensive Federal program intended:

- To set a national standard and define a detailed program for mining coal and reclaiming mined land
- To prohibit mining from areas where reclamation is not feasible
- To balance the agricultural productivity of land against coal resources and ensure adequate agricultural production following mining
- To allow the public to participate in decisions when the environment might be affected by coal mining
- To achieve reclamation of previously mined and abandoned lands.

SMCRA encourages State administration of the Title V program under the supervision of the U.S. Department of Interior, Office of Surface Mining. SMCRA regulates all surface mines, together with those underground mines that will disturb more than two acres of surface lands, including haul roads. SMCRA also regulates freestanding coal preparation plants located outside the permit areas of active mines, and substantial coal exploration activities.

The purpose of SMCRA, as specified in the Act is as follows:

- (a) establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations;
- (b) assure that the rights of surface landowners and other persons with a legal interest in the land or appurtenances thereto are fully protected from such operations;
- (c) assure that surface coal mining operations are so conducted as to protect the environment;
- (d) assure that adequate procedures are undertaken to reclaim surface areas as contemporaneously as possible with the surface coal mining operations;
- (e) assure that the coal supply essential to the nation's energy requirements, and to its economic and social well-being is provided and strike a balance between protection of the environment and agricultural productivity and the nation's need for coal as an essential source of energy;
- (f) assist the States in developing and implementing a program to achieve the purposes of this Act;
- (g) promote the reclamation of mined areas left without adequate reclamation prior to the enactment of this Act and which continue, in their unreclaimed condition, to substantially

degrade the quality of the environment, prevent or damage the beneficial use of land or water resources, or endanger the health or safety of the public;

- (h) assure that appropriate procedures are provided for the public participation in the development, revision, and enforcement of regulations, standards, reclamation plans, or programs established by the Secretary or any State under this Act;
- (i) provide a means for development of the data and analyses necessary to establish effective and reasonable regulation of surface mining operations for other minerals;
- (j) encourage the full utilization of coal resources through the development and application of underground extraction technologies;
- (k) stimulate, sponsor, provide for and/or supplement present programs for the conduct of research investigations, experiments, and demonstrations, in the exploration, extraction, processing, development, and production of minerals and the training of mineral engineers and scientists in the field of mining, minerals resources, and technology, and the establishment of an appropriate research and training center in various States; and
- (l) wherever necessary, exercise the full reach of Federal constitutional powers to insure the protection of the public interest through effective control of surface coal mining operations.

Federal regulations that implement SMCRA establish both minimum performance standards describing how coal must be mined and reclamation activities that are required to protect the environment and public health. The permanent program performance standards under SMCRA address many environmental issues similar to those addressed under a NEPA review.

USOSM, with input from USEPA, has developed performance standards for surface mining operations that include standards for signs and markers to identify the various working areas of the mine, permit area boundaries, and buffer zones. Other operational standards discuss nearly every aspect of coal mining that is generally applicable to the industry. These standards include coal recovery, disposal of non-coal wastes, and use of explosives in coal mining, to name a few. They are codified in Title 30 CFR, Chapter VII, Parts 700 through 899.

Protection of Surface Water and Groundwater Resources

Surface water and groundwater resource protection is mandated by pre-mining study requirements together with performance standards promulgated under several topics, especially Hydrologic Balance. The performance standards address surface water and groundwater diversions, sedimentation ponds, and other surface and subsurface discharge structures. Dams and embankments of coal wastes are regulated, as are the casing and sealing of wells and other underground openings. The standards also define water rights of neighboring groundwater users. SMCRA requires replacement of domestic, agricultural, or industrial water supplies that have been affected by contamination, diminution, or interruption resulting from surface mining activities.

Protection of Aquatic and Terrestrial Ecosystems

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Aquatic ecosystems are afforded protection under SMCRA through protection of natural watercourses, Section 515(c)(4)(D). The Hydrologic system is protected in Section 515(b)(2) interpreted in regulations 30 CFR 715.17. Also, Section 515(6)(24) requires that the best available control technology be used to minimize disturbances to aquatic biota, and through the prohibition of mining on lands where reclamation is not feasible. This includes fragile lands, lands containing non-renewable resources, and lands containing natural hazards. Terrestrial ecosystems are protected under Section 515(6)(24), which requires that the best available technology be used to minimize disturbance. Critical habitats of organisms that have been Federally classified as threatened or endangered are further protected by the Act in a requirement that these critical habitats be reported to the SMCRA regulatory agency so that review procedures established under the Endangered Species Act can be followed.

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All surface mining and reclamation activities are to be conducted to minimize disturbance of the hydrologic balance within the permit and adjacent areas, to prevent material damage to the hydrologic balance outside the permit area, to ensure the protection or replacement of water rights, and to support approved postmining land uses. The performance standards require the operator to plan and carry out specific measures to ensure that the hydrologic balance is not adversely affected.

Generally, protection of the hydrologic balance is achieved by requiring the operator to handle surface runoff in a manner that minimizes the exposure of water to soils, and especially to acid- and toxic-forming materials. These measures include channeling surface flow around the mine site with diversion ditches, and passing all drainage within the disturbed area through sediment control structures. To protect the groundwater, the operator is required to manage excavations and other disturbances so as to prevent or control discharge of pollutants into the groundwater. To avoid drainage from acid- or toxic-producing materials, the operator is required to identify the strata that contain such materials, either bury the material or treat it, and during active operations to store or stockpile the materials in a manner that inhibits their contact with surface or groundwater.

Several Federal regulations protect the hydrologic system during the conduct of surface mining and subsequent reclamation. Protection of the hydrologic balance is covered by 30 CFR 816.41(a), which requires that all surface mining and reclamation activities "be conducted to minimize disturbance to the hydrologic balance" in the permit and adjacent areas, and that material damage to the hydrologic balance outside the permit area be prevented.

Protection of the pre-mining groundwater resource is covered by 30 CFR 816.41(b), which requires the handling of earth materials in a manner that minimizes infiltration of contaminants into the groundwater system, and restores approximate pre-mining recharge capacity. (The hydrologic reclamation plan in 30 CFR 780.21(h) describes how the permittee proposes to mine and reclaim so as to meet these requirements.)

Surface water is protected under 30 CFR 816.41(d) which requires proper handling of earth materials, groundwater discharges and surface runoff so as to minimize the formation of acid/toxic drainage and additional contributions of suspended solids to streams.

Protection of the hydrologic system from acid/toxic materials is further addressed by 30 CFR 816.41(f) which requires specific storage, burial or treatment practices to avoid drainage into the groundwater or surface water from acid/toxic materials.

The rights of potentially affected water users are protected by 30 CFR 816.41(h) which requires replacement of a water supply that has been impacted, i.e. contaminated, diminished, or interrupted, by surface mining activities. Replacement of domestic water supplies damaged by underground mining operations conducted after October 21, 1992 is required by 30 CFR 817.41(j).

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The quality of water leaving permitted areas is governed by 30 CFR 816.42 which incorporates the point-source effluent limitations of the Environmental Protection Agency by reference to 40 CFR Part 434.

Protection of water quality through construction and maintenance of temporary and permanent diversions of streams away from disturbed areas is addressed in 30 CFR 816.43. To divert the overland flow around the disturbed area, the operator constructs diversion ditches that are stable, able to afford protection against flooding, and designed to prevent contributions of suspended solids to the surface-water system. Control of on-site surface flow is accomplished by passing all drainage through a sediment pond. The sediment pond is designed to allow suspended solids to settle out, and if needed, water treatment is performed before the water leaves the disturbed area. These structures are designed according to the criteria set forth at 30 CFR 816/817.49 which establishes the requirements for design certification, structure stability, the freeboard, foundation stability, spillways and the frequency of inspections that are to be conducted by a qualified registered professional engineer.

Sediment is also controlled by use of proper mining techniques that limit the amount of sediment generated during the mining operation. These methods include disturbing the smallest area possible, reclaiming disturbed areas as soon as possible after the coal is removed, stabilizing all backfill material so that the volume and rate of runoff is controlled, and diverting runoff around exposed areas. Sediment transport from disturbed areas is also controlled by using straw bales, rip rap, check dams, mulches, and vegetation on site (30 CFR 816.45).

To ensure that water quality and quantity are not adversely affected during the course of the mining operation, and that water discharges from the disturbed areas are in compliance with all applicable State and Federal water quality laws, a monitoring program is required for both ground and surface water. During the permitting process the operator must submit a monitoring plan as part of the permit to be approved by the regulatory authority. Each plan is to specify monitoring sites, parameters that will be measured, and the frequency of measurement. Hydrologic data collected during mining operations will be submitted to the regulatory authority at least every three months and continue until final bond release. If during the course of mining operations, the monitoring reports indicate that a water quality parameter has exceeded the acceptable level, the operator must contact the regulatory authority and initiate action to correct the problem (30 CFR 816.451).

Further protection of the hydrologic balance is provided by prohibition of mining operations being conducted within 100 feet of a perennial or intermittent stream as set forth at 30 CFR 816/817.57. This provision is to keep mining operations from adversely affecting a stream by maintaining a buffer zone between the stream and the mining operation.

Sediment ponds, unless they are designed, constructed, and approved as permanent structures, must be removed prior to final bond release. Prior to their being removed and the area reclaimed, any water discharges from the structure must meet State or Federal EPA effluent limitations (30 CFR 816.46).

Fish and Wildlife

Coal mining operations are required to be planned, designed and operated to minimize impacts to fish and wildlife and their habitats. As part of the permitting process, applicants are required to submit a plan demonstrating that the proposed mining operation will be conducted in a manner which minimizes impacts to species existing within the proposed permit area and their habitats. The operator must comply with performance standards designed to protect fish and wildlife and their habitats as set forth at 30 CFR 816/817.97. These include the provisions summarized below.

To ensure protection of endangered or threatened species that exist within the permit area, no mining activity may be undertaken which is likely to jeopardize the existence of these species or their habitats. If during the course of mining the operator becomes aware of such species at the site, he shall contact the regulatory authority. The regulatory authority, in consultation with the State and Federal fish and wildlife agencies, will determine whether, and under what conditions, the operator may proceed.

If the permit area includes wetlands or other habitats of unusually high value for fish and wildlife, the operator shall avoid disturbing these areas and if practicable enhance, or replace or restore these areas.

Power lines and other transmission facilities must be designed and constructed to minimize electrocution hazards to raptors. Haul and access roads must be located and operated to avoid or minimize impacts on important fish and wildlife resources. Fences, overland conveyances and other barriers must be designed to allow large mammals passage through the permit area. If concentrations of toxic-forming materials occur in a pond, the pond must be fenced or covered so that wildlife do not have access to the facility. If the postmining land use is fish and wildlife habitat, the vegetation used on the site must have nutritional value for wildlife, provide cover and continue to support and enhance the habitat after the performance bonds are released.

Topsoils and Subsoils

Protection of the soils within an area to be disturbed by surface mining is achieved through design and operation of the mine in compliance with the performance standards for soils handling at 30 CFR 816/817.22. To ensure that the soils are available for redistribution on completion of coal extraction, soils must be salvaged before mining and protected during the course of mining. Before any surface disturbance occurs, the mining area is cleared of all vegetative material. The topsoil, if it is of sufficient quality to sustain vegetation and is at least six inches thick, is removed from the site separate from any subsoil material. The topsoil is stockpiled in a designated topsoil storage area that is protected from contaminants and unnecessary compaction. To prevent erosion, the stockpile is temporarily revegetated and located so that winds and surface drainage do not blow or wash it away. The regulatory authority may require subsoils to be removed and stockpiled, if necessary to achieve revegetation. When mining is completed, but before topsoil is distributed on the mined area, the soil is tested to determine if any additional nutrients or soil amendments are needed to ensure an adequate growing medium. The soils are then redistributed over the mined area so that a uniform thickness is achieved, and prepared for seeding or planting. Selected overburden materials (subsoils) may be substituted for topsoil if the operator can demonstrate through testing that the resulting soil medium is equal to or more suitable for sustaining vegetation than the existing topsoil.

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Appendix B

SMCRA prohibits new surface mine operations within 300 feet of any public park or within National Parks, National Wildlife Refuges, the National System of Trails, Wilderness Areas, Wild and Scenic Rivers, and National Recreation Areas. It also requires that all new coal mining operations that may affect a public park first be approved by the agency with jurisdiction over the park. Surface mining activities may be excluded from Federal lands in National Forests, if the Secretary of Agriculture finds that multiple uses of the National Forest would be impaired by the proposed mining. The public notice provisions of the SMCRA provide opportunity for owners of private recreational facilities to comment on coal mine permit applications that may affect the operations of such facilities.

No new coal mines can be permitted that may affect publicly owned places that are listed on the National Register of Historic Places, unless such mining is approved by the State Historic Preservation Officer. The regulatory authority's discretionary power to prohibit mining includes those areas where mining may affect historic lands of cultural, historic, scientific, or aesthetic value.

SMCRA sets special performance standards for mining on prime farmlands. Prime farmland is defined as land with suitable resource characteristics (as determined by USDA-SCS) that also has been used as cropland for at least five of the ten years before its proposed use for mining purposes. The SMCRA standards require that soil removal, stockpiling, replacement, reclamation, and revegetation methods return mined prime farmland to a level of productivity equal to that which it had before disturbance.

Within the discretionary provisions for designating areas as unsuitable for mining, the regulatory authority can prohibit surface mining that would affect lands subject to hazards, including areas subject to frequent flooding. The regulatory authority also may prohibit mining activities in areas with unstable geologic characteristics, and it may impose special standards for such areas related to woody material disposal, topsoil handling, downslope spoil disposal, head-of-hollow and valley fills, and pre-existing underground mines. The regulatory authority may designate an area as unsuitable for mining based on the incompatibility of mining activities with existing land use plans of local governments. The general performance standards of the Act also set forth requirements for mining roads and require that post-mining land uses on mined sites be compatible with adjacent land use policies and plans.

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Appendix B

The USOSM performance standards require that noise and vibration from blasting operations be controlled to minimize the danger of adverse effects from airblast and vibration to humans and structures. The Act requires pre-blast surveys, resident notification of blasting schedules, limits on air blasts, explosives handling rules (including requirements for blasters-in-charge), and recordkeeping requirements.

Explosives

Most mining operations use explosives to remove overburden from above the coal seam. Operators are required to comply with all State and Federal laws that regulate the use of explosives, as well as complying with performance standards at 30 CFR 816/817.61-.68. These standards are designed to minimize any adverse impacts related to blasting, such as ground vibration, airblast levels, or flyrock causing personal injury or property damage.

As part of the permit application, operators are required to submit a blasting plan that details where blasting will occur, what type and amount of explosives to be used, and how frequently they will be detonated. When mining begins, and at least thirty days prior to any blasting, the operator must notify in writing, all residents or owners of structures located within one-half mile of the permit area that they may request a pre-blasting survey. The operator conducts a pre-blasting survey of the structure to determine its condition, documenting any existing damage to the structure, and any other structures present such as pipelines, cables, transmission lines, cisterns, power lines, and wells. The operator will then prepare a written report signed by the person who conducted the survey. Copies of the report shall be promptly provided to the person requesting the survey and to the regulatory authority. If the property owner disagrees with any of the specifics in the report, the points of disagreement are forwarded to the operator and to the regulatory authority.

To ensure that the public is adequately notified of when blasting will occur at a mine site, the operator obtains approval of a blasting schedule from the regulatory authority during the permitting process. The schedule includes the name, address, and telephone number of the operator, the specific areas in which blasting will occur, the dates and time periods when blasting will occur, the methods to control access to the blasting area, and the type and patterns of audible warning and all-clear signals to be used before and after blasting. This schedule is approved by the regulatory authority, and unless night operations are approved, blasting will be conducted between sunrise and sunset. The approved schedule is circulated to local government agencies, public utilities and to anyone residing within one-half mile of the permit area. In addition, for surface mining operations the schedule is to be published in a local newspaper at least ten days, but not more than thirty days, before blasting begins.

Community Integrity and Quality of Life

SMCRA prohibits new mining operations within 40 feet of any roadway, or within 100 feet of a public road right-of-way (except where a mine haul road enters or adjoins the right-of-way) without public notice. The public has opportunity to comment and ensure that it is adequately protected from the potentially adverse effects of additional traffic and right-of-way acquisition. SMCRA also prohibits outright any surface mining operations within 300 feet of an occupied

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Coal Mine Waste Disposal

Mined coal may be processed at the mine site, resulting in waste material being separated from the coal. This waste material can be buried at the mine site if the regulatory authority approved a coal waste disposal area complying with 30 CFR 816/817.81. The disposal area is approved in the permitting process if the operator demonstrates that construction of the waste fill will not adversely affect the surface and groundwater regimes, that it will be stable, is suitable for reclamation and revegetation, is compatible with the postmining land use, does not create a public hazard, and is designed to prevent combustion of the materials being buried. The fill must be designed by a qualified registered professional engineer.

If the proposed disposal area contains springs or streams, the excess spoil fill will be constructed with under drains and surface water diversions that either carry the surface drainage under the fill or around it. This drainage system reduces contact of coal waste material with surface or groundwater that may result in fill instability or production of acid or toxic water. Coal waste material is transported to the site and placed in the manner that was approved in the permit application. Placement may be in terraces, so the material can be compacted to ensure stability and to provide for control of surface drainage on the fill. Once placed in the fill, waste material will be covered with at least four feet of the best available, non-toxic and non-combustible material. The fill will then be revegetated.

During construction of the fill, a qualified professional engineer will inspect the site at least quarterly and at each critical construction phase. Critical construction phases include foundation preparation, installation of drainage systems, and final grading and revegetation of the fill.

Backfilling and Grading

As the mining operation proceeds, areas where coal has been removed are to be reclaimed in a contemporaneous manner, or according to a schedule approved by the regulatory authority as stated at 30 CFR 816/817.100. The first phase of this reclamation is backfilling and grading the mined area, to be carried out in accordance with the requirements at 30 CFR 816/817.102-.107. The spoil material that was removed to expose the coal seam is returned to the area, unless it was placed in an excess spoil fill. The spoil is compacted to ensure stability and to prevent leaching of any toxic materials that may be present. The spoil is graded so the approximate original contour is achieved, with the elimination of all highwalls, spoil piles and depressions. If acid- and toxic-forming materials are present, these materials will be covered with non-toxic and non-combustible material, or treated, to prevent impacts to the surface and groundwater regimes. Upon completion of the backfilling, the site is graded, topsoil is spread, and the site is seeded and mulched. The regulations at 30 CFR 816.99 and 816.107 are designed to ensure that backfilling operations prevent landslides in steep slope areas.

Revegetation

Successful mine site reclamation also requires successful revegetation. To ensure that revegetation is successful, the operator must comply with the performance standards at 30 CFR

816/817.111-116. The operator is required to establish a vegetative cover on all areas that were disturbed during the mining operation.

The permanent vegetative cover that was approved in the permitting process must support the approved postmining land use and be diverse, effective and permanent; comprised of species native to the area (or of introduced species where necessary to achieve the postmining land use); be at least equal in extent of cover to the natural vegetation in the area; and be capable of stabilizing the land surface from erosion. The reestablished plant species shall be compatible with the approved postmining land use; have the same seasonal characteristics of growth as the original vegetation; be capable of regeneration and plant succession; and be compatible with plants and animals in the area. Revegetation of the site must be performed during the first normal planting season after the site has been backfilled and topsoil replaced. Once seeding and/or planting of the area has occurred, the area will either be mulched or some other approved soil stabilizing practice used to prevent erosion, unless the regulatory authority determines that erosion will not be a problem.

Prior to bond release on the site, success of revegetation will be measured by the regulatory authority. Success will be judged on its effectiveness for the approved postmining land use, and extent of cover compared to the cover in natural vegetation of the area, and the requirements in the paragraph above. Statistically valid sampling tests must be used. Ground cover, production or tree and shrub stocking shall be no less than 90 percent of the approved success standard. For fish and wildlife habitat, recreation or forest products, success is based on tree and shrub plantings as well as ground cover. Trees and shrubs must be healthy and in place for not less than two growing seasons. If the area is determined not to have achieved revegetation success, the operator is required to take whatever action the regulatory authority deems appropriate to augment the revegetation in order to achieve successful revegetation.

Operators have a period of extended responsibility for successful revegetation. This period begins after the last year of augmented seeding, fertilization or irrigation. In areas with more than 26 inches of annual average precipitation, the period of responsibility lasts no less than five full years. Where annual average precipitation is less than 26 inches, the period of responsibility lasts no less than 10 full years. The purpose is to achieve a reasonable degree of certainty that the plantings have taken hold and can remain viable without further human tending.

Subsidence

USOSM regulations at 30 CFR 817.121(a) require mine operators to adopt measures consistent with known technology which prevent subsidence from causing material damage to the extent technologically and economically feasible, maximize mine stability and maintain the value and reasonably foreseeable use of the surface lands; or adopt mining technology which provides for planned subsidence in a predictable and controlled manner. Under section 817.121(d) of the above rule USOSM and the State regulatory authorities may limit the percentage of coal extraction underneath public buildings and facilities, churches, schools and hospitals, impoundments with more than 20 acre-feet storage capacity or under any aquifer that serves as a significant water source for any public water supply system. Also, the regulatory authorities may suspend mining activities under urban areas, cities, towns and communities and adjacent to major impoundments and perennial streams, if subsidence causing material damage can result in imminent danger situations to inhabitants of the urbanized areas, cities, towns and communities.

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Regulations implementing provisions of The Energy Policy Act of 1992, require all underground coal mining operations conducted after October 24, 1992, to promptly repair or compensate for material damage to non-commercial buildings and occupied residential dwellings and related structures as a result of subsidence due to underground coal mining operations, and to replace drinking, domestic, and residential water supplies which have been adversely affected by underground coal mining operations. The regulations also require repair of damage to include rehabilitation, restoration, or replacement of the identified structures, or compensation to the owners in the full amount of the diminution in value resulting from the subsidence. A pre-subsidence survey is required to document the condition of non-commercial buildings and occupied residential dwellings and related structures subject to subsidence-related damage caused by underground mining activities.

Roads

Access to coal mining operations requires the construction and maintenance of access and haul roads from a public road to the mine site. To ensure that such roads are designed, constructed, maintained and used to minimize damage to the public health and safety and to the natural environment, the operator must comply with performance standards set forth at 30 CFR 816/817.150-.151. The performance standards which apply to any access or haul road depend on whether the road is primary or ancillary. Primary roads are used for coal or spoil haulage, used for site access for more than six months, or will be retained for the postmining land use. Ancillary roads are those roads that are not defined as primary.

Any road that is constructed or used as access to a mine site must meet performance standards that control or prevent: erosion and dust, damage to fish and wildlife and their habitats, contribution of suspended solids to stream flow or runoff outside the permit area. Roads must not cause or contribute to violation of Federal or State water quality standards, must refrain from seriously altering the normal flow of water in stream beds or drainage channels, and non-acid- and non-toxic-forming substances must be used in road surfacing. Additionally, all roads will be designed and constructed in accordance with current engineering practices and not located in the channel of an intermittent or perennial stream. Upon completion of mining activities, the roads will be removed (if not needed for the approved postmining land use) and the area reclaimed to support the postmining land use.

If a road is classified as a primary road, the operator must meet the performance standards cited above, plus the standards at 30 CFR 816/817.151. These standards require that a qualified registered professional engineer certify that the road has been constructed as designed and is in accordance with the approved permit. Primary roads must have a minimum static safety factor of 1.3 on the embankment and be located on the most stable available surface. To prevent adverse impacts to the environment associated with surface runoff, the primary roads must meet drainage control criteria that include the construction and maintenance of ditches, culverts, and cross drains.

Special Performance Standards

The general performance standards summarized above are nationwide minimum standards for controlling the surface effects of coal mining. To address the special considerations of certain geographical areas or coal mining methods, USOSM has developed a set of special performance

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State SMCRA Programs

SMCRA contains provisions for enforcement of the environmental performance standards by a state if the state can demonstrate that it can satisfactorily fulfill this function. In order to obtain primacy from USOSM, the state must submit an application to USOSM indicating that the state program has a basis in state law and a set of procedures and regulations that are adequate to enforce the Federal standards. The states proposed laws and regulations must be no less stringent than the Federal model and may be more stringent. USOSM can either accept and approve the state program or it can adopt and implement its own program for the state. USOSM retains regulatory control of coal mining on Federal and Indian lands. If the state is granted primacy, USOSM monitors the state's enforcement of the program on a regular basis and evaluates the states administration of the program at least annually. Should the state not meet USOSM's requirements in carrying out the program, USOSM can enforce its own program within the state.

Kentucky has primacy; USOSM monitors the state's enforcement of the program on a regular basis and evaluates the states administration of the program at least annually. The Kentucky Revised Statutes Chapter 350 or 405 Kentucky administrative regulations Chapters 7 through 24.

Tennessee does not have primacy; USOSM has not delegated SMCRA authorities. The Tennessee Division of Water, Mining Section implements the state surface mining permit program under TDEC Rule 0400-3-1 et seq. TDEC Division of Surface Mining and TCA § 59-8-201 et seq. Tennessee Mineral Surface Mining Law of 1972.

Virginia has primacy, USOSM monitors the state's enforcement of the program on a regular basis and evaluates the state's administration of the program at least annually. The Virginia Department of Mines implements the state surface mining permit program under the Virginia Coal Surface Mining Control and Reclamation Act of 1979 (Va.Code §45.1-226) and Agency 25 Chapters.

West Virginia has primacy; USOSM monitors the state's enforcement of the program on a regular basis and evaluates the state's administration of the program at least annually. The West Virginia Surface Mining Reclamation Act (W.Va.Code §§22-3) and Regulations (Title 38 Series 2) were changed in 1997. These changes have not yet received approval from the United States Office of Surface Mining.

Clean Water Act Section 402

The NPDES is a program to control and eliminate water pollution from point sources (pipes or outfalls) through a permit pursuant to Section 402(a)(1) of the Clean Water Act. States may be authorized or “delegated” by EPA to implement the NPDES permit program.

Types of Point Sources: Industrial and Municipal

- **Industrial Point Sources:**
 - commercial, mining, and manufacturing facilities;
 - classified as “major” or “minor” through a rating system based on discharge flow, pollutant loading. Mining point sources may be determined majors on a case-by-case basis.
 - EPA has the authority to review, comment, or object to draft NPDES permits for all major, and for minors of certain industrial categories such as coal mining.
- **Municipal Point Sources:**
 - domestic wastewater discharges from Sewage Treatment Facilities
 - classified as “major” if the discharge flow is greater than 1 million gallons per day.

Contents of NPDES Permit:

- Effluent Limits
- Standard requirements such as monitoring and reporting (40 CFR 122)
- Specific conditions for the type of facility

Types of Effluent Limits:

- **Technology-based Limits for Industrial facilities:** effluent limitations based on industry-wide treatment technology. The minimum level treatment for toxic and non-conventional pollutants is Best Available Treatment Economically Achievable (BAT). Special standards are set for “new sources” (NSPS). The NPDES permit regulations list specific effluent guideline limits for most industry categories, including coal mining. For coal mining, BAT normally consists of neutralization, precipitation of metals, and sedimentation. Specific effluent limits expressed in concentrations are required for pH, iron, manganese, and suspended solids.
- **Technology-based Limits for Municipal facilities:** effluent limitations based on “secondary treatment” (40 CFR 133):
- **Water Quality-Based Limits:** effluent limitations designed to protect aquatic life and human health. Limits are calculated using a simple mass balance equation or more complex models. For calculating water quality-based effluent limits the following information is needed: flow of the stream, discharge flow, concentration of the pollutants in the discharge, and the concentration of the pollutant in a stream which will protect aquatic life and human health.

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Appendix B

CWA

DISCHARGE OF DREDGED OR FILL MATERIAL

- Effluent limits in the NPDES permit are the more stringent of BAT or Water Quality - Based Limits

Types of Pollutants Categories:

- Conventional Pollutants: BOD, TSS, fecal coliform, pH, and oil and grease
- Toxic Pollutants: organics and metals
- Nonconventional Pollutants: nitrogen and phosphorus

Permit Processing:

- Permit applications must be submitted 180 days before commencement of discharge or for renewal. Two forms are required. Form 1 lists activities covered, identifying information, location, a list of other environmental permits, a topographical map of the facility, a brief description of the nature of the business. Form 2 requires detailed information about the discharge.
- EPA must review applications for completeness and notify applicant of completeness or deficiencies. (States are not required to do this, but many do.)
- Public comment is required. All interested parties may comment on the draft permit and may request a hearing. Hearing request must be in writing and state the issues to be raised at the hearing.

Permit Monitoring and Reporting:

- Facilities are normally required to analyze the concentration of pollutants in its discharge, the discharge flow, and report the results to the NPDES authority on a form (Discharge Monitoring Report -DMR). For municipalities and some industry categories, the results are expressed in concentrations; others are expressed in loadings.
- The NPDES permit describes frequency of the monitoring, the sample location, and the test methods.
- Computer database maintains records of all the reports on the discharge.

Clean Water Act Section 404

The Army Corps of Engineers ("Corps") is authorized by sec. 404 of the CWA to issue permits for the discharge of dredged or fill material in waters of the U.S. Coal mining operations often result in the discharge of fill material into U.S. waters, notably "valley fills" associated with steep slope mining.

Under circumstances explained in sec. 404(e), the Corps may issue general permits for discharges determined to have a minimal effect. Such a general permit is currently in effect for discharges of fill material from coal mining operations regulated under SMCRA.

EPA's main responsibilities under sec. 404: EPA has several duties under sec. 404, the most significant of which is to issue the environmental standards which the Corps must apply in making permit decisions. These standards, the "404(b)(1) Guidelines", are found in 40 CFR Part 230 and are summarized below. Under part 230.10, no discharge of dredged or fill material can be permitted if it will cause or contribute to "significant degradation" of the waters of the U.S.

EPA also has the ultimate authority for determining the scope of CWA jurisdiction, although the Corps makes such decisions on a daily basis.

EPA reviews and comments on individual permit applications, and has the authority under 404(c) to effectively limit or veto a permit, by restricting "the specification...of any defined area as a disposal site" for dredged or fill material.

States may apply for authority to issue 404 permits for discharges in the State's waters which are not "navigable in fact". EPA is responsible for approving a State's authority, following criteria in sec. 404(h), and conducts oversight of approved programs. The Corps retains authority for activities in waters which are navigable in fact.

Applicable Statutory Provisions

CLEAN WATER ACT, SECTION 404: PERMITS FOR DREDGED AND FILL MATERIAL

(a) Discharge into navigable waters at specified disposal sites.

The Secretary [of the Army] may issue permits, after notice and opportunity for public hearings for the discharge of dredged or fill material into the navigable waters at specified disposal sites. . . .

(b) Specification for disposal sites.

Subject to subsection (c) of this section, each such disposal site shall be specified for each such permit by the Secretary:

(1) through the application of guidelines developed by the Administrator, in conjunction with the Secretary, which guidelines shall be based upon criteria comparable to the criteria applicable to the territorial seas, the contiguous zone, and the ocean under section 403(c), and

(2) in any case where such guidelines under clause (1) alone would prohibit the specification of a site, through the application additionally of the economic impact of the site on navigation and anchorage.

(c) Denial or restriction of use of defined areas as disposal sites.

The Administrator is authorized to prohibit...any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area...as a disposal site, whenever he determines,...that the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. Before making such determination, the Administrator shall consult with the Secretary....

(e) General permits on State, regional, or nationwide basis

(1) ...the Secretary may...issue general permits on a State, regional, or nationwide basis for any category of activities involving discharges of dredged or fill material if the Secretary determines that the activities in such category are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will have only minimal cumulative adverse effects on the environment. Any general permit issued under this subsection shall

(A) be based on the guidelines described in subsection (b)(1) of this section, and...

(2) No general permit issued...shall be for a period of more than five years after the date of its issuance...and such general permit may be revoked or modified by the Secretary if, after opportunity for public hearing, the Secretary determines that the activities authorized by such general permit have an adverse impact on the environment or such activities are more appropriately authorized by individual permits.

EPA Regulations

PART 230_SECTION 404(b)(1) GUIDELINES FOR SPECIFICATION OF DISPOSAL SITES FOR DREDGED OR FILL MATERIAL

The Guidelines contain eight subparts, as follows:

Subpart A - provisions of general applicability

Subpart B - four conditions which must be satisfied

Subpart C - describes how a discharge may affect components of a site

Subparts D-F - characteristics and values of particular aquatic ecosystems

Subpart G - physical, chemical and biological evaluations and test

procedures

Subpart H - means to prevent or minimize adverse effects

Subpart I - advanced identification of disposal areas

Extracts from the Guidelines

230.1 Purpose and policy.

(a) The purpose of these Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material.

(b) Congress has expressed a number of policies in the Clean Water Act. These Guidelines are intended to be consistent with and to implement those policies.

(c) Fundamental to these Guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern. [emphasis added]

230.6 Adaptability

(a) The manner in which these Guidelines are used depends on the physical, biological and chemical nature of the proposed extraction site, the material to be discharged, and the candidate disposal site....

(b) The Guidelines user...must recognize the different levels of effort that should be associated with varying degrees of impact and require or prepare commensurate documentation. The level of documentation should reflect the significance and complexity of the discharge activity.

230.10 Restrictions on discharge.

Note: Because other laws may apply to particular discharges and because the Corps or State 404 agency may have additional procedural and substantive requirements, a discharge complying with the requirement of these Guidelines will not automatically receive a permit.

...

(a) Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic environment, so long as the alternative does not have other significant adverse environmental consequences.

...

(2) An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant which could reasonably be obtained...or managed in order to fulfill the basic purpose of the proposed activity may be considered.

(b) No discharge of dredged or fill material shall be permitted if it:

(1) Causes or contributes, after consideration of...dilution and dispersion, to violations of any applicable State water quality standard;

...

(3) Jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973,...

(c) Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by subparts B and G, after consideration of subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in those subparts...[e]ffects contributing to significant degradation considered individually or collectively, include:

(1) Significantly adverse effects of the discharge of pollutants on human health or welfare, including...effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites.

(2) Significantly adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependant on aquatic ecosystems...

(3) Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy; or

(4) Significantly adverse effects of discharge of pollutants on recreational, aesthetic, and economic values.

(d) Except as provided under section 404(b)(2), no discharge...shall be permitted unless and appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem. Subpart H identifies such possible steps.

Guidance and Interpretation

There is considerable body of guidance and interpretative material for the sec. 404 program, including: (1) Corps Regulatory Guidance Letters; (2) EPA Policy Memoranda; and (3) Interagency Memoranda of Understanding or Agreement. A good reference compilation of documents is Strand, Margaret N., *Wetlands Deskbook, 2nd Edition*, 1997, Environmental Law Institute, 1616 P Street, N.W. Washington, D.C. 20036 (4) Army Corps of Engineers Standard Operating Procedures for the Regulatory Program.

A particularly useful guidance document is the February 1990 Memorandum of Agreement between EPA and the Corps concerning "The Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines." Highlights of the document are:

- Reference to the broad, multi-part definition of mitigation in the Council on Environmental Quality regulations at 40 CFR 1508.20, to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. The MOU simplifies this list by combining mitigation types into three general types: avoidance, minimization and compensatory mitigation.
- Statement of policy that "[t]he determination of what level of mitigation constitutes 'appropriate' mitigation is based solely on the values and functions of the aquatic resource that will be impacted."
- Clarification that the Corps will apply the three general types of mitigation in sequence: first avoidance, then minimization, and finally, compensation for impacts to aquatic resource values which cannot be avoided and minimized.

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- Reference that measures to accomplish these steps can only be identified through resource assessments tailored to the site and performed by qualified professionals. Monitoring is an important aspect of mitigation.
- Provision for one for one functional replacement, at a minimum, for all aquatic resources, including wetlands.
- Provision that mitigation requirements will be enforceable conditions of 404 permits.

Clean Air Act (CAA)

The Clean Air Act is intended to foster the protection and enhancement of the nation's air quality, and to safeguard public health and welfare and the productive capacity of the population. The Act is divided into three titles.

- Title I Air Pollution Prevention and Control deals with control of pollution from stationary sources;
- Title II Emission Standards for Moving Sources deals with control of pollution from mobile sources;
- Title III addresses general and administrative matters;
- Title IV Acid Deposition Control addresses acid rain problems;
- Title V Permits establishes an operating permit program for states to administer
- Title VI Stratospheric Ozone Protection establishes requirements to address stratospheric ozone problems

The Clean Air Act requires EPA to promulgate national ambient air quality standards (NAAQS) for certain pollutants to protect the public health (primary NAAQS) and protect the public welfare (secondary NAAQS). NAAQS have been promulgated for criteria pollutants (currently particulate matter, sulfur dioxide, carbon monoxide, ozone, nitrogen dioxide, and lead) to protect public health and welfare.

Each State is required to adopt a plan, called a State Implementation Plan (SIP), that limits emissions from air pollution sources to the degree necessary to achieve and maintain the NAAQS. The SIP provides emission limitations, schedules and timetables for compliance by stationary sources. The Act focuses on "major" stationary sources or major modifications of existing sources. Major sources are defined as sources that emit, or have the potential to emit, more than a prescribed amount of a designated pollutant. Section 110 of the Act requires each State to submit to EPA for approval a "State Implementation Plan" for "implementation, maintenance, and enforcement" of these standards in each air quality control region (or portion thereof) within the State. Each plan must include source-specific emission limitations, and such other measures necessary to insure attainment and maintenance of primary or secondary standards.

States are also required to adopt measures to prevent significant deterioration of air quality (PSD) in "clean air areas." When a SIP is approved by the Administrator, it is enforceable by both the Federal and State governments.

In addition to the SIP regulatory scheme, the Act establishes other major regulatory programs for stationary sources. The New Source Performance Standards (NSPS) program establishes stringent emissions limitations for "new" sources in designated industrial categories regardless of the State in which the source is located or the air quality associated with the area.

The National Emissions Standards for Hazardous Air Pollutants (NESHAP), regulates emissions of pollutants for which no NAAQS is applicable but that cause increases in mortality or serious illnesses. The NESHAP program can be delegated to any qualifying State (CAA, Section 112).

EPA has designated all areas of the country as either "attainment" or "non-attainment" for each of the criteria pollutants. SIPs must assure attainment of NAAQS by prescribed dates. SIPs must meet

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Federal requirements, but each State may choose its own mix of emission controls for sources to meet the NAAQS.

Air Quality Data and Trends

Information regarding air quality data and trends in the study area was electronically retrieved from the EPA's online Aerometric Information Retrieval System (AIRS). The AIRS database is a compilation air quality data collected from state and local environmental agencies who operate monitoring sites throughout the nation. These monitoring sites utilize sensitive equipment to measure the concentration of criteria air pollutants, which include carbon monoxide (CO), sulfur dioxide (SO₂), ozone (O₃), nitrogen dioxide (NO₂), and particulate Matter (PM₁₀). The criteria air pollutants associated with mining activity include particulates, sulfur oxides (So_x), nitrous oxides (NO_x), and carbon monoxide (CO) (Marcus 1997).

Although the new standards for PM_{2.5} (particulate matter smaller than 2.5 microns in diameter) were established by the EPA in July 1997, monitoring will not be completed until between 2001 and 2004, non-attainment areas will be designated between 2002 and 2005, and planning and control requirements will be developed between 2005 and 2008. Attainment in non-attainment areas is targeted between 2012 and 2015.

There are 42 monitoring stations located in the study area. Except for O₃ levels, monitoring stations in the study area reported good air quality for all criteria air pollutants. Stations monitoring O₃ concentrations in Boyd and Greenup Counties (KY) reported multiple years where levels exceeded EPA air quality standards. In addition, Pike County, KY, reported two days in 1994 where O₃ levels exceeded EPA air quality standards.

According to the EPA's online "Green Book" [<http://www.epa.gov/oar/oaqps/greenbk/>] a portion of Boyd County, KY, is the only non-attainment area in the study area. This non-attainment portion of Boyd County exceeds the NAAQS levels for SO₂. In Boyd County, the sources of SO₂ are petroleum refining facilities, that comprise approximately 61 percent of all total emissions; blast furnaces and steel mills (32 percent); and industrial inorganic chemical facilities (7 percent).

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Endangered Species Act

This Act requires all Federal Agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy the critical habitats of such species. Federal agencies are prohibited under the Endangered Species Act of 1973 (16 USC 1531 et seq.) from jeopardizing species in danger of extinction or threatened with endangerment and from adversely modifying habitats essential to their survival. If listed species or their habitat may be affected, formal consultation with USFWS under Section 7 of the Endangered Species Act is required. If the consultation reveals that the action will affect a listed species or habitat adversely, acceptable mitigative measures must be undertaken or the proposed permit will not be issued.

Fish and Wildlife Coordination Act

The FWCA recognizes the vital importance of wildlife resources to the U.S.; provides that wildlife conservation shall receive equal consideration and will be coordinated with other water resource development programs; establishes fish and wildlife conservation as a coequal purpose or objective of federally funded or permitted water resource development proposals or projects. Activities to which the FWCA was intended to apply include the discharge of pollutants, and actions dependent upon or resulting in the diversion, control, or modification of a stream or other body of water. Action agencies are required to consult with the FWS and State conservation agency. Action agencies are required to give full consideration to the reports and recommendations of FWS/State, and shall incorporate into the project plan such justifiable means and measures for wildlife purposes needed to obtain maximum overall project benefits. However, final decision on wildlife mitigative measures rests with the action agency.

Executive Orders

Undeveloped floodplains are protected by Executive Order 11988 as implemented by the guidelines of the Water Resources Council (43 FR 29:6030-6055, February 10, 1978). Under these guidelines, an application for a Federal permit that proposes the structural modification or control (such as channelization) of a stream or other body of water is subject to review by the US Fish and Wildlife Service and the US Army Corps of Engineers as mandated by the Fish and Wildlife Coordination Act (16 USC 661 et seq.) and Section 10 of the River and Harbor Act of 1899. These agency reviewers and the general public may identify additional Federal authorization or specific mitigative measures that are necessary to ensure an adequate permit review and a sufficient level of environmental protection.

EPA, under the provisions of Executive Order 11988, must avoid wherever possible the long- and short-term impacts associated with the occupancy and modification of floodplains and avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The Agency also must incorporate floodplain management goals into its regulatory decision making processes. To the greatest extent possible EPA must:

- Reduce the hazard and risk of flood loss, and wherever it is possible, to avoid direct or indirect adverse impact on floodplains.
- Where there is no practical alternative to locating in a floodplain, minimize the impact of floods on human safety, health, and welfare, as well as the natural environment.
- Restore and preserve natural and beneficial values served by floodplains.
- Identify floodplains that require restoration and preservation, recommend management programs necessary to protect these floodplains, and include such considerations in on-going planning programs.
- Provide the public with early and continuing information concerning floodplain management and with opportunities for participating in decision making including the evaluation of tradeoffs among competing alternatives.

Executive Order 11990, entitled "Protection of Wetlands", requires EPA to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new Federal construction in wetlands if a practicable alternative exists. The EPA Statement of Procedures on Floodplain Management and Wetlands Protection (January 5, 1979) requires that EPA determine whether proposed permit actions also will occur in or will affect wetlands. If so, the responsible official must prepare a wetlands assessment, that will be part of the overall environmental assessment or environmental impact statement. The responsible official is either to avoid adverse impacts or minimize them if no practicable alternative to the action exists. In addition, Section 404 of CWA requires USACE permit approval for activities that would result in the placement of fill in wetlands.

Agency Regulatory Process Flow Charts

The following presents the statutory/regulatory processes of the agencies that have jurisdiction over MTM/VF operations. These processes include:

- WVDEP SMCRA Process
- CWA Section 402 NPDES Permit Process
- CWA Section 404 Permit Process
- USFWS Endangered Species Act Process

Each of these processes is outlined below and illustrated in a subsequent process flow diagram. They generally indicate agencies' responsibilities and the applicants' requirements as of January 2003.

(A) WVDEP SMCRA Process for Applications with Fills Requiring 404 Permits

The following numbers correspond to the numbers on the flowchart.

- (A) In developing their permit application package, the applicant is required to submit a "Lands Inquiry" to WVDNR (Figure 1. WV SMCRA Process for Applicants with Fills Requiring 404 Permits). The inquiry contains information on proposed mining sufficient for the agency to initiate their comment processes on such potential issues as endangered species. Also the applicant is required to notify, and obtain a response from, the USFWS concerning endangered species that could be affected by their operation. The USFWS response must be included in the application for it to be considered administratively complete.
- (B) Anyone considering the preparation and submittal of a proposed coal mine application is encouraged to request a preapplication meeting with WVDEP. By design, this meeting is intended to provide an opportunity for applicant and regulator to identify and discuss potential issues of concern and to define additional data which the applicant must collect to facilitate the permit decision process.
- (C) Typically, a SMCRA and NPDES 402 application are submitted concurrently.
- (D) When initially received, the SMCRA application undergoes an "Administrative Completeness" review. This is a cursory review (not a technical review) of the application designed to make sure that the applicant has responded to each item or section of the application. If it is determined that the applicant has omitted a response to an item or section of the application, a letter is sent to the applicant requesting that the omitted response(s) be provided.
- (E) When the omitted response(s) is provided, the application is determined to be administratively complete and a surface mine application (SMA) number is issued. The SMA number is issued for one year. As long as the applicant continues to pursue the proposed application in

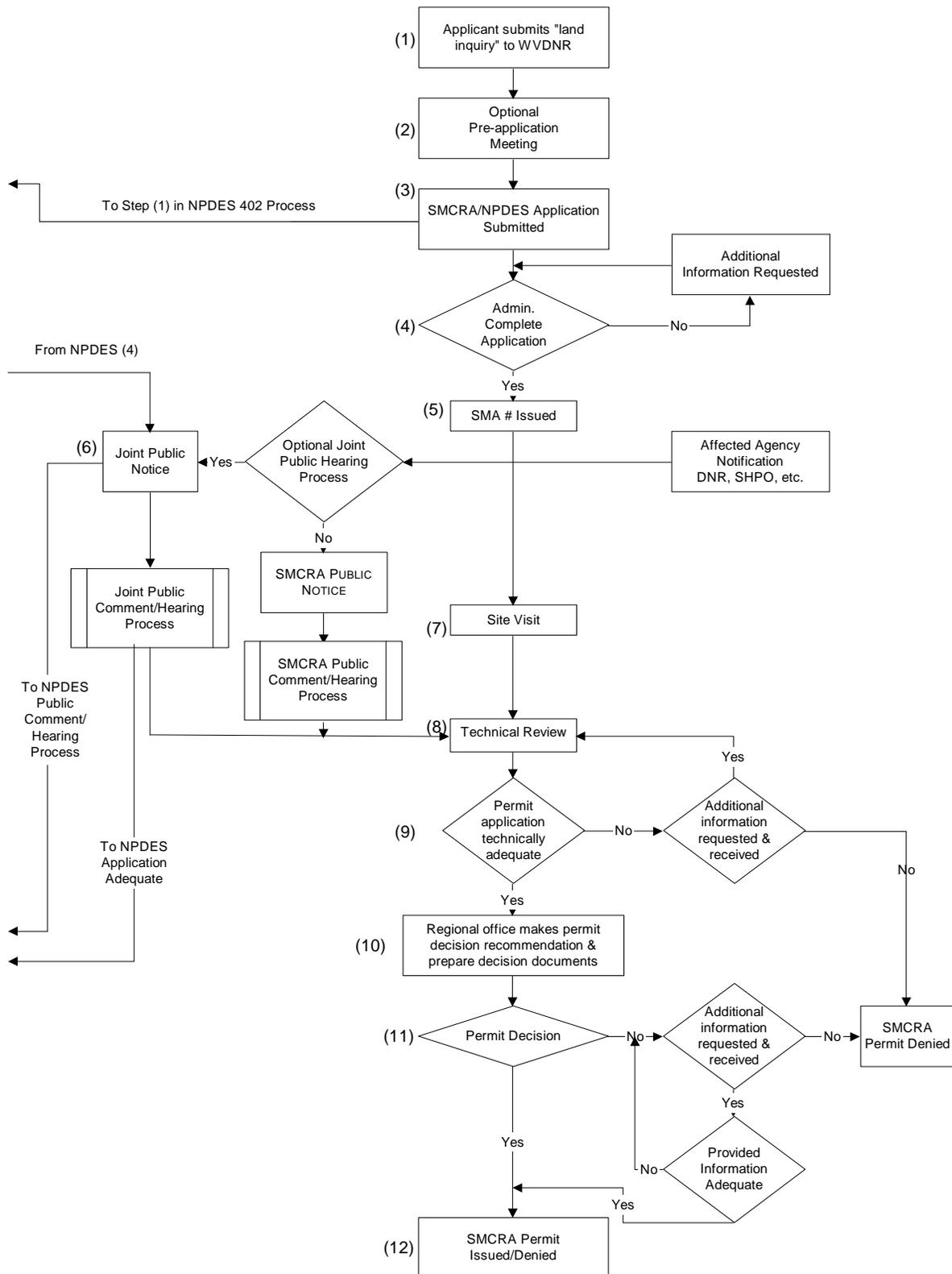
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good faith, the one-year period may be extended as necessary until a permit decision is made. If the SMA number is allowed to expire, an applicant must resubmit the permit application.

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Figure 1. WV SMCRA Process for Applications with Fills Requiring 404 Permits



When the SMA number is issued, the applicant is notified that they may initiate the advertising of their public notice of proposed coal mining activities in the local newspaper. The applicant has the option of choosing to time the publication of the public notice so as to facilitate a joint SCMRA/CWA Section 402 public review and hearing, or proceed with separate publications and/or hearings. The public is notified of how, when, and where to respond if they have interests or concerns relevant to the proposed mining. The public may submit comments and/or request that a public hearing be held concerning the proposed mine. If a public hearing is requested on the SMCRA application it is scheduled and public notice is given as to the date and location of the public hearing. Written and oral comments may be submitted during the informal conference. During the advertisement and public comment period, a copy of the SMCRA application is made available for public review at the courthouse of the county in which the mine is proposed.

At or about the same time the applicant is notified to begin their public notice, WVDEP sends a notification of proposed mining to other potentially affected agencies including such agencies as: municipal government (if in city limits), local public works, County Clerk, Regional Planning Commission, WV Soil Conservation District, WVDEP Office of Air Quality, Division of Culture and History {State Historic Preservation Officer (SHPO)}, WV Division of Natural Resources (WVDNR), COE, USFWS, OSM, USEPA, and others if applicable.

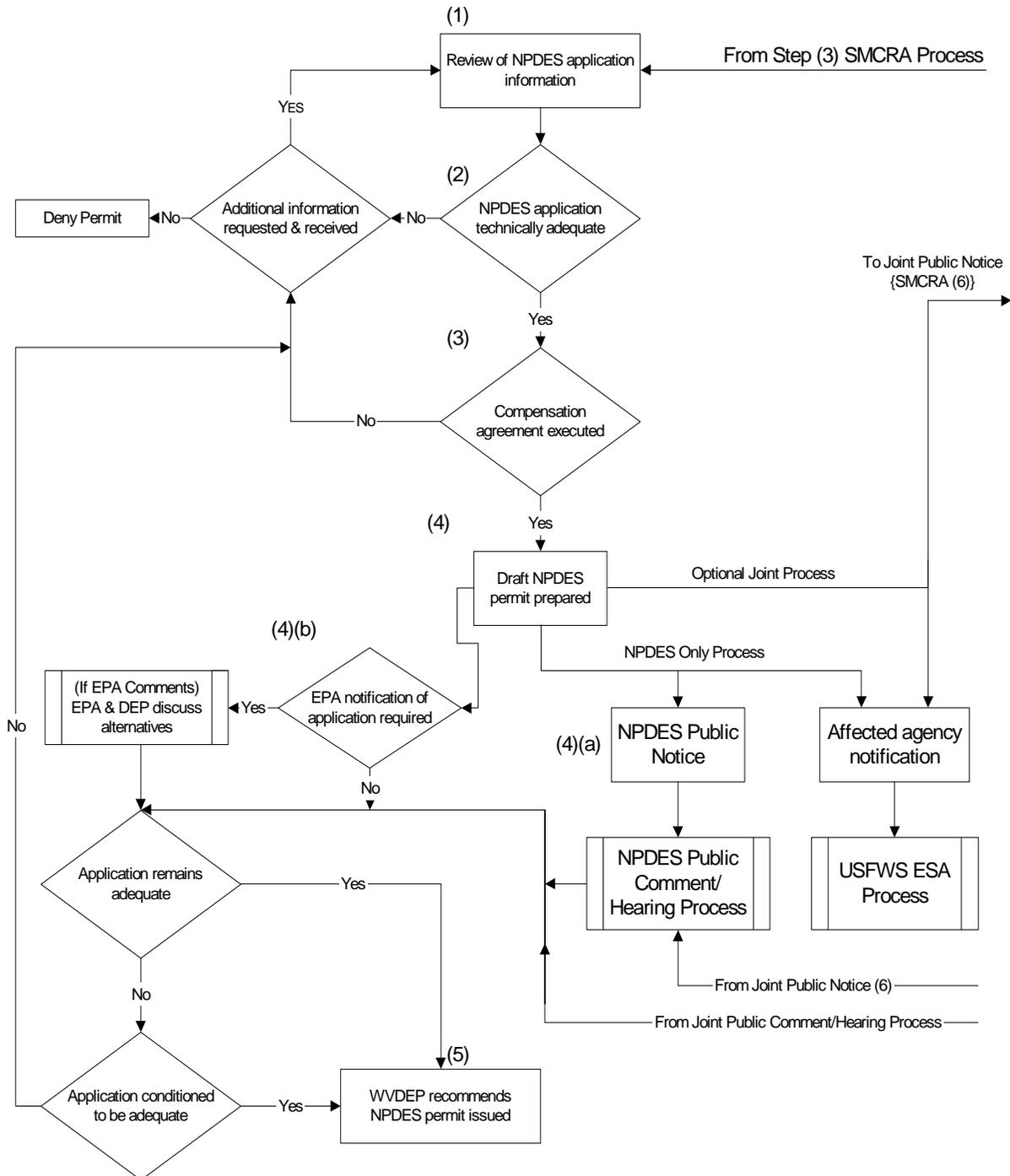
- (F) At, or about, the time the technical review of the application is initiated a site visit is scheduled. WVDEP schedules a site visit so that the assigned review staff can become familiar with the area proposed to be affected by the mining activities.
- (G) A technical review of the application is initiated at or about the time the site visit is scheduled. The purpose of this review is to assure that the proposed mine application is planned in accordance with applicable requirements. Comments received from the public or any other agency are considered during the technical review process.
- (H) If the proposed application is found to be technically deficient, a letter is sent to the applicant requesting the deficiencies be addressed.
- (I) When all deficiencies are adequately addressed, the appropriate WVDEP Regional office makes a recommendation to WVDEP Headquarters to approve the application. If the permit application remains deficient, the recommendation would be to deny it. Permit decision findings are prepared by the regional office in support of their recommendation. A cumulative hydrologic impact analysis (CHIA) is included in the findings package. The CHIA is designed to predict the cumulative hydrologic impacts associated with the proposed mine and other known mining (present or future) on both the surface and groundwater regimes. For the regional office to recommend a proposed mine permit be issued, the CHIA must indicate that the cumulative hydrologic balance will not be adversely affected.
- (J) WVDEP Headquarters evaluates the recommendation, including a review of the findings and comments received during the public review process. If the review of the recommendation, the findings, and the comments indicate that everything is in order, WVDEP will issue the

- permit. If the review identifies remaining problems with the application, the applicant is notified of the problem(s) and provided an opportunity to resolve the identified issue(s).
- (K) If potential issues are successfully addressed, the SCMRA permit may be issued. If not, the permit may then be denied.
- (L) If WVDEP proposes to issue a permit and that permit continues to be a candidate for a CWA 404 General Permit (GP) or Individual permit (IP), WVDEP will issue the SCMRA permit and the applicant will apply to the COE and the appropriate 404 process may begin.
- b. CWA Section 402 National Pollutant Discharge Elimination System Permit (NPDES) Process
- (1) Typically, concurrent applications are received for both a WVDEP SCMRA permit, NPDES 402 permit, and State 401 Certification (Figure 2. NPDES/402 Process). When received, WVDEP initiates a technical review of the NPDES application.
- (2) If the application is determined to be technically deficient, a deficiency letter is prepared and sent to the applicant. If the technical deficiencies are not or cannot be successfully resolved, the 402/NPDES permit is denied.
- (3) This step only applied to applications submitted prior to 1 July, 2002. As of 1 July, 2002 the state 401 certification became a separate application and is no longer addressed in the 402 permit process. If the application is technically adequate or the applicant successfully resolves identified deficiencies, a stream compensatory mitigation agreement may be executed or signed by the applicant and WVDEP¹ if required. The type of compensatory mitigation agreement required of an applicant is determined by the extent of resource involved. Where the applicant proposes to impact streams the following guidelines are used. If more than 250 acres of watershed (measured from the toe of the fill) or more than ½ mile of stream length is impacted by the proposed action, a specific compensatory mitigation agreement is required. If less than 250 acres and less than ½ mile of stream is impacted, the mitigation agreement is typically “best management practices”(BMPs).

¹ Stream compensatory mitigation agreement is technically a part of the CWA Section 401 certification, but is shown in the 402 process only because the WVDEP has found it most efficient to resolve the compensation issue at this time prior to 7/1/02.

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Figure 2. WV NPDES/402 Process



* If less than 250 acres of watershed from toe of basin and less than 1/2 acre stream impacted, compensatory mitigation agreement has traditionally been BMP's. If more than 250 acres of watershed or more than 1/2 acre of stream impacted a compensatory mitigation agreement is required. Note: Technically, compensatory mitigation agreement is a part of the 401 certification process, but is shown in the 402 process only because the state has found it most efficient to resolve the compensation issue at this time.

- (4) When the application is technically correct and the compensatory mitigation agreement executed (prior to 7/1/02), a draft NPDES permit is prepared by the regional office and sent to WVDEP headquarters and the applicant. At or about the time the public notice for the draft NPDES permit is prepared the applicant sends a notification of the draft NPDES permit to the other potentially affected agencies: USFWS, COE, WVDNR, and others. The preparation of the draft permit initiates two actions or processes (public/agency and USEPA notification) which occur on concurrent paths:
- (a) The first concurrent action to be described involves public/agency participation:
- With the preparation of the draft permit, the applicant places a public notice in the local newspaper notifying the public that WVDEP has prepared a draft permit and the draft permits available for review and comment. The applicant may choose to time the publication of the public notice so as to facilitate a joint SCMRA/CWA Section 402 public review and/or hearing. The public is advised where comments are to be submitted and how a public hearing on the draft permit may be requested. If a public hearing is requested on the NPDES permit, WVDEP evaluates the request and determines if holding a public hearing is appropriate. If a decision is made to hold a public hearing, WVDEP publishes a notice of the date and location of the hearing. The hearing is held and comments received either by mail or during the hearing are evaluated by WVDEP.
 - At or about the time the public notice for the draft NPDES permit is prepared the applicant notifies affected agencies of the draft permit. The agencies are sent a notification with a copy of the legal advertisement and given 30 days from the date of receipt to provide comments.
 - If the evaluation of comments on the draft NPDES permit leads WVDEP to the conclusion that the permit does not adequately address all comments and concerns, WVDEP determines if the draft permit can be conditioned to adequately address the comments and concerns. If so, the draft permit is conditioned and upon completion of the requirements of the concurrent part of the process, the NPDES permit may be issued. If the draft permit cannot be conditioned to address the comments or concerns, WVDEP may request the applicant provide additional information (i.e., revisions) for the NPDES application to resolve the issue(s). If the information is requested and provided, the application reenters the technical review process previously identified. If the information provided is adequate, the process continues. If the NPDES application cannot or is not revised to resolve the issue(s), the application is denied.
- (b) The second process involves notification of USEPA by WVDEP, and initiates USEPA's involvement in the 402 NPDES process:
- WVDEP determines if USEPA notification is required. If it is not, then the permit may be issued upon successful completion of the public involvement process

described above. If USEPA is required to be notified, then WVDEP provides a copy of the NPDES application and draft permit to USEPA.

- (v) Upon notification of draft NPDES permit, USEPA has 30 days to review the draft permit and provide a “general objection” to the draft permit. If a “general objection” is not received within 30 days, the draft permit may be issued upon completion of the public involvement process. If a “general objection” is received, USEPA then has 60 days in which to submit a “specific objection”. If a “specific objection” is not submitted within 60 days, the draft permit may be issued upon completion of the public involvement process. If a “specific objection” is received within 60 days, WVDEP has 90 days in which to satisfy or resolve the USEPA objection(s). If the WVDEP satisfies USEPA objections and the public participation process has been successfully completed, WVDEP recommends that the West Virginia Office of Water Resources issue an NPDES permit. If the objections are not successfully satisfied, USEPA may assume 402/ NPDES responsibility for the application.
- c. CWA Section 401 (State Water Quality Certification) Process
- (1) WV Legislative Rule Title 47, Series 5A requiring a separate application for their State Water Quality Certification (401 Certification) went into effect 1 July, 2002. Prior to that time the 401 certification was processed with the NPDES (402) permit. The 401 Certification is required to be submitted concurrently with a SMCRA permit application filling waters of the US. If the application is for filling of ephemeral waters only, then it has been pre-certified and will not require an application or advertisement. Applications for certification of NWP 404 permits are described below. The COE usually receives applications for individual 404 permits prior to the SMCRA or 401 Certification applications being submitted to WVDEP, but once submitted the review process is generally the same.
 - (2) If the application is determined to be technically deficient (inadequate or missing information on stream delineation or minimization, inadequate or no mitigation plan), a deficiency letter is prepared and sent to the applicant. If the technical deficiencies are not or cannot be successfully resolved, the 401 Certification is denied.
 - (3) If the application is technically adequate or the applicant successfully resolves identified deficiencies, a stream compensatory mitigation agreement may be executed or signed by the applicant and WVDEP (if required). The type of compensatory mitigation agreement required of an applicant is determined by the extent of resource involved. Where the applicant proposes to impact streams the following guidelines are used. If more than 250 acres of watershed (measured from the toe of the farthest downstream disturbance; i.e. the pond) or more than ½ mile of stream length is impacted by the proposed action, a specific compensatory mitigation agreement is required. If less than 250 acres and less than ½ mile of stream is impacted, a general mitigation agreement is executed requiring "best management practices"(BMPs). Additional mitigation may also be required by the COE for the CWA 404 permit.

- (4) When the application is technically correct, the compensatory mitigation agreement executed (if required), and the SMCRA permit is issued, the applicant applies to the COE for their CWA 404 permit. The COE provides a PCN that states the type of 404 permit being considered.
- (5) The applicant is required to advertise in a newspaper of general circulation in the county the operation is located. The ad must run one time and allow a thirty (30) day comment period. Applicant must address any deficiencies identified by WVDEP resulting from the public comments received.
- (6) If the application remains technically adequate or the applicant successfully resolves identified deficiencies, and the 404 permit is issued by the COE, the 401 certification is issued. Upon issuance of the 401 certification the affected agencies are notified (USFWS, COE, WVDNR, and others) and given a fifteen (15) day comment period.
- (7) If the application remains technically adequate, or any identified deficiencies successfully resolved, the 401 certification is complete.

d. CWA Section 404 Permit Process

Under the Baseline or presettlement condition, valley fills were permitted under CWA Nationwide Permit 21 or 26: Surface Coal Mining Activities (Figure 3. Pre-settlement 404 General Permit Process)^{2 3} provided the permittee notified the District COE Engineer. The notification was required to include an OSM or state approved mitigation plan. The COE, at the discretion of the District Engineer, could require a bond to ensure success of the mitigation. For discharges in special aquatic sites, including wetlands, the notification needed to include a delineation of affected special aquatic sites.

² USCOE has prepared an Environmental Assessment and has issued a Finding of No Significant Impact for each NWP to meet NEPA and CWA Section 404(b)(1) requirements.

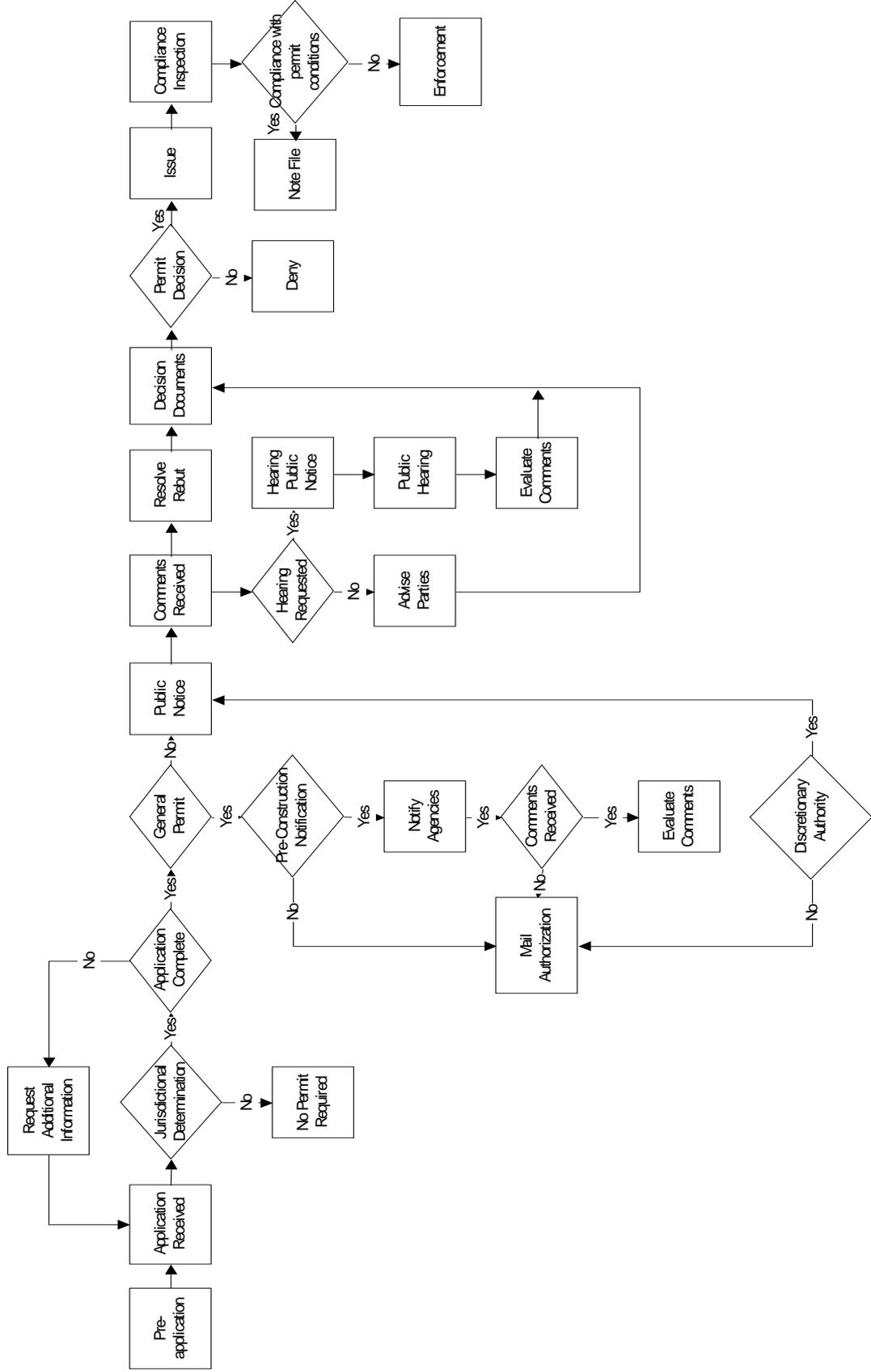
³ Section 401 Water Quality Certification has been issued on a programmatic basis for NWPs. No additional applications are required.

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Figure 3. 404 Permit Process

Source: USCOE 1999



The following, in part, are selected general conditions that must be followed for authorization by a NWP to be valid:

(1) Notification.

- (a) **Timing:** Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a Preconstruction Notification (PCN) as early as possible and shall not begin the activity:
- Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or
 - If notified in writing by the District or Division Engineer that an individual permit is required; or
 - Unless 45 days have passed from the District Engineer's receipt of the complete notification and the prospective permittee has not received written notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be notified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2). This automatic 45 day permit authorization does not apply to NWP 21.
 - For NWP 21 (Surface Coal Mining Activities), the PCN must include an Office of Surface Mining (OSM) or state-approved mitigation plan, if applicable. To be authorized by this NWP, the District Engineer must determine that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are minimal both individually and cumulatively and must notify the project sponsor of this determination in writing.
- (b) **Contents of Notification:** The notification must be in writing and include the following information: (1) Name, address and telephone numbers of the prospective permittee; (2) Location of the proposed project; (3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), Regional General Permit(s), or Individual Permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP (Sketches usually clarify the project and when provided result in a quicker decision.); (4) For NWPs 7, 12, 14, 18, 21, 34, 38, 39, 40, 41, 42, and 43, the PCN must also include a delineation of affected special aquatic sites, including wetlands, vegetated shallows (e.g., submerged aquatic vegetation, seagrass beds), and riffle and pool complexes (see paragraph 13(f));
- (c) **Form of Notification:** The standard Individual Permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and

- (2) **District Engineer's Decision:** In reviewing the PCN for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may submit a proposed mitigation plan with the PCN to expedite the process. The District Engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the District Engineer will notify the permittee and include any conditions the District Engineer deems necessary. The District Engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee is required to submit a compensatory mitigation proposal with the PCN, the proposal may be either conceptual or detailed. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the District Engineer will expeditiously review the proposed compensatory mitigation plan. The District Engineer must review the plan within 45 days of receiving a complete PCN and determine whether the conceptual or specific proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then the District Engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an Individual Permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the District Engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation proposal that would reduce the adverse effects on the aquatic environment to the minimal level. When conceptual mitigation is included, or a mitigation plan is required under item (2) above, no work in waters of the US will occur until the District Engineer has approved a specific mitigation plan.

- (3) **Agency Coordination:** The District Engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level. For activities requiring notification to the District Engineer that result in the loss of greater than 1/2-acre of waters of the US, the

- District Engineer will provide immediately (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy to the appropriate Federal or state offices (USFWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 15 calendar days before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. As required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer will provide a response to NMFS within 30 days of receipt of any Essential Fish Habitat conservation recommendations. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.
- (4) **Wetlands Delineations:**Wetland delineations must be prepared in accordance with the current method required by the Corps (For NWP 29 see paragraph (b)(9)(iii) for parcels less than (1/4-acre in size). The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 45-day period will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.
 - (5) **Compliance Certification.** Every permittee who has received NWP verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include:
 - (a) A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions;
 - (b) A statement that any required mitigation was completed in accordance with the permit conditions; and
 - (c) The signature of the permittee certifying the completion of the work and mitigation.
 - (6) **Mitigation:**The District Engineer will consider the factors discussed below when determining the acceptability of appropriate and practicable mitigation necessary to offset adverse effects on the aquatic environment that are more than minimal.
 - (a) The project must be designed and constructed to avoid and minimize adverse effects to waters of the US to the maximum extent practicable at the project site (i.e., on site).
 - (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.
 - (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland impacts requiring a PCN, unless the District Engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. Consistent with National policy, the District Engineer will establish a preference for

restoration of wetlands as compensatory mitigation, with preservation used only in exceptional circumstances.

(d) Compensatory mitigation (i.e., replacement or substitution of aquatic resources for those impacted) will not be used to increase the acreage losses allowed by the acreage limits of some of the NWP. For example, 1/4-acre of wetlands cannot be created to change a 3/4-acre loss of wetlands to a 1/2-acre loss associated with NWP 39 verification. However, 1/2-acre of created wetlands can be used to reduce the impacts of a 1/2-acre loss of wetlands to the minimum impact level in order to meet the minimal impact requirement associated with NWPs.

(e) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes. Examples of mitigation that may be appropriate and practicable include, but are not limited to: reducing the size of the project; establishing and maintaining wetland or upland vegetated buffers to protect open waters such as streams; and replacing losses of aquatic resource functions and values by creating, restoring, enhancing, or preserving similar functions and values, preferably in the same watershed.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., easements, deed restrictions) of vegetated buffers to open waters. In many cases, vegetated buffers will be the only compensatory mitigation required. Vegetated buffers should consist of native species. The width of the vegetated buffers required will address documented water quality or aquatic habitat loss concerns. Normally, the vegetated buffer will be 25 to 50 feet wide on each side of the stream, but the District Engineers may require slightly wider vegetated buffers to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the Corps will determine the appropriate compensatory mitigation (e.g., stream buffers or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where vegetated buffers are determined to be the most appropriate form of compensatory mitigation, the District Engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland impacts.

(g) Compensatory mitigation proposals submitted with the "notification" may be either conceptual or detailed. If conceptual plans are approved under the verification, then the Corps will condition the verification to require detailed plans be submitted and approved by the Corps prior to construction of the authorized activity in waters of the U.S.

(h) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases that require compensatory mitigation, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

- (7) Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the US authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit (e.g. if a road crossing over tidal waters is constructed under NWP

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Appendix B

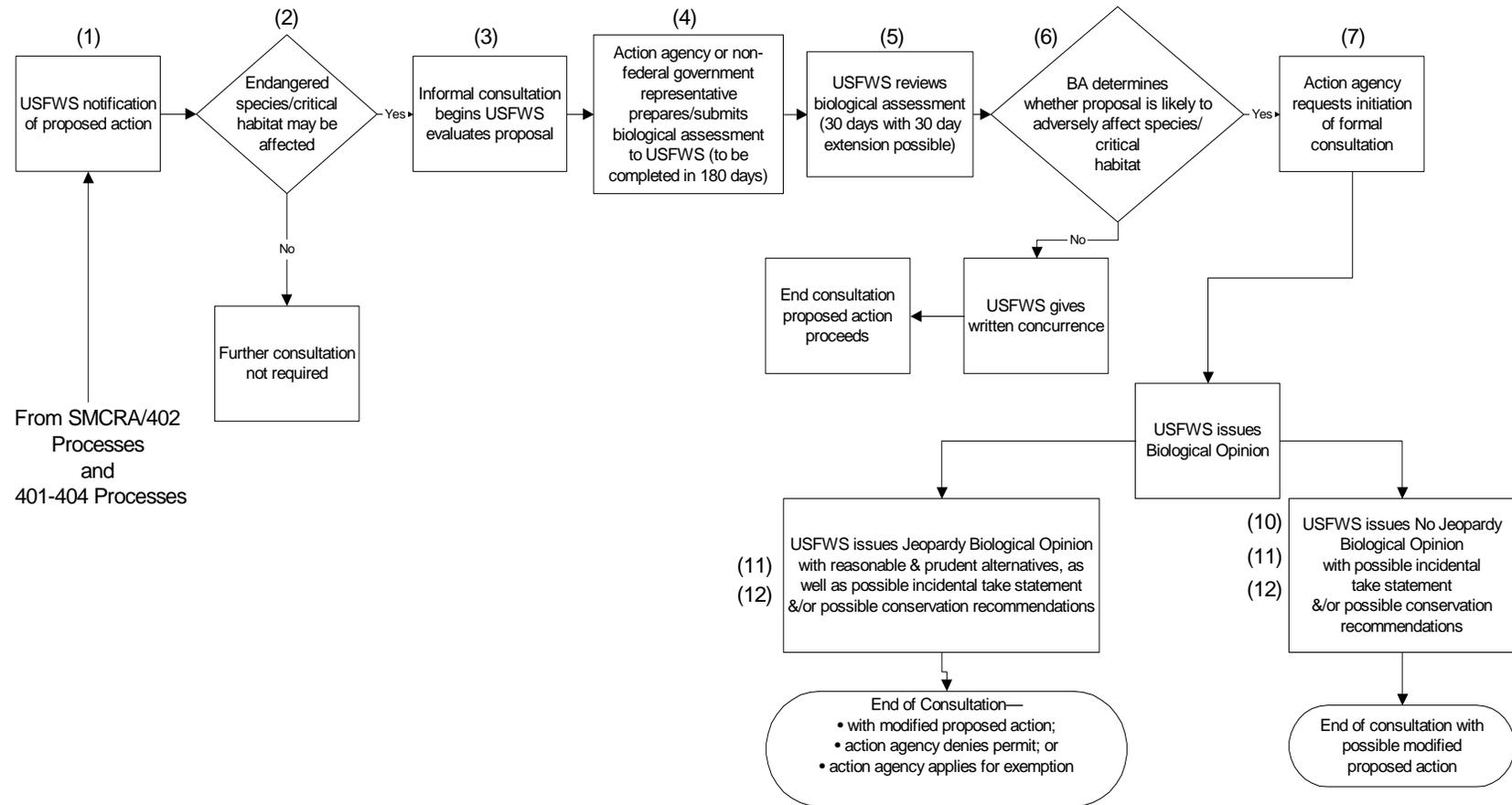
14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the US for the total project cannot exceed 1/3-acre).

- (1) The ESA Section 7 consultation process between federal agencies and the USFWS may be triggered by a COE CWA Section 404 permit application and/or by a SCMRA applicant proposed mine notification (Figure 4. U.S. Fish and Wildlife Service Endangered Species Act Consultant Process).
- (2) The federal agency evaluates the proposed action and determines whether it may affect federally listed threatened or endangered species (T&E) or designated critical habitat may be affected. If no species/critical habitat may be affected, no consultation is required.
- (3) In order to assist the federal agency in determining whether a species or critical habitat may be affected, the USFWS can provide a species list and information regarding the species/critical habitat. The USFWS may recommend studies or surveys as appropriate.
- (4) If the T&E species or critical habitat may be affected and the proposal is a major construction activity or has similar physical impacts, the action agency or designated non-federal representative must prepare a biological assessment (BA). The BA is intended to assess the likelihood of whether the proposed project is likely to adversely affect any T&E species or critical habitat. The BA must be submitted within 180 days to USFWS unless a time extension is agreed to by the federal agency and USFWS.
- (5) Upon receipt, USFWS has 30 days to review the BA; thirty day extensions may occur in the review process based on complexity of the BA or workload responsibilities of USFWS).
- (6) If the conclusion of the BA is that adverse effects to a species and critical habitat are not likely to occur and the USFWS concurs in writing with that conclusion, the informal consultation process is concluded.

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IV. Alternatives

Figure 4. US Fish & Wildlife Service Endangered Species Act Consultation Process
Source: USOSM 1999



- (7) If the BA concludes that adverse effects to T&E species/critical habitat are likely, or the USFWS disagrees with a BA indicating that impacts are not likely, the action agency must request initiation of the formal consultation process. The Agency can also modify the proposal to avoid the finding of likely to adverse effects. The formal consultation process takes 135 days—90 days to consult and 45 days to prepare the biological opinion.
- (8) If the USFWS believes the proposed action will jeopardize the continued existence of the T&E species or adversely modify critical habitat, a “jeopardy” opinion is prepared.
- (9) USFWS must then recommend reasonable and prudent alternatives to the proposed action, if available, which reduce the impacts to T&E/critical habitat to a level that would not jeopardize the T&E/critical habitat.
- (10) If the USFWS believes the proposed action will *not* jeopardize the continued existence of the T&E/or adversely modify critical habitat, a “no jeopardy” opinion is prepared.
- (11) Whether USFWS issues a jeopardy or no jeopardy opinion, if the USFWS anticipates that there may be “incidental take”(harm or killing) of listed animal species, the USFWS will specify reasonable and prudent measures to minimize the take in exchange for authorizing the otherwise prohibited take. Any terms and conditions associated with the incidental take statement are not discretionary and as such must be made a part of any permit issued.
- (L) The USFWS may also specify discretionary conservation recommendations at the end of the biological opinion that would promote the recovery of the species.

While consultations are required when the proposed action may affect a listed species or critical habitat, a conference is required only when the proposed action is likely to jeopardize the continued existence of a proposed species or destroy or adversely modify proposed critical habitat. Conferencing can be done on an informal or formal basis. No specific regulatory time frames exist for conferencing but the policy of the USFWS is to follow the same time frames for formal consultation. In a similar process as consultation, a conference report, in the case of informal conference, and a conference opinion for formal conference are prepared. The findings of the conference report or opinion are advisory in nature, however, as soon as the listing becomes effective, the prohibition against jeopardy or adverse modification applies to the action.

e. **SCMRA Requirements for the Protection of Endangered Species**

- (A) Permits for exploration removing more than 250 tons of coal, or occurring on lands designated for surface coal mining operations require a description of any endangered or threatened species (listed species). The regulatory authority must also find in writing that the exploration and reclamation activities will not jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat of those species.
- (B) Performance standards for coal exploration prohibit disturbance of critical habitat of listed species.

- (C) To avoid duplication, each regulatory program is required to provide for the coordination of review and issuance of permits with applicable requirements of the Endangered Species Act.
- (D) Each permit application is required to include site specific information when the site or adjacent area is likely to include listed or proposed species. The level of detail of the information must be determined by the regulatory authority in consultation with the federal agencies with responsibility for listed species. The permit is required to include a description of how the operator will minimize disturbance and adverse impacts to listed species. The Service can request the regulatory authority to supply the information described in the previous two sentences.
- (E) Regulatory authorities are required to provide written notification to federal fish and wildlife agencies whenever the State or OSM receives an application for a new permit, significant revision of a permit, or permit renewal.
- (F) Regulatory authorities are required, as a condition of a permit approval, to make a written finding that the proposed operation would not affect the continued existence of listed species or result in destruction or adverse modification of their critical habitat.
- (G) Permit revisions require the regulatory authority to make the same findings as for permit approval. Permit renewals require that the regulatory authority disapprove a permit renewal if it finds in writing that the existing permit is not in compliance with applicable requirements.
- (H) Since the taking of a listed species is prohibited and mining activities that are likely to jeopardize the continued existence of listed species are also prohibited, the mining operator must promptly notify the regulatory authority of the presence of a protected species within the permit area. The regulatory authority must consult with appropriate federal fish and wildlife agencies to determine whether and under what condition the operation may proceed.

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Appendix B

The following presents various stream definitions that were in place at the beginning of this EIS process.

State/agency	Definitions specific to surface coal mining	Other definitions (if any)
OSM	<p>"Perennial stream means a stream or part of a stream that flows continuously during all of the calendar year as a result of ground-water discharge or surface runoff. The term does not include 'intermittent stream' or 'ephemeral stream'."</p> <p>"Intermittent stream means -</p> <ul style="list-style-type: none"> (a) A stream or reach of a stream that drains a watershed of at least one square mile, or (b) A stream or reach of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and ground water discharge." <p>"Ephemeral stream means a stream which flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice, and which has a channel bottom that is always above the water table."</p> 	N/A
WV	<p>"Intermittent Stream' means: (a) a stream or reach of a stream that drains a watershed of at least one square mile; or (b) a stream or reach of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and ground water discharge." CSR 38-2-2.69, 2.69.a., and 2.69.b.</p> <p>"Perennial Stream' means a stream or portion of a stream that flows continuously." CSR 38-2-2.86.</p>	<p>"Wet weather streams' are streams that flow only in direct response to precipitation or whose channels are at all times above the water table." CSR 46-1-1-2.9. (WQS regulations)</p> <p>"Intermittent streams' are streams which have no flow during sustained periods of no precipitation and which do not support aquatic life whose life history requires residence in flowing waters for a continuous period of at least six (6) months." CSR 46-1-1-2.9. (WQS regulations)</p>

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State/agency	Definitions specific to surface coal mining	Other definitions (if any)
MD	<p>“<u>Ephemeral stream</u>’ means a stream which flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice, and which has a channel bottom that is always above the local water table.” COMAR 26.20.01.02(30)</p> <p>“<u>Intermittent stream</u>’ means: (a) a stream or reach of a stream that drains a watershed of at least 1 square mile; or (b) a stream or reach of stream that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and ground water discharge.” COMAR 25.20.01.02(47)</p> <p>“<u>Perennial stream</u>’ means a stream or part of a stream that flows continuously during all of the calendar year as a result of ground water discharge or surface runoff.” COMAR 26.20.01.02(63)</p>	<p>“<u>Intermittent stream</u>’ means a nontidal body of flowing water for which the computed design stream flow is zero.” COMAR 26.08.01.B(42) (WQS regulations).</p>
PA	<p>“<u>Ephemeral stream</u> -- A water conveyance which lacks substrates associated with flowing waters and flows only in direct response to precipitation in the immediate watershed or in response to melting snowpack and which is always above the local water table.” 25 Pa. Code § 87.1</p> <p>“<u>Intermittent stream</u> -- A body of water flowing in a channel or bed composed primarily of substrates associated with flowing water, which, during periods of the year, is below the local water table and obtains its flow from both surface runoff and groundwater discharges.” 25 Pa. Code § 87.1</p> <p>“<u>Perennial stream</u> -- A body of water flowing in a channel or bed composed primarily of substrates associated with flowing waters and is capable, in the absence of pollution or other manmade stream disturbances, of supporting a benthic macroinvertebrate community which is composed of two or more recognizable taxonomic groups of organisms which are large enough to be seen by the unaided eye and can be retained by a United States Standard No. 30 sieve (28 meshes per inch, 0.595 mm openings) and live at least part of their life cycles within or upon available substrates in a body of water or water transport system.” 25 Pa. Code § 87.1</p>	<p>The definitions in the “noncoal mining” regs (25 Pa. Code § 77.1) are the same.</p>

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State/agency	Definitions specific to surface coal mining	Other definitions (if any)
VA	<p>“Ephemeral stream’ means a stream which flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice, and which has a channel bottom that is always above the local water table.” 4 VAC 25-130-700.5</p> <p>“Intermittent stream’ means: (a) A stream or section of a stream that drains a watershed of at least one square mile, or (b) A stream or section of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and ground water discharge.” 4 VAC 25-130-700.5</p> <p>“Perennial stream’ means a stream or part of a stream that flows continuously during all of the calendar year as a result of ground-water discharge or surface runoff. The term does not include ‘intermittent stream’ or ‘ephemeral stream.’” 4 VAC 25-130-700.5</p>	<p>“Intermittent or perennial stream’ means a stream or part of a stream that flows continuously during all (perennial) or for at last one month (intermittent) of the calendar year as a result of ground water discharge or surface runoff.” 4 VAC 25-30-20 (regs governing mining minerals other than coal)</p>
KY	<p>“Intermittent or perennial stream’ means a watercourse or part of a watercourse that flows continuously during all (perennial) or for at least one (1) month (intermittent) of the calendar year as a result of groundwater discharge or surface run-off. The term does not include an ephemeral stream which is one that flows for less than one (1) month of a calendar year and only in direct response to precipitation in the immediate watershed and whose channel bottom is always above the local water table.” 405 KAR 1:010(29)</p>	<p>Kentucky’s general water quality standards regs do not define “ephemeral,” “intermittent,” or “perennial” streams. [Per Eva Long, EPA Region IV] Kentucky defines regulated "surface waters of the Commonwealth" as either blue-line streams on a USGS topo map (non-field confirmed) or a discrete conveyance with a defined channel (field confirmed). Statistical recurrence of low flow does not enter into the definition of a stream.</p> <p>“Surface waters” means those waters “having well-defined bands and beds, either constantly or intermittently flowing; lakes and impounded waters; marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Effluent ditches and lagoons used for waste treatment which are situated on property owned, leased, or under valid easement by a permitted discharger are not considered to be surface waters of the Commonwealth.” 401 KAR 5:002(257)</p>

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State/agency	Definitions specific to surface coal mining	Other definitions (if any)
TN	OSM administers the SMCRA program in TN, and uses its own definitions.	[Per Lydia Mayo, EPA Region IV] TN regulations at 1200-4-3-.04(4) define wet weather conveyances as: "... (conveyances that are man-made or natural watercourses, including natural watercourses that have been modified by channelization, that flow only in direct response to precipitation runoff in their immediate locality and whose channels are above the groundwater table and which do not support fish or aquatic life and are not suitable for drinking water supplies)...shall be protective of humans and wildlife that may come in contact with them and shall not degrade or adversely affect the quality of downstream waters. Applicable water quality standards will be maintained downstream of wet weather conveyances." [Per Robbie Baker, TDEP] The TN regulations do not use the terms "perennial," "intermittent," or "ephemeral." The terms "intermittent" and "ephemeral," as well as "de minimis" stream are sometimes used in general permits, including those related to mining, but are not defined. The State is developing proposed regs that may define these terms and debating whether to use a flow-based def. or a def. based on ecoregion, physiogeographic region, or watershed size. As template for state-issued general permits and def. of "de minimis" stream, current thinking is that a "de minimis" stream would have a drainage area of 20 acres.
American Geological Institute		Perennial: "a stream or reach of stream that flows continuously throughout the year and whose upper surface generally stands lower than the water table in the region adjoining the stream." Jackson, Julia A., 1977, <i>Glossary of Geology</i> , American Geological Institute, Alexandria, VA, p. 769.
U.S. Department of the Army		Perennial: "a stream that flows continuously all year (including wet and dry years) and has a minimum flow of 40 liters per minute." U.S. Army Material Command, 1975, "Glossary of Environmental Terms," AMC Pamphlet 706-119, Environmental Series Part Five, p. 200

APPENDIX C

REGIONAL SETTING SUPPORTING INFORMATION

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APPENDIX C: REGIONAL SETTING SUPPORTING INFORMATION

Climate

The climate within the study area is temperate and is favorable for many types of plants and animals. Generally, summers are warm and humid with winters moderately cold. Valleys can have lower temperatures than the surrounding hills when cooler heavier air drains to areas of lower elevations. Precipitation is fairly well distributed throughout the year. Seasonal temperatures, rainfall, snowfall, wind, and humidity differ from West Virginia, Kentucky, Tennessee and Virginia. Monthly temperature and precipitation data for each state within the study area are shown in Tables C-1 through C-4.

Table C-1
Monthly Temperature and Rainfall Data for
the Kentucky Portion of the Study Area

Month	Approximate Range of Daily Maximum Temperature (°F)	Approximate Range of Daily Minimum Temperature (°F)	Approximate Monthly Rainfall (inches)
January	42-50	21-26	4-5
February	46-51	22-29	4
March	56-61	30-36	5
April	68-71	40-44	4
May	77-80	49-53	4
June	80-86	59-61	4
July	85-90	62-66	5
August	84-89	60-65	3-4
September	79-83	53-58	3-4
October	69-73	40-53	2
November	57-63	30-36	3-4
December	47-50	25-30	3-4

Table C-2
Monthly Temperature and Rainfall Data for
the Tennessee Portion of the Study Area

Month	Approximate Range of Daily Maximum Temperature (°F)	Approximate Range of Daily Minimum Temperature (°F)	Approximate Monthly Rainfall (inches)
January	45-49	25-29	5
February	48-52	27-30	4-5
March	56-63	34-37	6
April	68-73	44-46	4-5
May	75-80	51-54	4-5
June	82-86	58-62	4-5
July	85-88	62-66	5
August	84-88	61-65	3-4
September	79-83	55-59	4
October	68-74	44-47	3
November	56-62	34-36	4
December	47-62	28-31	5-6

Table C-3
Monthly Temperature and Rainfall Data for
the West Virginia Portion of the Study Area

Month	Approximate Range of Daily Maximum Temperature (°F)	Approximate Range of Daily Minimum Temperature (°F)	Approximate Monthly Rainfall (inches)
January	38-44	18-25	3-4
February	41-47	18-26	3
March	52-57	26-34	3-5
April	64-70	36-44	3-4
May	72-77	46-51	4
June	77-83	52-59	3-5
July	80-86	56-64	5-6
August	80-85	56-63	4-5
September	75-80	50-56	3-4
October	64-69	38-44	3
November	53-57	29-35	3
December	42-47	20-28	3-4

**Table C-4
Monthly Temperature and Rainfall Data for
the Virginia Portion of the Study Area**

Month	Approximate Range of Daily Maximum Temperature (°F)	Approximate Range of Daily Minimum Temperature (°F)	Approximate Monthly Rainfall (inches)
January	37-44	17-22	3-4
February	40-49	19-25	3-4
March	50-59	28-34	4-5
April	59-69	35-42	3-4
May	68-77	44-50	4-5
June	75-84	52-58	4
July	78-87	56-63	5
August	77-86	55-62	3-4
September	71-81	48-56	3-4
October	61-70	36-43	2-3
November	51-60	29-35	3-4
December	41-49	21-27	3-4

Snowfall

The average amount of snowfall within the study area ranges from 7 to 50 inches, differing from West Virginia, Kentucky, Tennessee and Virginia. Information of a few select counties within the study area is provided for example purposes.

Nicholas County West Virginia has cold and snowy winters with an average yearly snowfall of approximately 50 inches. On average, approximately 34 days per year have at least one inch of snow on the ground. The average yearly snowfall in Braxton County, West Virginia, is approximately 29 inches. On the average, 15 days of the year have at least one inch of snow on the ground. The number of such days varies greatly from year to year. In Kanawah and Wyoming Counties, West Virginia, the average yearly snowfall is about 30 inches.

There is somewhat less snowfall in the Tennessee portion of the study area, than in the West Virginia portion. In Bledsoe, Fentress, Pickett, Anderson, and Cumberland Counties, average snowfall ranges from 7 to 20 inches per year.

Elliot, Bell, Harlan, Pike, Carter, Knox, Whitley, McCreary, Wayne, Jackson, Owsley, Powell, and Wolfe Counties, Kentucky. The average yearly snowfall is approximately 15 inches, but the ground is seldom covered with snow for more than a few days because of intermittent thaws. There is more

than one inch of snow on the ground for approximately 4-8 days per year. During a normal year not more than six snowfalls are more than one inch deep.

The average annual snowfall in Bledsoe County, Tennessee, is 7 inches. It is seldom that more than one inch of snow is on the ground for a whole day.

Rainfall

Heavy rains, that occur at any time of the year, and severe thunderstorms in summer sometimes cause flash flooding, particularly in narrow valleys.

Approximate monthly rainfall averages for the Kentucky, Tennessee, and West Virginia portions of the study area can be seen in Tables C-1 through C-4. An approximate average of 43 to 50 inches of rain falls on the Kentucky portion of the study each year. Anywhere from 2 to 5 inches of rain can be expected in any given month of the year with the wettest month being July and the driest month being October. On average, approximately 90 to 97 days throughout the year will have 0.10 inches or more of precipitation in the Kentucky portion of the study area.

Approximately 52 to 55 inches of rain falls on the Tennessee portion of the study area in the average year. Anywhere from 3 to 6 inches of rain per month can be expected in this area with the wettest months being March and December and the driest month being October. Approximately 84 to 95 days throughout the year will experience greater than 0.10 inches of precipitation.

In the West Virginia portion of the study area, approximately 38 to 50 inches of rain occurs per year. Monthly rainfalls of 3 to 6 inches can also be expected in this area throughout the year. The wettest month tends to be July while the driest months are usually February, October, and November. Approximately 86 to 101 days throughout the year will experience greater than 0.10 inches of rain in the West Virginia portion of the study area.

In the Virginia portion of the study area, approximately 41 to 50 inches of rain occurs per year that is similar to the rest of the study area. Anywhere from 2 to 5 inches of rain can be expected in any given month of the year with the wettest months being March, May, and July and the driest month being October.

Supplemental Geology Information for the MTM/VF EIS Study Area

This appendix is provided for general reference on geologic considerations within the study area. Topics include environment of deposition, post-depositional deformation, chemical nature of overburden and potential for acid mine drainage formation, and detailed descriptions of coal-bearing rock units in Kentucky, Tennessee, Virginia, and West Virginia.

1. Environment of Deposition

Coal seams were formed by the accumulation and burial of plant material to form peat, which the pressure of overlying sediments eventually converted into coal. The physical and chemical properties of the coal and associated sedimentary rocks are related directly to the depositional

environment in which the peat beds accumulated, and to the structural stresses exerted on the peat beds during and after their deposition and burial.

The Appalachian Basin of the eastern United States was a site of sediment accumulation for most of the Paleozoic era, approximately 570 to 225 million years ago, during which two significant mountain-building events occurred along the eastern margin of the continent. The latter of these events, known as the Appalachian orogeny, occurred from about 320 to 220 million years ago, during the Pennsylvanian through mid-Triassic periods. The coal-bearing or carboniferous rocks of the Appalachian coalfields accumulated from sediments shed off these mountains from approximately 300 to 250 million years ago, primarily during the Pennsylvanian period. Table C-5 depicts these periods in relation to the geologic time scale.

Sediments eroded from the ancestral Appalachian mountains were transported by streams and rivers to the Appalachian Basin, where a large inland sea existed at the time. Numerous swamps, river deltas, tidal deltas, and back barrier marshes existed in the coastal area of the ancient inland sea. The thickness and lateral extent of the swamps were partially dependent on the topographic surface on which the swamp developed (Horne et al. 1978). The extent and duration of each swamp determined the regional extent and thickness of individual coal seams. Discrete depositional events lasting millions of years, coupled with local and regional uplift, folding, and erosion, produced numerous discontinuous seams. Influxes of coarse-grained clastic sediments, forming shaly partings and impure coals, are commonly found in the Basin coal seams. Stream channel migration within the shifting fluvial and deltaic drainage systems eroded part of the swamp deposits. Other ancient stream channels were filled with fine to coarse-grained clastic sediments. These ancient areas of erosion and deposition in the swamp are represented by local thinning and lateral interruption of the seams. Differential compaction and slumping of the newly-deposited clastic sediments also formed irregularities in the underlying swamp deposits.

Table C-5 Geologic Time Scale

ERA	Period	EPOCH	Duration in Millions of Years (Approx.)	Millions of Years Ago (Approx.)
CENOZOIC	Quaternary	Recent		
	Tertiary	Pleistocene		1.8
		Pliocene	3.2	5.0
		Miocene	17.5	22.5
		Oligocene	15.0	37.5
		Eocene	16.0	53.5
		Paleocene	11.5	65
MESOZOIC	Cretaceous		71	136
	Jurassic		54-59	190-195
	Triassic		30-35	225
PALEOZOIC	Permian		55	280
	Pennsylvanian		40	320
	Mississippian		25	345
	Devonian		50	395
	Silurian		35-45	430-440
	Ordovician		60-70	500
	Cambrian		70	570
Precambrian				

The thickness, continuity, lateral extent, and quality of the coal seams in the study area relates directly to the depositional environment of each swamp and the depositional environment of the sediments that accumulated on top of the peat that was transformed into coal (Horne et al. 1978). The heating and compaction produced by the depth and duration of burial of the swamp deposits also affect the quality of the coal seam and overlying material.

The acid-forming, iron disulfide minerals known as pyrite and marcasite, and various trace elements, occur chiefly in depositional environments that are associated with slowly subsiding delta plains and back bays. Low concentrations of the acid forming iron disulfide minerals and trace elements occur in areas where sporadic but rapid subsidence of the coal-producing lower and upper delta plain, and back bay depositional environments.

2. Post-Depositional Deformation

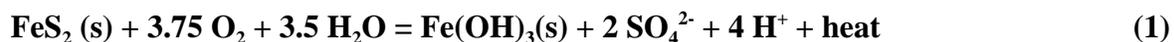
The Appalachian orogeny lasted into the Triassic period, with mountain building and deformation continuing as the North American and African continents were driven together by tectonic forces. During the latter stages of the orogeny, the eastern portion of the Appalachian Basin was strongly deformed into tight fold structures, which later erosion would carve into the Valley and Ridge Province. At the Allegheny Front, the amplitude of folding abruptly diminishes, much as wrinkles in a tablecloth pushed by hand. Forces from the continental collision did propagate beyond the Allegheny Front to form low-amplitude anticlines and synclines with fold axes oriented in a general northeast to southwest direction.

With regards to coal mining, this deformational event divided the Appalachian coalfields between the steeply-dipping strata of the Valley and Ridge Province and the shallowly-dipping Appalachian Plateau Province. Regional metamorphism in the eastern part of the Valley and Ridge Province converted the coal deposits into anthracite, and the steep dips of the strata favored underground mining methods. Erosion of higher strata also removed the coal seams from many areas in this province where they had originally been deposited, generally limiting the extent of mining activities to several remnant deposits in large anticlines. West of the Allegheny Front, the coal was not metamorphosed, and the lesser degree of uplift from folding allowed much of the original coal to remain after erosion. The shallower dip of the low amplitude folds better permits use of surface mining methods and is also more efficient for underground methods. The combination of the two factors has allowed development of widespread surface and underground coal mining in the Appalachian Plateau Province. Fracturing of overburden rocks from folding stresses may also lower in this area, providing better roof support control in underground mining applications.

3. Toxic Overburden and Acid Mine Drainage Formation

Pyrite is a sulfide mineral formed in the reducing environments commonly associated with Bituminous coal fields. Coal mine drainage is produced by the oxidation of pyrite in an aqueous environment that dissociates the iron and sulfur found in the pyrite (FeS_2). Pyrite is found in several forms with end members consisting of globular framboidal to euhedral crystalline. A direct relationship exists between surface area and reactivity of the various forms of pyrite, with larger surface area (i.e. smaller particles) being more reactive (Caruccio, 1970). As such framboidal forms of pyrite tend to have greater surface area therefore possesses greater theoretical reactivity than other forms of pyrite.

The oxidation of the pyrite in the coal seam and overburden begins with the removal of the coal, exposing the pyrite to oxygen. Rose and Cravotta (Brady et al, 1999) summarized the stages of pyrite oxidation by the following stoichiometric reaction (1):



In the above reaction, the reactants are shown on the left side of the equation as solid pyrite, water and oxygen while the products are located on the right side listed as ferric hydroxide, sulfate, hydrogen ions and heat.

Alkaline mine drainage can be produced when acidic mine pools come in contact with alkaline overburden and/or alkaline recharge migrates into the mine void. This water can contain significant quantities of carbonate or bicarbonate that have dissolved along the flow path. The initial reaction (2) between calcite, in limestone, and acidic water is:



As further neutralization continues, the reaction (3), for pH values above 6.3 can be given as (Cravotta et al, 1990):



This reaction will produce alkaline mine drainage with circumneutral pH, alkalinity greater than acidity, high sulfate and calcium concentrations and iron hydroxide as a precipitate. Rose and Cravotta also point out that carbonate dissolution and production of alkalinity are independent of saturation conditions, significant reaction rates can occur under saturated and unsaturated conditions.

Toxic overburden also may contain elements that are poisonous to plants and animals, acid producing, or both. Excessive amounts of sodium, salt, sulfur, copper, nickel and other trace elements in the water or the soil derived from mined overburden have a detrimental effect on plants and may hinder revegetation (Torrey 1978). Arsenic, boron, and selenium are other elements that may be present in overburden. Acidic material or material with the potential of becoming acidic upon oxidation (pH 4.0 or less; chiefly the minerals pyrite or marcasite) has the capability to cause water pollution by chemical reaction resulting in increased concentrations of dissolved iron and other metals at low pH.

As a general rule, the southern coal seams and associated overburden contain less sulfur concentrations than northern coal seams, most notably from mid West Virginia northward. Southern coal measures also have a dearth of alkaline (carbonate) material resulting in low buffering capacities of the overburden. In these areas, threshold OBA values are vitally important because small amounts of pyrite can lead to formation of AMD due to the paucity of alkaline material. In these instances, alkaline addition into the backfill is a common reclamation practice.

Acid mine drainage is a potential problem anywhere in the Appalachian Basin because alkaline overburden with high buffering capacity is scarce and discontinuous, and unweathered zones in the massive sandstones overlying the coal seams are frequently pyritic with a high potential for acid production. In the northern coalfield, mining practices as well as local variability of the thickness and lateral extent of limestone-rich materials affect mine drainage quality. The variability in acid drainage problems may be compounded when more than one coal seam is mined or the coal seam splits into two or more benches locally.

4. Coal-Bearing Geologic Formations in the Study Area

The following narrative sections present information on the coal-bearing geologic formations for each of the four states within the study area. Refer to Table C-6 for a stratigraphic correlation chart that provides both a geologic timescale and correlations of units across state boundaries.

a. Kentucky

One to four coal seams are present in with the northern coal basin area of Kentucky and increase to as many as 15 seams within the southern part of the basin. The coal seams are thin and discontinuous for the most part, with only one to three coals being extensively mined. (Kiesler, 1983, Leist, 1982, and Quinones, 1981). Refer to Table C-7 for a list of coal beds found within the Kentucky coal basin.

Upper Mississippian Rock Units

The Upper Mississippian rock units of along the northwestern edge of the Kentucky coalfields include the Newman Limestone of the Pennington Group to the northeast. To the southwest the coalfields are also bordered by Pennington Group rocks but include the Bangor, Kidder, and Monteagle Limestones. Along the southeastern boundary of the coalfields the Upper Mississippian rocks also include the Newman limestone, two shale units, the Fort Payne Chert, and the Berea Sandstone. Upper Mississippian rock units along the southeastern coalfield boundaries are exposed along the Pine Mountain Overthrust Belt (Noger, 1988).

Table C-6
Stratigraphic Correlation Chart of the Appalachian Plateau Province *

Geologic System	West Virginia	Virginia	Kentucky	Tennessee
<i>Quaternary</i>	Recent Valley Alluvium	Recent Valley Alluvium	Recent Valley Alluvium	Recent Valley Alluvium
<i>Permian</i>	Dunkard Group		Monongahela Group	
<i>Upper Pennsylvanian</i>	Monongahela Group Conemaugh Fm.		Conemaugh Fm.	
<i>Middle Pennsylvanian</i>	Allegheny Group	Harlan Formation	Breathitt Formation	Cross Mt. Fm. Vowell Mt. Fm. Redoak Mt. Fm. Graves Gap Fm. Indian Bluff Fm.
<i>Lower to Middle Pennsylvanian</i>				Slatestone Formation Crooked Fork Group
<i>Lower Pennsylvanian</i>	Pottsville Group <u>Formerly</u> Kanawha New River Pocahontas Formations	Wise Fm. Gladeville SS Norton Fm. Lee Fm.	Lee Formation	Crab Orchard Mountains Group Gizzard Group
<i>Upper Mississippian</i>	Mauch Chunk Group	Pennington Fm.	Pennington Fm.	Pennington Fm.
<i>Upper to Middle Mississippian</i>	Greenbrier Limestone	Greenbrier Limestone	Newman Limestone	Newman Limestone

*Developed from USGS HA 730-L and HA 730-K, Harlow (1993), Cardwell (1968), and Rader (1993).

Pennsylvanian Lee Formation

The Lee formation is characterized by massive orthoquartzite sandstone beds with lenses of conglomerate; sandstone comprises up to 80 percent of the formation. The formation in Eastern Kentucky is divided into the upper Corbin Sandstone Member and lower Rockcastle Sandstone Member. Sandstone beds can intertongue or grade into shale beds which range from 20-40 feet. Interbeds of carbonaceous shale, siltstone, coal (included in the formation) are most common in upper part of the formation. Lower members in places intertongue with Upper Mississippian rocks (Leist, 1982). The Lee Formation typically outcrops in deeply eroded stream valleys and along structural highs of the Eastern Kentucky coal basin.

The Lee Formation, along with under- and overlying beds, has a gentle southeasterly dip and thickens to the southeast towards the Cumberland Mountain Overthrust block (Quinones, 1981). The Lee Formation is mostly exposed along the northwestern boundary of the KY coal basin and ranges in thickness from about 500 feet in northeastern KY to about 1,500 feet in along the southern margins of the KY coalfields (Kiesler, 1983, Leist, 1982, and Quinones, 1981). Thin outcrop

patterns also occur along the southeast margin of the KY coalfields along the Cumberland Mountain Overthrust block (Noger, 1988).

Pennsylvanian Breathitt Formation

Within the eastern Kentucky coal basin, the Breathitt Formation rocks are divided into upper, middle, and lower members and have the most extensive surface coverage of any formation in the basin, approaching approximately 75 percent. The Breathitt Group rocks are comprised of siltstone, sandstone, shale, coal, underclay, ironstone, but very little limestone aside from the Magoffin Member limestone and calcareous shale, which is widespread within the middle portion of the formation. Sandstone units usually range in thickness from 30 to 120 feet and are less competent than the sandstones of the underlying Lee Group. The unit reaches its maximum thickness along the southeastern edge of the coal basin, achieving thickness of about 3000 feet. Basal portions of the Breathitt Formation intertongue with the underlying Lee Formation (Kiesler, 1983, Leist, 1982, Quinones, 1981, and Noger, 1988).

The Breathitt Group rocks contain the majority of the mineable coals within the Basin, and number upwards of 21 to 30 coals (refer to Table C-7) depending upon the location within the Eastern Kentucky Coal Basin. Thicknesses and extents of coal units are variable. Unit thickness ranges from 6 to 100 inches. The thickest beds tend to be elongate in a northeasterly direction within the basin.

Pennsylvania Conemaugh Group

In northeastern Kentucky, the Conemaugh Group includes shale, siltstone, variegated sandstone, and a few thin coals (Kiesler, 1983). Included in ascending order are the Brush Creek Coal (Princess No. 10), Brush Creek Limestone, and Ames Limestone. The Conemaugh Group ranges in thickness from 430-460 feet (Noger, 1988).

Pennsylvania Monongahela Group

The Monongahela Group is comprised of shale and sandstone and is described as being at least 140 **feet** thick in northeastern Kentucky (Noger, 1988). No reference to the presence of any coals is made within the Kentucky Geologic Map (Noger, 1988).

Pennsylvania Conemaugh/Monongahela Groups Undifferentiated

W.E. Price, et.al. (1962) describe the undifferentiated Conemaugh/Monongahela Group as containing variegated siltstones and claystones with massive sandstones in the lower part. Also included are a few thin coals and limestones (Price, 1962). Price (1962) describes three sandstone members in ascending order: the Mahoning Member (maximum 100 feet thick), the Buffalo Member (average 45 feet), and the Morgantown Member (average 50 feet thick).

Table C-7
Correlation Chart of Major Coal Beds and Coal Zones and Other
Key Beds of the Pennsylvanian of Eastern Kentucky (Modified from Rice and Others, 1979)

		North of Pine Mountain Fault			Along and South of Pine Mountain Fault		
		North	East	South			
Conemaugh and Monongahela Formations		Ames Limestone Member	Removed by erosion	Removed by erosion	Remove by erosion		
		Brush Creek Limestone Member					
		Brush Creek coal bed					
Upper part of Breathitt Formation		Upper Freeport coal bed					
		Princess No. 8 coal bed					
		Princess No. 7 coal bed					
		Princess No. 6 coal bed					
		Obryan (Vanport) Limestone Member ¹					
		Flint Ridge Flint of Morse (1931)					
		Princess No. 5 (Skyline) coal zone	Richardson coal zone	Knob coal zone			
Middle part of Breathitt Formation		Princess No. 4 coal bed	Broad coal zone	Broas coal zone			
			Hindman coal bed	Stoney Fork Member			
		Princess No. 3 (Mudseam) coal bed	Peach Orchard coal zone	Hazard No. 9 coal zone	Francis coal zone		
			Hazard coal zone	Braden Mountain Coal Bed	Big Wheel coal bed	High Splint Coal Bed	
			Haddix coal zone	Red Ash coal bed	Low Splint coal bed		
		Magoffin Member	Magoffin Member	Magoffin Member	Magoffin Member		
	Lee and Breathitt Formations	Lee Formation and lower part of Breathitt Formations	Taylor coal bed	Taylor (Sharp) coal bed	Copland (Sharp) coal bed	Limestone coal bed	Middle part
			Hamlin coal zone	Hamlin coal zone	Beech Grove coal bed	Pardee coal bed	
			Fire Clay Rider coal bed	Fire Clay-Whitesburg coal zone	Hatfield coal bed	Hignite (Smith) coal bed	
			Fire Clay coal bed		Big Mary coal bed	Wallins Creek coal bed	
Little Fire Clay coal bed			Windrock coal bed		Wallsins Creek coal bed		
Whitesburg coal bed				Upper Pioneer coal bed			
Kendrick Shale Member			Kendrick Shale Member		Kendrick Shale Member		
Cannel City coal bed			Amburgy coal zone	Lower Pioneer coal bed			
			Elkins Fork Shale of Morse (1931)	Jordan coal bed	Poplar Lick (Creech) coal bed		
Tom Cooper (Van Lear) coal bed		Upper Elkhorn No. 3 coal bed	Elk Gap coal bed	Darby coal bed			
Grassy coal bed		Alma coal zone	Lick Fork coal bed	Kellioka (Taggart marker) coal bed			
Lee Formation		Bruin coal bed	Lower Elkhorn coal bed	Jelico coal zone	Collier coal bed	Lower part	
			Powellton coal zone	Blue Gem coal bed	Harlan (Mingo) coal zone		
				Little Blue Gem coal bed	Path Fork (Rich Mountain) coal bed		
		Betsie Shale Member	Betsie Shale Member	Betsie Shale Member	Betsie Shale Member		
		Zachariah coal bed	Clintwood (Matewan) coal bed	Lily (Manchester, River Gem, or Swamp Angel) coal bed	Hance (Bennetts Fork) coal bed		
		Corbin Sandstone Member of Lee Formation	Cedar coal bed	Corbin Sandstone Member of Lee Formation			
		Mine Fork coal bed	Little Cedar coal bed	Gray Hawk coal bed	Mason (Murray) coal bed		
		Splash Dam coal bed	Beattyville coal bed	Splitseam coal bed			
	Warm Fork coal bed		Barren Fork coal bed	Clear Fork (Rex) coal bed			
Olive Hill Clay bed of Crider (1913)	Lower Banner coal bed						
	Lee Formation (undivided)	Rockcastle Sandstone Member of Lee Formation	Naese coal bed	Lee Formation			
		Beaver Creek coal bed	Tunnel coal bed				
		Stearns No. 1 ½ coal bed					
		Stearns No. 1 coal bed					
		Livingston Conglomerate Member of Lee Formation					
			Cumberland Gap coal bed				

¹Revised stratigraphic nomenclature (Rice and others, in press)

b. Tennessee

The geologic formations of Upper Mississippian and Pennsylvanian age in Tennessee are described in ascending order in the sections that follow. Table C-8 depicts Eastern Tennessee coalbeds.

Upper Mississippian Rocks

Throughout the Eastern Tennessee coalfields, the Upper Mississippian Pennington Formation separates the Pennsylvanian-aged coals and associated rocks from the underlying Mississippian aged carbonates and related rocks. The Pennington Formation is a transitional unit and ranges in thickness from 100 to 700 feet from west to east. The formation is composed of shale (highly variegated and distinctive to the east), fine-grained sandstone, and conglomerates which grade downwards to limestones/carbonates, and has a persistent dolomite at its base. The Pennington Formation underlies most all the Cumberland Plateau and outcrops along its western and eastern margins (Gaydos, 1982 and Hardeman, 1966).

Pennsylvanian Rocks

The Pennsylvanian-aged rocks cap the extensive uplands of the Cumberland Plateau and contain the coals of the Eastern Coal Province of Tennessee. Within the northern portion of the coal province, or coalfields, these rocks range in thickness from 600 to 3,000 feet from east to west (Gaydos, 1982). Within the southern portion of the province, Pennsylvania-aged rocks range in thickness from approximately 200 to 1,000 feet from west to east (Hollyday, 1983 and May, 1983). The rocks are comprised of cyclical sequences of shale and conglomerate with lesser amounts of siltstone and coal to the west and cyclical sequences of sandstone, siltstone, shale, coal, underclay, and conglomerate to the east. Older Pennsylvanian rocks underlie the near surface to the west, while younger rocks underlie the near surface to the east, due to the predominant dip and thickening of rock units towards the east. The following narrative summarizes the major Pennsylvanian-aged rock units of the Cumberland Plateau coalfields.

Lower Pennsylvanian Gizzard Group

Shale, siltstone, sandstone, and conglomerate comprise the Gizzard Group. This unit extends from the base of the overlying Sewanee Conglomerate to the top of the Pennington Formation. Thickness ranges from 0 to 520 feet (Hardeman, 1966). The Warren Point sandstone is a significant unit in this group averaging 100 feet in thickness (Brahana, 1986). This unit exists at ground surface primarily in the extreme southern portion of the coalfield (Hardeman, 1966).

Lower Pennsylvanian Crab Orchard Mountain Group

This group of associated rocks is comprised of primarily conglomerate, sandstone, siltstone, shale, and coal. The unit extends from the Rockcastle Conglomerate to the base of the Sewanee Conglomerate. Thickness ranges from 200 to 950 feet (Hardeman, 1966). In ascending order, it includes the Sewanee, Lantana, and Morgan Springs coals (Hardeman, 1966 and Hollyday, 1983). Three major sandstone units occur in the group which, in ascending order, include the Sewanee, Newton, and Rockcastle (Brahana, 1986). This unit exists at the ground surface over extensive portions of the southern to central coalfields.

Middle Pennsylvanian Crooked Fork Group

The Crooked Fork Group consists primarily of shale, sandstone, conglomerate, siltstone, and coal and extends from the Poplar Creek Coal down to the top of the Rockcastle Conglomerate. Group thickness ranges from 320 to 455 feet (Hardeman, 1966). This unit has a somewhat limited coverage at ground surface and is present within the north-central and northern portions of the basin (Hardeman, 1966). Major coals include, in ascending order, the Rex, Hooper, and Poplar Creek (Hardeman, 1966). Sandstone units in this group and those overlying are generally much thinner and less laterally persistent versus those in the underlying units discussed above.

Middle Pennsylvanian Formations

These units occur only within the northeastern portion of the plateau coalfields and overlie the preceding formations. Six formations comprise the Middle Pennsylvanian in the Tennessee coalfields and include the following in ascending order (Hardeman, 1966):

Slatestone Formation – Shale, sandstone, siltstone, and several important coals including the Jellico and Poplar Creek – 500 to 720 feet thick.

Indian Bluff Formation – Shale, sandstone, siltstone and thin coals; includes the Pioneer Sandstone at top – 150 to 475 feet thick.

Graves Gap Formation – Shale, sandstone, siltstone, and coal; includes the Windrock coal – 275 to 385 feet.

Redoak Mountain Formation – Shale, sandstone, siltstone, and several important coals including the Pewee coal – 340 to 420 feet.

Vowell Mountain Formation – Shale, sandstone, siltstone, and coal; includes the Frozen Head Sandstone Member – 230 to 375 feet.

Cross Mountain Formation – Shale interbedded with sandstone, siltstone, and thin coal beds – maximum thickness is 550 feet.

Coal units within the Eastern Coal Province of Tennessee are difficult to correlate regionally (May, 1983). The important coals in northern Tennessee are the Upper Pennsylvanian Pewee, Big Mary, and Jellico coals of Upper Pennsylvanian age, the Coal Creek of Upper Pennsylvanian age, and the Sewanee of Lower Middle Pennsylvanian age (Gaydos, 1982). In the west-central portion of the coalfields, the important coals include the Richland and overlying Sewanee coals found within the Crab Orchard Mt. Group of Lower Pennsylvanian age (May, 1981 and Hardeman, 1966).

The primary coals within the east-central portion of the basin are the Big Mary, Rock Springs, and Coal Creek coals, whose position within the Pennsylvanian sequence is not specified (Gaydos, 1982). Possibly these coals have been renamed. Within the southern section of the coalfields, the major coals include (in ascending order) the Bon Air within the Lower Pennsylvanian Gizzard Group, the Richland, Sewanee, Lantana, and Morgan Springs located within the Lower to Middle Pennsylvania Crab Orchard Mt. Formation (Hollyday, 1983).

**Table C-8
Eastern Tennessee Coal Beds**

Geologic System	Formation/Group	Coal Bed*
Middle Pennsylvanian	Cross Mountain Formation	(thin coals)
	Vowell Mountain Formation	(various coals)
	Redoak Mountain Formation	Pewee
	Graves Gap Formation	Windrock
	Indian Bluff Formation	(thin coals)
	Slatestone Formation	Jellico
	Crooked Fork Group	Poplar Creek Hooper Rex
Lower Pennsylvanian	Crab Orchard Mountain Group	Morgan Springs (underlies Rockcastle Conglomerate) Lantana (overlies Newton Sandstone) Sewanee Richland (overlies the Sewanee Conglomerate)
	Gizzard Group	Wilder Bon Air (underlies Warren Point Sandstone) White Oak Sale Creek

(Taken from [USGS Water-Resources Investigations Open File Report 82-679 \(1983\), Figure 2.2-2](#) and [Geologic Map of Tennessee, Tennessee Department of Conservation, Division of Geology, 1966, East-Central Sheet](#))

* This list is not necessarily a complete list; it is based upon listed references.

c. Virginia

The geologic formations of Upper Mississippian and Pennsylvanian age in Virginia are described in ascending order in the sections that follow. The nomenclature used for these units can be found in Table C-9.

Upper Mississippian Rocks

The Upper Mississippian Rocks within the Southwestern Virginia coalfields consist primarily of the Pennington Group. This group consists of shale, sandstone, mudstone, conglomerate, siltstone, and minor limestone and coal. The shale, siltstone, and mudstone occur in variegated colors of gray, black, and red (Harlow, 1993). The top of the Pennington Group intertongues in places with the overlying Pennsylvanian Lee Formation. The Pennington ranges in thickness from 235 feet in the southwest to 2,355 feet to the northeast in Tazewell County.

Pennsylvanian Rocks

The Pennsylvanian-aged rocks of the southwestern Virginia coalfields in ascending order include the Lee and Norton Formations, the Gladeville Sandstone, and the Wise Formation over the

majority of the coalfields except the northeastern corner (eastern Buchanan and western Tazewell Counties) where the laterally-equivalent Pocahontas, New River, and Kanawha Formations overlie Upper Mississippian rocks. The Upper Mississippian and overlying Pennsylvanian rock units of the Southwestern Virginia coalfields are summarized in ascending order below.

Lower Pennsylvanian Lee Formation

The Lee Formation consists of quartzarenite, conglomerate, sandstone, shale, siltstone, and coal. The Lee Formation ranges in thickness from zero feet in Buchanan County to 1680 feet in Lee County (Rader, 1993). The Lee Formation is dominated by three quartz-rich sandstone members that form steep cliffs and ridges (Harlow, 1993). In ascending order these members include the Middlesboro Member and the Bee Rock Sandstone. The Middlesboro Member overlies Upper Mississippian rocks and is composed of two tongues of clean, light gray quartzose sandstone that thin to the southeast. The lower tongue has a maximum thickness of 400 feet, the upper tongue being thinner at approximately 125 feet (Harlow, 1993). The Bee Rock Sandstone Member is a 100-ft thick unit of quartzose, conglomeratic sandstone (Harlow, 1993). Per Harlow (1993) the base of the Norton Formation is defined as the top of the uppermost quartzarenite rock unit of the Lee Formation and from northwest to southeast this boundary is displaced downward as the quartzarenite bodies pinch out, such that the boundary then becomes the top of the Naese Sandstone Member, the Bee Rock Sandstone Member, and finally the upper or lower part of the Middlesboro Member. Refer to Table V.A.2-5 below for coal beds known to occur in the Lee Formation and overlying formations.

Pocahontas Formation

The Pocahontas Formation is laterally equivalent to the Lee Formation and underlies the New Ricer Formation in the northeastern coalfield area (Rader, 1993). The unit thins to the northwest and is fine- to medium-grained micaceous, feldspathic sandstone interbedded with siltstone, coal, and underclay (Harlow, 1993). Sandstone comprises 70 percent of the formation (Rader, 1993). The deep coal seams of the Pocahontas Formation are generally thicker than the coal of the overlying Norton and Wise formations (Harlow, 1993). The Pocahontas Formation is also known for its thick, low-sulfur coal seams (Harlow, 1993). The unit ranges in thickness from zero to 970 feet achieving maximum thickness in Tazewell County (Rader, 1993).

Lower Pennsylvanian Norton Formation

The Norton Formation lies just below ground surface over most of Dickenson and Buchanan Counties. The Norton Formation overlies the Lee Formation and underlies the Wise Formation and Gladeville Sandstone within the southwestern Virginia Coal field region. The unit consists of siltstone and shale, and some sandstone, coal, and underclay. The siltstone and shale are gray to dark gray and thinly laminated and the sandstone is fine to medium grained and weakly cemented. To the northwest the average thickness ranges from 750-800 feet; to the southeast the formation is up to 1,300 feet thick (Harlow, 1993). Per the Virginia Geologic Map (1993), the formation thickens from northwest to southeast across the coalfields from 500 to 2,480 feet.

Per Harlow, the base of the Norton Formation is defined as the top of the uppermost quartzarenite of the Lee Formation. From northwest to southeast across the coalfield, this lower boundary is

displaced downward as the Lee Formation quartzarenite bodies pinch out such that the lower boundary transitions from the top of the Naese Sandstone Member, the Bee Rock Sandstone Member, the upper part of the Middlesboro Member to the lower part of the Middlesboro Member (Harlow, 1993). The Norton Formation contains nine mineable coal seams, eight of which were evaluated for hydraulic conductivity by G.E. Harlow and include the Kennedy, Bearwallow, Big Fork, Lower Banner, Upper Banner, Splashdam, Hagy, and the Norton (Harlow, 1993).

Lower Pennsylvanian New River Formation

The New River Formation of Lower Pennsylvanian age is a coal-bearing sequence of sandstone, siltstone, and shale. Lithologically similar to the Pocahontas Formation except for the presence of coarse-grained quartzarenite and conglomerate sandstone that grades laterally into the Middlesboro Member of the Lee Formation. The New River Formation conformably overlies the Pocahontas Formation and is known for numerous thick, low-sulfur coal seams. These seams thin to the northwest across the basin where the New River and Pocahontas intertongue with the Lee Formation. Some of the coal seams included within the formation are the Lower Seaboard, Upper Seaboard, Castle, Tiller, and Jawbone (Harlow, 1993). Formation thickness is estimated to range from 1,380 to 1,925 feet from southwest to northeast.

Lower Pennsylvanian Gladeville Sandstone and Wise Formation

The Gladeville is a resistant quartzose sandstone and conglomerate that conformably overlies the Norton Formation. In southern sections of Wise and Dickenson Counties it forms numerous ridges and low plateaus. The Gladeville thins and eventually is absent to the north and northeast (Harlow, 1993). This unit ranges in thickness from zero up to 65 feet (Rader, 1993). The Wise Formation is composed of composed of siltstone, sandstone, shale, limestone, coal, underclay, and two distinctive calcareous shale units. The formation includes several thick sandstone units, including the Clover Fork, Marcum Hollow, and Reynolds sandstone members. It conformably overlies the Gladeville Sandstone and reaches a thickness of 2,300 ft to the northwest, where it is capped by the Harlan Sandstone. The formation contains up to 18 coal seams including, in ascending order, the Dorchester, Lyons, Blair, Clintwood, Imboden, Kelly, Upper St. Charles, Wilson, Taggart Marker, and Low Splint (Harlow, 1993). Additional coals include the High Splint at the top of the formation and the Williamson (Rader, 1993).

Lower Pennsylvanian Kanawha Formation

The Kanawha Formation consists primarily of sandstone, siltstone, shale, coal, and underclay. The upper sandstone beds are locally conglomeratic, lenticular, and thickly to massively bedded. The base of formation is conformable and placed at the bottom of the Kennedy Coal that overlies the McClure Sandstone member of the New River Formation. The Kanawha is equivalent to the Wise Formation and upper part of the Norton Formation and is approximately 550+ feet thick. The upper part of the formation is eroded within the Virginia coalfields.

Lower to Middle Pennsylvanian Harlan Formation

The Harlan Formation consists of sandstone, siltstone, shale, and coal. The sandstone is moderately resistant and comprises approximately 48 percent of the formation. The formations contain 22 discontinuous coal beds, and the base is defined as the top of High Splint Coal. The formation is up to 650 feet in thickness (Rader, 1993).

**Table C-9
Southwestern Virginia Coalbeds**

Geologic System	Formation/ Group	Coal Bed Name		Formation/ Group
Lower to Middle Penn.	Harlan Formation	22 discontinuous coals		
Lower Pennsylvanian	Wise Formation and Gladeville Sandstone	High Splint (top) Low Splint Taggart Marker Wilson Upper St. Charles Kelly Imboden Clintwood Blair Lyons [Williams-pos.? [Philips-pos.? [Numerous others] Dorchester (base)	[Coal present but no specific data located] Kennedy (base)	Kanawha Fm. (top part eroded)
	Norton Fm.	Norton Hagy Splashdam Upper Banner Lower Banner Big Fork Bearwallow Kennedy		
	Norton Fm.		Jawbone Tiller Castle Upper Seaboard Lower Seaboard	New River Fm.
	Lee Fm.	coal – up to 6 seams including: Raven Jawbone Tiller		
				Coal present in seams thicker than those of Norton and Wise Fm.
Upper Miss.	Pennington Group			

Source: Rader, 1993 and Harlow, 1993.

d. West Virginia

The geologic formations of Upper Mississippian and Pennsylvanian age in West Virginia are described in ascending order in the section that follows. Table C-10 summarizes the significant coal beds found within the Appalachian Plateau coalfields of southern West Virginia. Within the following narrative, the older formation name usage for the Lower Pennsylvanian-aged rocks in West Virginia is used here (Pocahontas, New River, and Kanawha Formations in ascending order) rather than Pottsville Group terminology which is the current usage as shown in Table C-6.

Upper Mississippian

The pre-Pottsville rocks include the Upper Mississippian-age shales and sandstones of the Mauch Chunk Group. These strata include by definition no coal beds. The Mauch Chunk Group is of hydrogeologic interest as a source of domestic and agricultural water supplies (Friel et al. 1967).

Pocahontas Formation

The coalbeds of the Pocahontas Formation are interbedded with sandstones, shales, siltstones, and underclays. The sandstones are light gray, very fine to coarse grained, thin-bedded to massive, and crossbedded. They consist of 50 to 65 percent quartz with large proportions of white-weathering feldspar, mica flakes, and dark mineral grains. The shales are medium to dark gray, thinly laminated, and carbonaceous. Horizontally laminated or crossbedded, medium light gray siltstones and medium-gray clayey to silty underclays occur in thin beds throughout the Pocahontas Formation (Hadley 1968; Cardwell 1975).

New River Formation

The lithology of the New River Formation is nearly identical to that of the underlying Pocahontas Formation (Englund 1968; Cardwell et al. 1968). Sandstones of the New River Formation are locally thicker, more massive, and more conglomeratic or quartzose than those of the Pocahontas Formation. The sandstones are moderately resistant and overly broad upland areas in central and eastern Raleigh County (Hadley 1978).

Kanawha Formation

The light gray, very fine to medium-grained, crossbedded, sub-graywacke sandstones weather faster than the sandstones of the underlying New River Formation. Kanawha Formation sandstones consist of 50 to 65 percent quartz with feldspar, mica, rock fragments, and opaque mineral grains. The beds of shale and siltstone are medium to dark gray, laminated, and locally calcareous. Large argillaceous (impure) limestone deposits occur in ellipsoidal concretions or thin discontinuous calcareous (carbonate-rich) beds with marine fossils locally present (Englund 1968).

Allegheny Formation

The Allegheny Formation consists of cyclical sequences of sandstone, siltstone, shale, limestone, coal, and underclay. (Englund 1968; Cardwell 1975).

Conemaugh Group

These strata comprise mostly non-marine cycles of red and gray shale, siltstone, sandstone, and thin beds of limestone and coal. The Conemaugh Group extends from the top of the Upper Freeport Coal to the base of the Pittsburgh Coal. Outcrops of the Conemaugh Group generally are limited to ridgetops and isolated peaks or small plateau areas.

Monongahela Group

The Monongahela Group is composed of non-marine red and gray shale, siltstone, sandstone, limestone, and coal. The Monongahela Group extends from the base of the Pittsburgh Coal to the top of the Waynesburg Coal. The thickness of the Monongahela Group in the Basin ranges from less than 100 feet to more than 400 feet.

Dunkard Group

Outcrops of these rocks are limited to the crests of ridges. The Dunkard Group extends from the top of the Waynesburg Coal upward to the bottom of the Upper Proctor Sandstone. The maximum thickness of the Group in West Virginia is nearly 1,200 feet. The Dunkard Group consists of cyclic sequences of non-marine red and gray shale, siltstone, sandstone, limestone, and coal.

Table C-10
Unified Stratigraphic Columns - West Virginia (Lotz 1970, USBM 1977)

Age	Rock Unit	Name	Local Names
PERMIAN	Dunkard Group	Nineveh	
		Hostetter	
		Fish Creek	
		Dunkard	
		Jollytown	
		Hundred	
		Washington "A"	
		Washington	
		Little Washington	
		Waynesburg "B"	
		Waynesburg "A"	
	Monongahela Group	Waynesburg	Fairview, Mt. Morris
		Little Waynesburg	
		Uniontown	
		Lower Uniontown	
		Sewickley	Mapletown, Tyron, Tyson
		Redstone	Pomeroy
		Pittsburgh	Big Vein, Pittsburgh No. 8 Raymond, Raymond City, Sally Malone
PENNSYLVANIAN	Conemaugh Group	Morgantown	
		Little Pittsburgh	
		Second Little Pittsburgh	
		Franklin Rider	
		Little Clarksburg	Dirty Nine-foot, Franklin
		Normantown	
		Lower Hoffman	
		Upper Clarysville	
		Lower Clarysville	
		Wellersburg Rider	
		Wellersburg	
		Barton Rider	
		Elk Lick	Barton, Four-foot
			Conemaugh Group
Federal Hill			

Table C-10
Unified Stratigraphic Columns - West Virginia (Lotz 1970, USBM 1977)

Age	Rock Unit	Name	Local Names	
PENNSYLVANIAN		Duquesne		
		Harlem	Crinoidal, Friendsville	
		Upper Bakerstown		
		Bakerstown	Thomas	
		Brush Creek	Forked Seam	
		Mahoning	Six-foot	
	Allegheny Group	Upper Freeport	Davis, Split-six	
		Lower Freeport	"D" Block, Roger	
		Upper Kittanning Rider		
		Upper Kittanning		
		Middle Kittanning	North Coalburg	
		Lower Kittanning	No. 5 Block, Tioga	
		Clarion	Little No. 5 Block	
		Tionesta		
		Kanawha Group	Upper Mercer	Stockton "A"
			Stockton-Lewiston	Belmont, Lewiston, Lower Mercer, Stockton
			Coalburg	
			Little Coalburg	
			Buffalo Creek	
			Winifrede	Black Bank, Dorothy, Quakertown
Lower Winifrede				
Chilton (A)				
Chilton Rider				
Chilton				
Little Chilton				
Hernshaw				
Dingess				
Williamson Rider				
Williamson				
Cedar Grove	Island Creek, Marpleton, Red Jacket, Thacker			

Groundwater Characterization

Surface coal mining can directly impact groundwater resources by altering the physical structure of aquifers overlying the coal seams being mined, replacing rock units of varying hydrologic properties with backfill spoil of a fairly heterogeneous nature. Placement of fills in hollows and valleys may change groundwater flow regimes as well by creating a groundwater storage medium where one did not previously exist. Recharge rates, groundwater elevations, and discharge patterns may all change within and around a mine site as a result. From a water quality standpoint, surface coal mining may expose acid-forming minerals in coal and overburden to accelerated reaction with air and water, resulting in acid mine drainage formation or elevated metals concentrations that may migrate into the groundwater system. Underground mining may have a lesser effect on overlying aquifers depending on its depth and overburden characteristics, but can still result in dewatering or changes in groundwater flow patterns, and is similarly susceptible to generation of acid mine drainage.

To provide background information to evaluate the potential effects of mining on groundwater quality and quantity, the following section describes the general characteristics of groundwater occurrence, quantity, quality, and related information for the Appalachian Plateau Physiographic Province. The Plateau Province contains the coalfields of Kentucky, Tennessee, Virginia, and West Virginia. Following a general discussion of groundwater within the overall Plateau Province, more specific information is provided for coalfield areas within each state where mountaintop mining may take place. Please refer to Table C-11, “Principal Aquifers of the Appalachian Plateau Province” which list the principal aquifers for each state and the correlating units across state boundaries.

Due to the large degree of lithologic variability of the bedrock within the coalfields, the USGS has utilized the geologic unit classification (e.g., group or formation name) as the basis for identifying the primary aquifers within the Plateau and associated coalfields within each state. As will be discussed below, most of the significant groundwater flow within the principal aquifers occurs within the fractured sandstone units within these formations or groups.

General Plateau Groundwater Occurrence and Quantity

Pennsylvanian-aged sandstone units are the most productive/widespread aquifers within Pennsylvanian-aged coal measures (USGS HA 730-K). Secondary porosity via rock fracturing is the primary means of movement of groundwater within the sandstone units since intergranular permeability is low (USGS HA 730-L); (refer to Figure C-1). Most fractures are shallow in depth, a few tens to a few hundreds of feet below ground surface, and decrease in number and openness with depth (USGS HA 730-L). Pennsylvanian-aged coals can also store and transmit water within their joint systems (USGS HA 730-L).

Harlow and LeCain (1993) found in studies completed in the coalfields of southwestern Virginia that the permeability of coal seams is greater than that for other rock types. At depths of less than 100 feet, though, Harlow and LeCain (1993) found that groundwater transmissivities (gal/day/ft or ft²/day) were similar for coal seams, sandstone, and lithologic contacts. At depths of 200 feet only coal seams had consistently measurable permeability. Harlow and LeCain (1993) found that the mean depth to standing water below land surface measured from 43 uncased coreholes was 221 feet for hilltop locations, 109 feet for hillslopes, and 39 feet in valleys. Their studies indicate that groundwater flow is minimal below 300 feet depth due to increased overburden pressures and thus

groundwater circulation is typically restricted to modest depths with discharge to valleys resulting either in stream flow or underflow beneath streams (Harlow and LeCain, 1993).

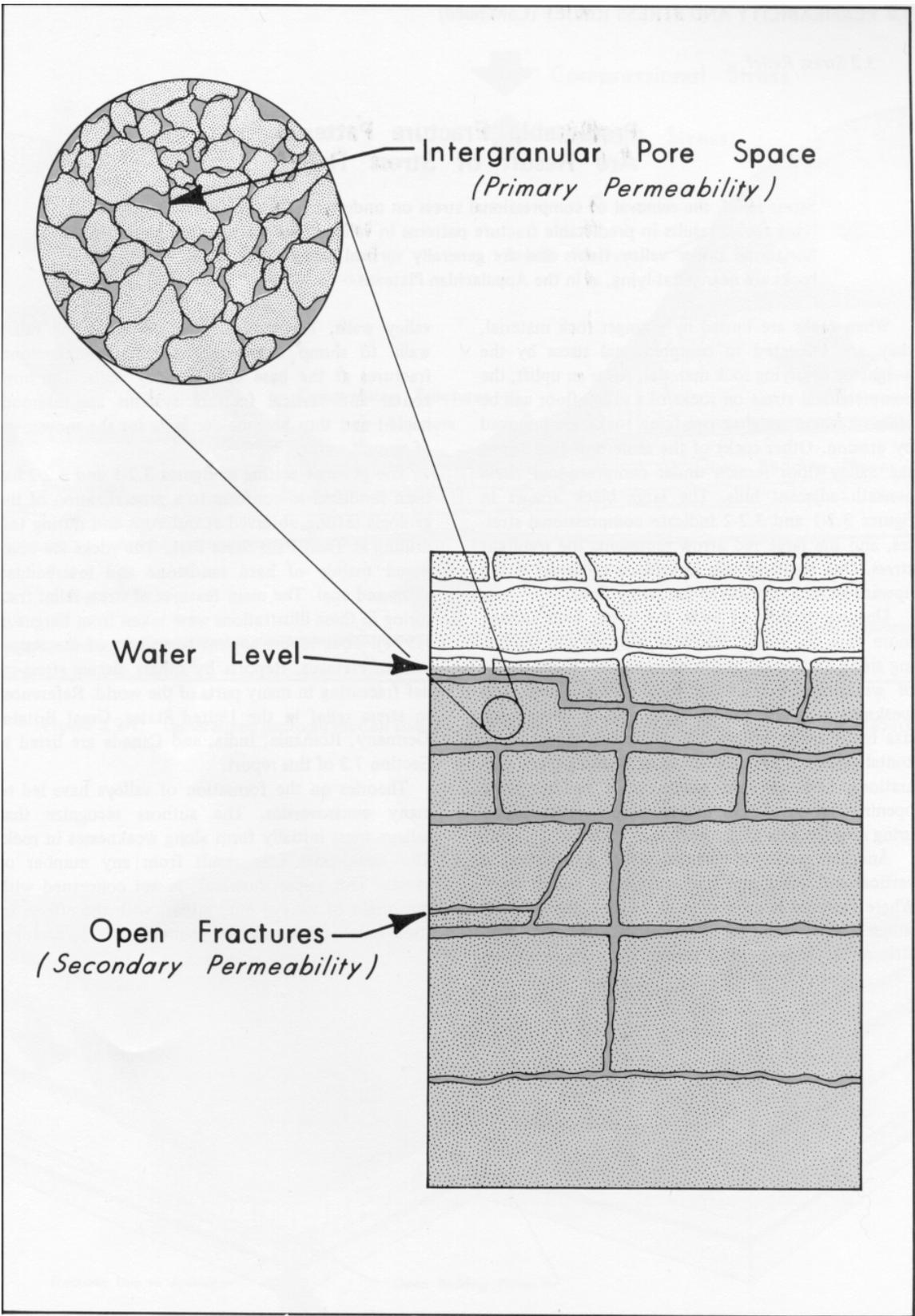
Table C-11
Principal Aquifers of the Appalachian Plateau Province *

Geologic System	West Virginia	Virginia	Kentucky	Tennessee
<i>Quaternary</i>	Recent Valley Alluvium	Recent Valley Alluvium	Recent Valley Alluvium	Recent Valley Alluvium
<i>Permian</i>	Dunkard Group		Monongahela Group	
<i>Upper Pennsylvanian</i>	Monongahela Group			
	Conemaugh Fm.		Conemaugh Fm.	
<i>Middle Pennsylvanian</i>	Allegheny Group		Breathitt Formation	Cross Mt. Fm. Vowell Mt. Fm. Redoak Mt. Fm. Graves Gap Fm. Indian Bluff Fm.
<i>Lower to Middle Pennsylvanian</i>	Pottsville Group	Harlan Formation		Slatestone Formation Crooked Fork Group
<i>Lower Pennsylvanian</i>	Formerly Kanawha New River Pocahontas Formations	Wise Fm. Gladeville SS Norton Fm. Lee Fm.	Lee Formation	Crab Orchard Mountains Group Gizzard Group
<i>Upper Mississippian</i>	Mauch Chunk Group	Pennington Fm.	Pennington Fm.	Pennington Fm.
<i>Upper to Middle Mississippian</i>	Greenbrier Limestone	Greenbrier Limestone	Newman Limestone	Newman Limestone

 Shaded area indicates a hydrologic confining unit.

*Developed from USGS HA 730-L and HA 730-K, Harlow (1993), Cardwell (1968), and Rader (1993).

Figure C-1 Features of Primary and Secondary Permeability.



(Source: Wyrick and Borchers 1981)

Underlying Mississippian-aged limestones are more productive where they lie closer to the ground surface along the eastern and western fringes of the Appalachian coal basins, but within the central portions of the coal basin, in general, they lie quite deep below the Pennsylvanian-aged sandstones. Separating Pennsylvanian-aged sandstone from the main Mississippian limestone sequence are the Upper Mississippian Pennington/Mauch Chunk shales, which act as a relatively confining unit overlying the Mississippian limestones (Cardwell, 1968 and USGS HA 730-L).

Yields of the Pennsylvanian-aged sandstones range from 5-500 gpm; yield varies due to changes in lithology, thickness, and degree of development of secondary fracture zones (USGS HA 730-K and -L). Middle and Lower Pennsylvania Formations contain more sandstone units versus Upper Pennsylvanian units (USGS HA 730-K). Some sandstone units are regionally extensive and have well developed fracture systems and higher groundwater yields.

Groundwater recharge to bedrock aquifers within the Plateau Region is lower compared to the Valley and Ridge Province due to steeper slopes, thinner regolith (weathered rock/soil), and faster runoff characteristics of the Plateau Region (HA 730-L). Recharge occurs mainly at hilltops and side slopes and moves in a stepwise fashion vertically through fractures and then laterally through sandstone/coal beds, which are underlain by less permeable layers such as underclays or shales (USGS HA 730-L and -K).

Saline water may be near the ground surface within the Plateau region valley bottoms due to an upcoming effect caused by groundwater discharge in these areas Stoner, et al, 1987, Minns, 1995). In some areas of the Appalachian Plateau, regional movement of groundwater may not occur as models suggest due to the predominance of local and intermediate flow systems (USGS HA 730-L). Circulation of groundwater in the dissected Plateau behaves as hydrologic islands; the islands being separated by valley discharge zones or streams (USGS HA 730-L). Water moves down tributary valleys toward major rivers, partly as surface water flowing into and down the stream channel and partly as water discharging into the streams through alluvial deposits or permeable valley bottom bedrock aquifers (USGS HA 730-L). Springs commonly represent lateral flow intersections with valley sidewalls. This discharge from springs is generally from unconfined conditions. Water that leaks across low-permeability units can be present within permeable beds within synclinal troughs and confined flow and can become artesian flow when tapped by wells in valley bottom (USGS HA 730-L).

Saline water may exist at relatively shallow depths beneath larger stream valleys in the Appalachian region as models by Stoner, et al (1987) and Minns (1995) indicate.. Brine water sources may be from deeper rock units and may move up along deep fractures (USGS HA 730-L). It is likely that relatively flat-lying, confining units that impede vertical mixing of fresh and saline water, along with the lack of intense fracturing of rocks, as can be found within the Valley and Ridge Province, also limit mixing of fresh and saline groundwater within the Plateau region (USGS HA 730-L).

Although the sandstone bedrock units of the coal basins can, in some cases, be traced over many miles, the distribution of local aquifers within these formations depends mostly on the distribution of fractures and their permeability (USGS HA 730-L). Groundwater recharge tends to be concentrated along valley sidewalls (near vertical and horizontal tensile fractures related to valley slumping) and valley bottoms where near horizontal fractures, parallel to bedding, are present due to relief of compressional stresses via erosion over long time periods (USGS HA 730-L). Valley

sidewall and bottom fractures are usually interconnected; fracturing tends to decrease toward ridge centers due to greater overburden pressure, and thus wells at ridge top settings will have lower yields (USGS HA 730-L). In general, well yields are directly proportional to the number of interconnected fractures (USG HA 730-L). Figure C-2, developed by Wyrick and Borchers (1981), provides a good representation of fracture patterns thought to occur within the Plateau bedrock and which exert a significant control on groundwater movement.

Underground mining can disturb the localized flow system by creating artificial drains, new fractures, and increased permeability, and can lower the groundwater table and/or change flow directions (USGS HA 730-L). Vertical fractures can connect deep mine areas with nearby wells, and existing deep mines may create “regional-like” flow patterns (USGS HA-730-L).

General Plateau Groundwater Quality

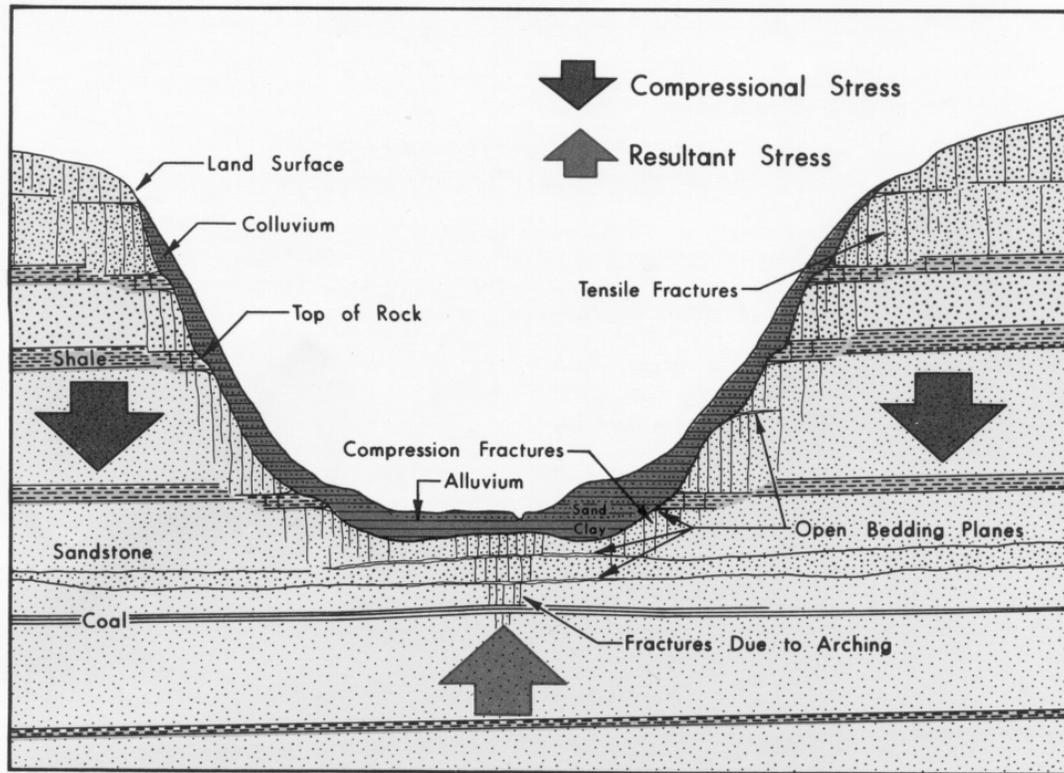
Within the plateau region, most fresh groundwater is of generally good quality, although some excessive levels of iron, chloride, and sulfate are known (USGS HA 730-K+L). Deeper groundwater is more mineralized than shallow waters due to greater residence time within the bedrock; saline water may be present within a few hundred feet of larger valley bottoms (HA-730-L+K). Water can be impacted by oil/gas development, brine solutions, waste disposal, and mining.

Most of the sedimentary rock minerals do not readily dissolve into groundwater, and thus dissolved solids of Plateau aquifers in undisturbed state have relatively low dissolved solids content, averaging about 230 mg/L (HA-730-L). Average hardness is about 95 mg/L (moderately hard; sandstone derived groundwater being softer versus shale derived groundwater), median pH is 7.3, and iron has a median concentration of 0.1 mg/L, with a high of 38 mg/L (HA-730-L). Plateau coalfield groundwater is of the sodium-bicarbonate or calcium-sodium bicarbonate (HA-730-L+K) type. Brine waters have dissolved solids concentrations of greater than 1000 mg/L and are found from 100 – 300 feet below larger valley bottoms although fresh water circulation may occur at very deep levels along deeply fractured or faulted zones (HA-730-L).

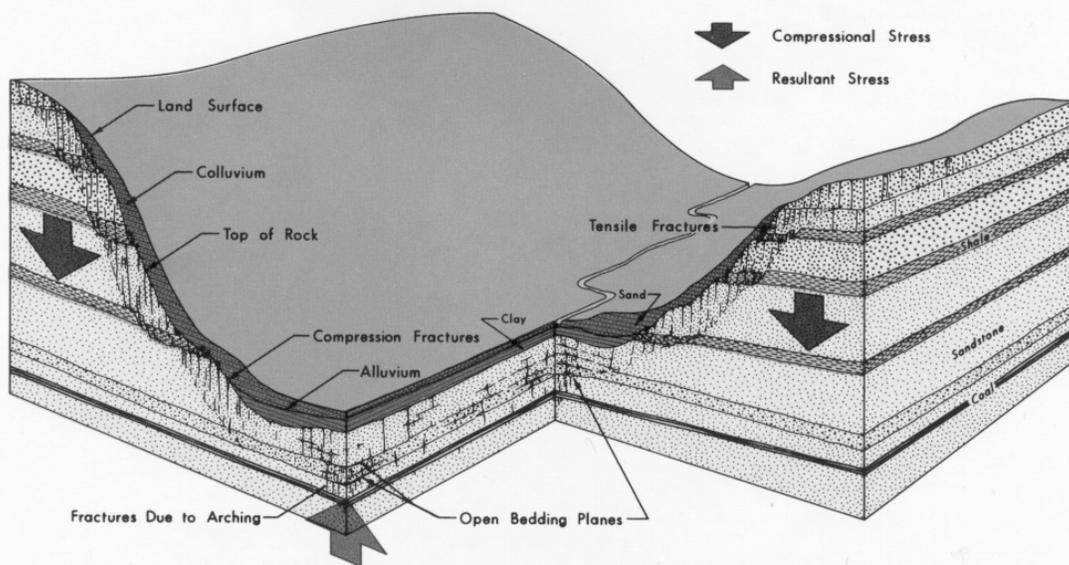
In surface mines, groundwater quality can be impacted by coal mining, with the greatest impact to uppermost aquifers and lessening impacts with depth (USGS HA 730-K). The basic chemical makeup of groundwater can change from a calcium bicarbonate type to a calcium sulfate type, along with increases in hardness, specific conductance, sulfate concentrations, and a decrease in pH. The chemical composition of coal and overburden also can have an impact on reclamation water quality (USGS 730-K and -L).

Total fresh groundwater withdrawals from consolidated sedimentary-rock aquifers in the Appalachian Plateau and Central Lowland Province is estimated at 282 mgd in 1985; 47 percent estimated for domestic/commercial uses and 41 percent for industrial, primarily mining related (HA-730-L). In the eastern Tennessee and Kentucky coal basins, surface water use greatly exceeds groundwater usage, exceeding 120 mgd for surface water to < 20 mgd for groundwater (USGS HA 730-K). Nevertheless, groundwater is still an important source of water for domestic, stock, small public, and industrial supplies (USGS HA 730-K).

Figure C-2 Stress-Relief Fracturing and Development of Secondary Permeability.



Generalized geologic section showing features of stress-relief fracturing



Block diagram of generalized geologic section showing features of stress-relief fracturing

(Source: Wyrick and Borchers 1981)

Kentucky Groundwater

Groundwater Occurrence and Quantity

Table C-11 presents the significant aquifers of the Plateau Province, which includes the coalfield provinces. As discussed earlier, groundwater flow within the aquifers is primarily within and through fractured/jointed sandstone bodies and also along bedding plane contacts. Within the Conemaugh, Breathitt and Lee Formations, multiple sandstone aquifers are present (Kiesler, 1983). Shale and coal yield some water, but less than the sandstone units.

In eastern Kentucky fresh groundwater yields for sandstones within the Breathitt and Conemaugh Formations range from 1 to 200 gpm, and those within the Lee Formation range from 1 to 300 gpm (Kiesler, 1983). Depths to water are usually less than 50 feet under valleys and about 300 feet under ridges (Kiesler, 1983). Wells less than 200 feet in depth usually yield 1-50 gpm and frequently are inadequate for domestic supply (Kiesler, 1983). Reportedly, wells greater than 300 feet in depth below perennial streams in the Lee Formation yield 300 gpm, and in the Breathitt Formation below 200 feet yield 200 gpm (Kiesler, 1983). These wells are possibly encountering upward-moving groundwater flow paths.

In the north and central portion of the coal province, yields of the Breathitt Formation are reported as ranging from <1 gpm up to 325 gpm; the Lee Formation from <1 gpm up to 140 gpm (Quinones, 1981). Groundwater yields obtained from sandstone beds at depths greater than 300 feet are probably from intergranular pore spaces due to likely sealing of fracture openings by overburden pressures (Quinones, 1981). Within the southern portion of Kentucky's Eastern Coal Province, groundwater yields of the Breathitt Formation are reported as ranging from 1-25 gpm and 1-250 gpm for the Lee Formation (Leist, 1982).

Groundwater Quality

Throughout the Plateau area of eastern Kentucky, groundwater quality is considered to be generally suitable (Kiesler, 1983, Quinones, 1981, and Leist, 1982). In eastern Kentucky groundwater ranges from soft to hard, with iron being the most objectionable constituent; ranging from 100-157,000 ug/L (Kiesler, 1983). Saline water (>1000 mg/L total dissolved solids) is usually found at 100 feet below principal valley bottoms, but also first encountered at depths of 300 feet (Kiesler, 1983). Saline or brine waters are common in oil/gas areas due to brine migration up wells with improperly installed well casings (Kiesler, 1983). Brines with more than 35,000 mg/l are known to occur at depth (Kiesler, 1983). Table C-12 below summarizes 1980 water quality data for the Lee and Breathitt Formation aquifers in eastern Kentucky (Kiesler, 1983).

Groundwater within the northern and central section of Kentucky's Eastern Coal Province is also considered to be generally suitable with iron again the most objectionable constituent ranging from 0.01 to 800 mg/L (Quinones, 1981). The source of this iron is likely related to coal mining activity (Quinones, 1981). Hardness ranges from 4 to 866 mg/L, and groundwater can be one of three types: calcium-magnesium bicarbonate, sodium bicarbonate, or sodium sulfate none of which is unique to the Breathitt or Lee Formations (Quinones, 1981). Table C-13 below provides a summary of groundwater quality for the Breathitt and Lee Formations (Quinones, 1981).

Appendix C

Within the southern portion of the eastern coalfields, groundwater quality is similar to the rest of the coalfield area except for apparently lower dissolved iron contents in the groundwater, ranging from 0.003 to 25 mg/L (Leist, 1982). Hardness ranges from 5-790 mg/L as reported in Table C-14 below (Leist, 1982). Saline or brine (>35,000 mg/L total dissolved solids) water are reported to occur at less than 100 feet below the deepest valley bottoms (Leist, 1982).

Table C-12
General Groundwater Composition of the Eastern Kentucky Coalbasin (Kiesler, 1983)

Constituent (mg/L)		Range	Median	Number of Samples
CONEMAUGH-BREATHITT FORMATIONS	Iron (Fe)	0.01 - 157	1.0	100
	Calcium (Ca)	2.4 - 248	27	118
	Magnesium (Mg)	0.5 - 177	7.5	117
	Sodium (Na)	1.5 - 742	29	121
	Potassium (K)	0.5 - 22	2.4	116
	Bicarbonate (HCO ₃)	0 - 537	153	102
	Sulfate (SO ₄)	0.1 - 2,749	13	185
	Chloride (Cl ⁻)	1 - 2,450	11	238
	Specific conductance (Microhms per centimeter at 25°C)	60 - 7,620	378	183
	Hardness as calcium carbonate (CaCO ₃)	3 - 2,190	96	185
	pH (Units)	2.6 - 8.8	7.1	167
Constituent		Range	Median	Number of Samples
LEE FORMATION	Iron (Fe)	0.01 - 16	0.82	25
	Calcium (Ca)	1.3 - 150	22	155
	Magnesium (Mg)	0.40 - 57	6.5	155
	Sodium (Na)	1.4 - 400	27	153
	Potassium (K)	0.8 - 9.2	1.9	153
	Bicarbonate (HCO ₃)	10 - 388	226	25
	Sulfate (SO ₄)	0 - 610	12	174
	Chloride (Cl ⁻)	1.0 - 849	9.4	177
	Specific conductance (Microhms per centimeter at 25°C)	39 - 2,970	310	175
	Hardness as calcium carbonate (CaCO ₃)	5 - 580	85	174
	pH (Units)	5.5 - 9.0	7.0	173

Table C-12
General Groundwater Composition of the Eastern Kentucky Coalbasin (Kiesler, 1983)

Constituent		Range		Median	Number of Samples	
MISSISSIPPIAN-DEVONIAN ROCKS	Iron (Fe)	-	-	-	-	0
	Calcium (Ca)	0.4	-	68	46	18
	Magnesium (Mg)	0.10	-	38	8.9	18
	Sodium (Na)	2.8	-	310	16	18
	Potassium (K)	0.1	-	2.1	1.0	18
	Bicarbonate (HCO ₃)	-	-	-	-	0
	Sulfate (SO ₄)	1.6	-	120	28	18
	Chloride (Cl)	2.2	-	210	8.3	18
	Specific conductance (Microhms per centimeter at 25°C)	270	-	1,470	330	18
	Hardness as calcium carbonate (CaCO ₃)	1	-	320	145	18
	pH (Units)	6.7	-	8.1	7.7	18

Table C-13
General Groundwater Composition for
Northern and Central Kentucky Coalbasin (Quinones, 1981)

Constituent		Range	Median	Number of Samples
BREATHITT FORMATION	Iron (Fe)	0.01 - 890	0.73	188
	Calcium (Ca)	1.4 - 124	32	29
	Magnesium (Mg)	.9 - 41	10	29
	Sodium (Na)	.6 - 318	83	26
	Potassium (K)	1.0 - 9.4	3	25
	Bicarbonate (HCO ₃)	0.0 - 620	138	189
	Sulfate (SO ₄)	0.0 - 1,100	22	189
	Chloride (Cl)	.8 - 1,200	10	240
	Specific conductance (Microhms per centimeter at 25°C)	22 - 4,530	388	189
	Hardness as calcium carbonate (CaCO ₃)	4 - 886	96	189
	pH (Units)	3.5 - 9.7	6.9	183
LEE FORMATION	Iron (Fe)	0.01 - 6.4	0.23	40
	Calcium (Ca)	3.6 - 52	5.5	28
	Magnesium (Mg)	.2 - 24	1.4	28
	Sodium (Na)	2.3 - 317	247	27
	Potassium (K)	1.1 - 28	2.2	27
	Bicarbonate (HCO ₃)	14 - 512	267	50
	Sulfate (SO ₄)	0.0 - 65	4.0	51
	Chloride (Cl)	.5 - 2,050	44	74
	Specific conductance	40 - 1,620	809	50
	Hardness as Calcium Carbonate (CaCO ₃)	7 - 256	27	51
	pH	6.0 - 8.9	7.5	46

Table C-13
General Groundwater Composition for
Northern and Central Kentucky Coalbasin (Quinones, 1981)

Constituent		Range	Median	Number of Samples
PRE-PENNSYLVANIAN ROCKS	Iron (Fe)	0.01 - 14	0.4	10
	Calcium (Ca)	13 - 14	-	2
	Magnesium (Mg)	1.0 - 1.2	-	2
	Sodium (Na)	.8 - 1.0	-	2
	Potassium (K)	.07 - 1.2	-	2
	Bicarbonate (HCO ₃)	9 - 442	122	10
	Sulfate (SO ₄)	1.4 - 260	7.0	11
	Chloride (Cl)	1.0 - 134	5	11
	Specific conductance	52 - 55	-	2
	Hardness as Calcium Carbonate (CaCO ₃)	32 - 272	82	9
	pH	6.0 - 7.5	7.1	6

Table C-14
General Groundwater Composition for Southern Kentucky Coalbasin (Leist, 1982)

Constituent (mg/L)		Range	Median	Number of Samples
BREATHITT FORMATION	Iron (Fe)	0.02 - 25	1.0	98
	Calcium (Ca)	2.3 - 86	26	15
	Magnesium (Mg)	0.5 - 38	6.4	15
	Sodium (Na)	1.2 - 312	22	15
	Potassium (K)	0.3 - 6.4	2.2	14
	Bicarbonate (HCO ₃)	0 - 455	127	99
	Sulfate (SO ₄)	0 - 237	9.7	98
	Chloride (Cl)	0.5 - 220	4	120
	Specific conductance (Microhms per centimeter at 25°C)	17 - 1,410	215	98
	Hardness as calcium carbonate (CaCO ₃)	5 - 540	82	99
	pH (Units)	3.8 - 9.7	6.9	95
	Dissolved solids	16 - 798	199	11
LEE FORMATION	Iron (Fe)	0.003 - 9.7	0.79	49
	Calcium (Ca)	1 - 201	13	36
	Magnesium (Mg)	0.30 - 70	2.5	41
	Sodium (Na)	0.4 - 1,520	1.8	38
	Potassium (K)	0.5 - 19	4.6	38
	Bicarbonate (HCO ₃)	5 - 315	61	61
	Sulfate (SO ₄)	0 - 240	6.5	64
	Chloride (Cl)	0 - 2,630	3	89
	Specific conductance (Microhms per centimeter at 25°C)	15 - 8,240	137	63
	Hardness as calcium carbonate (CaCO ₃)	5 - 790	44	63
	pH (Units)	5.7 - 8.4	6.8	59
	Dissolved solids	19 - 4,860	77	36

Tennessee Groundwater

Groundwater Occurrence and Quantity

Within the northern Tennessee coal basin, well yields in the Pennsylvanian aquifers range from <5 to >300 gpm, with 62 percent of 376 wells having yields ranging from 10 to 25 gpm (Gaydos, 1982). As in other areas of the Plateau, groundwater occurs primarily within fractures and joints of sandstone units of Pennsylvanian-aged rocks. Variation in yields and transmissivities is due to the difference in the size and the irregular nature of the fracture system in Pennsylvanian units. Most of all wells are less than 400 feet in depth and most of all domestic wells are less than 200 feet in depth (Gaydos, 1982). Transmissivities of wells range from 5 - 13,000 ft²/day, with 68 percent of all wells ranging from 11 - 240 ft²/day (Gaydos, 1982).

Within the central portion of the Eastern Tennessee Coal Basin, well yields for wells completed in Pennsylvanian aquifers range from 5-150 gpm. Transmissivities estimated from specific capacity data for 16 wells and range from 20-2,000 ft²/day, 68 percent of which range from 30-500 ft²/day (Gaydos, 1982). This wide range is primarily due to variation in size and extent of the fracturing in the sandstones of the Pennsylvanian rock units (Gaydos, 1982).

In the southern section of the coal basin, groundwater flow, as for other areas in the Appalachian Plateau's coal basins, is primarily through fractured/jointed sandstone bodies which have intergranular permeability (Hollyday, 1983). Most water zones are within 100 feet of ground surface (Hollyday, 1983). For more than 400 wells, measured yields ranged from <5 gpm to about 300 gpm, with 68 percent of the wells being less than 20 gpm (Hollyday, 1983). Estimated transmissivities for 6 wells range from 20-75 ft²/day, with 68 percent of the wells ranging from 30-700 ft²/day (Hollyday, 1983).

Groundwater Quality

Within the northern areas of the coal basin, iron and chloride levels are relatively high in groundwaters, with chlorine being more common at depth due to brine water contaminating overlying fresh groundwater (Gaydos, 1982). Pennsylvanian aquifers within this area generally need minimal treatment for use and are moderately mineralized, slightly acidic, and soft to moderately hard (Gaydos, 1982). Table C-15 below provides some general water quality data for undifferentiated Pennsylvanian rocks in the northern section of the coal basin (Gaydos, 1982).

Within the central portion of Tennessee's Eastern Coal Field, groundwater is of suitable quality, generally soft to moderately hard, and is of a calcium bicarbonate, sodium bicarbonate, or calcium sulfate type (Gaydos, 1982). Dissolved solids are relatively low, with some sandstone aquifers reporting low pH and high manganese concentrations (Gaydos, 1982). Excessive iron levels are a major problem in Cumberland County.

Within the southern portion of the coalfields, groundwater is again considered to be of generally good quality, ranging from soft to moderately hard (Hollyday, 1983). Groundwater, as in other areas of the coal basin, is either a calcium bicarbonate, sodium bicarbonate, or calcium sulfate type with dissolved solids concentrations low, and locally high concentrations of iron and manganese. Table C-16 below, obtained from Hollyday (1983), provides some water quality data for wells completed

Appendix C

with the Pennsylvanian-aged aquifers. Data collected from wells at sites 7, 14, 15, 17, 23-25, 28, 31-33, and 35 are for Plateau aquifer units.

Table C-15
General Groundwater Composition for Northern Tennessee Coalbasin

AQUIFER	Aquifer Type	Hardness (milligrams per liter)	Iron (micrograms per liter)	Sulfate (milligrams per liter)	Chloride (milligrams per liter)	Dissolved Solids (milligrams per liter)	pH (Units)
Pennsylvanian rocks (undifferentiated)	Fractured sandstone and conglomerate	40-120	400-6,000	5-60	5-50	250-400	6.4-7.2
Mississippian rocks (undifferentiated)	Carbonate rocks	100-300	100-1,000	1-100	1-20	150-400	6.8-7.8
Ordovician rocks (undifferentiated)	Limestone	200-400	100-2,000	5-50	2-50	250-500	6.8-8.0

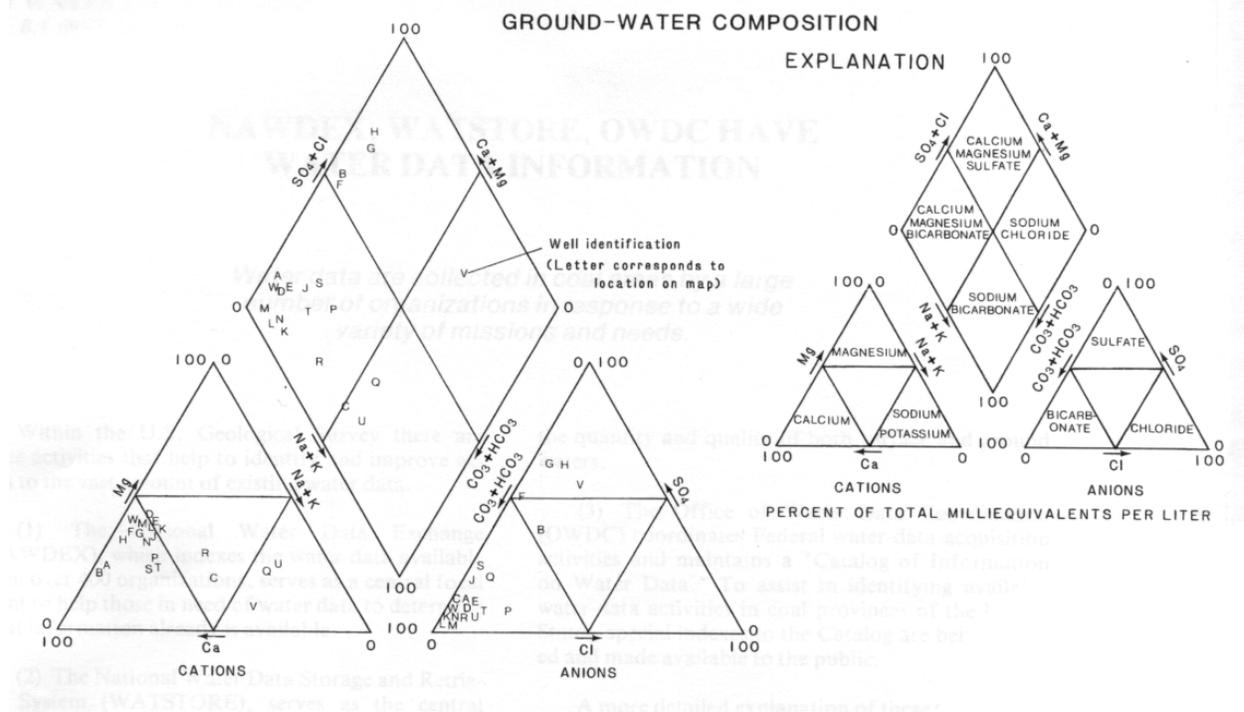
(Numerical ranges represent typical values and do not include unusually high or low values)

Table C-16
General Groundwater Composition for Northern Tennessee Coalbasin (Hollyday, 1983)

Site Number	Year Sampled	Specific Conductance (µmho/cm)	Dissolved solids, residue at 180°C (mg/L)	pH (units)	Dissolved Iron (µg/L)	Dissolved Manganese (µg/L)	Dissolved sulfate (mg/L)	Hardness as CaCO ₃ (mg/L)
1	1960	128	106	6.7	-	-	4.0	-
2	1960	668	517	7.4	30	-	215.	370
3	1965	262	-	7.9	-	-	.4	140
4	1963	41	40	6.5	-	-	.0	8
5	1970	227	156	7.6	-	10	.0	-
6	1960	166	117	7.2	10	-	.4	84
7	1958	55	39	6.0	1,300	-	3.4	16
8	1958	275	160	7.4	490	-	18	140
9	1963	300	212	7.6	-	-	4.4	150
10	1958	365	213	7.6	20	-	6.2	190
11	1946	-	124	-	-	-	5.8	-
12	1946	-	7,280	-	-	-	206	-
14	1976	30	43	5.2	2,400	270	1.5	6
15	1976	138	128	6.4	960	1,200	.8	75
16	1958	289	163	7.7	120	-	4.8	150
17	1958	78	60	6.7	11,000	1,000	1.7	12
18	1977	200	126	7.4	10	0	10	91
19	1975	205	-	7.2	-	-	1.5	100
21	1974	140	-	7.4	-	-	-	68
22	1974	189	-	7.4	-	-	1.9	-
23	1954	135	77	6.8	-	-	14	54
24	1954	201	110	7.2	-	-	10	98
25	1954	180	102	6.9	-	-	3.0	90
26	1977	290	144	7.5	10	10	2.3	130
27	1977	180	118	7.9	40	0	3.0	97
28	1977	180	97	7.1	290	90	1.7	61
29	1954	-	62	6.6	-	0	3.0	34
30	1977	580	-	7.5	50	10	22	250
31	1977	250	144	7.5	30	310	5.2	84
32	1954	202	124	6.8	-	-	17	68
33	1977	225	115	7.4	0	0	7.3	100
34	1977	250	-	7.6	10	10	3.5	120
35	1977	280	160	7.8	0	10	3.1	120
Range		30-668	39-7,280	5.2-7.9	0-11,000	0-1,200	.0-215	6-370
Median		202	124	7.4	35	10	3.5	98
No. of Samples		30	27	31	18	14	32	28

Virginia Groundwater

Groundwater Occurrence and Quantity

Figure C-3 General Ground-Water Composition of Virginia Coal Fields.

Within the Appalachian Plateau coalfields of Virginia, groundwater occurs primarily within and is obtained from fractured sandstone bedrock. Groundwater moves and is stored primarily along bedding planes and within jointing and fracture systems within the rocks and is the major source of water for many domestic, commercial, and public supplies (Hufschmidt, 1981). Per Hufschmidt (1981), well yields range from 5 to 200 gallons per minute, with most less than 30 gallons per minute, and vary depending upon the type of rock and the number and size of openings penetrated by the well within the rock unit.

Groundwater Quality

Per Hufschmidt (1981), groundwater quality is highly variable but generally suitable for most uses within the coalfield province of Virginia. Groundwater from Pennsylvanian-aged sandstone is characteristically of the calcium magnesium sulfate type with hardness varying considerably (Hufschmidt, 1981). As for other areas within the Allegheny Plateau coalfields, water quality within the Virginia coalfields can be impacted by many factors including rock type, duration of water contact with bedrock, and external sources of contamination. Within the Virginia coalfields, dissolved solids concentrations are generally low, but locally high concentrations of iron, sulfate, and hardness can occur and, in some areas, high levels of chloride and nitrate suggest contamination by septic systems (Hufschmidt, 1981). Per Hufschmidt (1981) wells constructed deeper than 200 to 300 feet below land surface and located near major rivers may encounter slightly to moderately saline water. Figure C-3 depicts general groundwater composition of Virginia coal fields.

(Source: USGS 1981)

West Virginia Groundwater

Groundwater Occurrence and Quantity

As for other regions of the plateau, sandstone units within West Virginia coal basin geologic formations and groups are the most productive aquifers within the coal basins of the Appalachian Plateau (see Table C-11). Yields from sandstones for these units throughout the Plateau region of West Virginia range from 5 to 400 gpm (USGS HA 730-L). Groundwater movement is largely by secondary permeability via bedrock fractures, joint systems, and bedding planes, and groundwater yields can be highly variable depending whether or not these features are encountered (Ehlke, 1982). Within the majority of the West Virginia's Plateau coalfields, i.e., mostly central/ south-central West Virginia, alluvial deposits along the larger rivers serve as productive sources of groundwater due in part to their adequate thicknesses (Ehlke, 1982).

Table V.C.1.-7 (Ehlke, 1982, 5.0.1) provides specific data for 53 wells in the central/south-central region of West Virginia, i.e. the Plateau region. These data show groundwater well yields, expressed in terms of specific capacity range, from <0.1 to 100 gal/min per foot of water-level drawdown within the well (Ehlke, 1982). Wells that encountered very few fractures, joints, or bedding plane partings usually have a specific capacity of equal or less than 1.0 gal/min per foot of well drawdown.

Within the southwestern portion of the Plateau fractured sandstone also provides the most significant source of groundwater, while alluvium is less productive compared to the central/south-central areas of the Plateau's coal basins due to its thinner nature (Ehlke, 1982). In the southwestern Plateau region of West Virginia, average yields from wells in valleys is reported to be 27 gal/min., and 9 gal./min. for wells within upland areas (Ehlke, 1982). Overall yields for all wells within the Plateau's Pennsylvanian sandstone and Quaternary alluvial aquifers ranges from 0.5 to 340 gal./min. (Ehlke, 1982). As discussed in the groundwater introductory section above, some groundwater occurring within the alluvium is flow-through contributed by discharges into the alluvium from the underlying fractured bedrock.

Groundwater Quality

Table C-18 (Ehlke, 1982) below provides comparative water quality data for southwestern West Virginia wells placed in alluvium and Upper and Lower Pennsylvanian aquifer units, in addition to summary water quality data for Upper and Lower Pennsylvanian aquifers unaffected by saltwater intrusion and mining, and for wells affected by these two activities. Also included are some typical chemical analyses for three wells not affected by mining or saltwater intrusion and located within Upper and Lower Pennsylvanian and alluvial aquifers (Ehlke, 1982). Wells 1401 and 5401 are located in Cabell County, and well 2701 is located in northern Logan County (Ehlke, 1982).

These data reveal that groundwater quality appears to be best in alluvial aquifers, at least in southwestern West Virginia. These aquifers have the lowest specific conductivity, pH, alkalinity, hardness, and chloride, iron, and manganese concentrations (Ehlke, 1982). Well sample data from Upper Pennsylvania aquifers have the highest values. Upper Pennsylvanian rock units are more soluble versus the other units and also contain more limestone than either, resulting in higher values for specific conductance, alkalinity, calcium, carbonate hardness, and dissolved solids (Ehlke, 1982). A concern in areas of deep mines, such as southwestern West Virginia, is that groundwater leaking from deep mines can impact other groundwater zones, increasing sulfate and noncarbonate hardness and also increasing dissolved solids in streams following discharge from the mines (Ehlke, 1982).

Table C-17
General Groundwater Composition of Virginia Coalfields
(Hufschmidt, 1981)

Well Number	Latitude	Longitude	County	Specific Capacity (gal/min)
1	38 34 49	80 42 34	Braxton	10.0
2	38 36 56	80 54 41	Braxton	.83
3	38 40 25	80 48 22	Braxton	8.0
4	38 40 43	80 35 27	Braxton	3.0
5	38 41 33	80 48 55	Braxton	2.0
6	38 20 46	81 09 47	Clay	2.5
7	38 27 39	80 51 51	Clay	25.
8	38 27 47	80 51 41	Clay	100.
9	38 30 50	80 46 17	Nicholas	.33
10	38 31 01	80 46 59	Nicholas	2.33
11	38 21 01	81 38 56	Kanawha	1.71
12	38 21 01	81 38 05	Kanawha	2.0
13	38 21 43	81 38 56	Kanawha	52.
14	38 22 11	81 34 28	Kanawha	25.
15	38 26 19	81 33 14	Kanawha	.07
16	37 51 00	81 48 27	Logan	.14
17	37 51 02	81 48 28	Logan	.20
18	37 52 19	81 50 18	Logan	.006
19	37 52 56	81 48 04	Logan	4.8
20	37 53 21	81 49 23	Logan	11.2
21	38 08 32	81 56 51	Lincoln	.012
22	38 09 15	81 56 52	Lincoln	.06
23	38 12 44	81 53 56	Lincoln	.18
24	38 13 43	81 53 30	Lincoln	.10
25	38 14 23	81 52 10	Lincoln	.04
26	38 15 29	81 48 41	Lincoln	.14
27	38 18 44	81 52 31	Lincoln	.04
28	38 12 01	81 44 29	Kanawha	.36
29	38 13 37	81 45 50	Kanawha	.04
30	38 17 33	81 46 49	Kanawha	.24
31	38 18 58	81 52 29	Kanawha	.82
32	38 21 01	81 53 13	Kanawha	.12
33	38 24 10	81 52 14	Kanawha	.12
34	37 48 06	81 35 38	Boone	2.0
35	37 53 40	81 40 20	Boone	.20
36	37 55 25	81 40 51	Boone	.04
37	37 57 20	81 52 55	Boone	.12
38	37 59 24	81 44 17	Boone	.24
39	38 04 28	81 36 29	Boone	.28

**Table C-17
(Continued)**

40	38 06 04	81 34 12	Boone	.32
41	38 07 36	81 35 14	Boone	.26
42	38 08 30	81 51 22	Boone	.40
43	38 07 57	81 48 54	Boone	.04
44	37 43 43	81 16 52	Raleigh	8.4
45	37 46 14	81 18 30	Raleigh	.62
46	37 49 15	81 28 27	Raleigh	4.8
47	37 51 34	81 25 02	Raleigh	5.0
48	37 52 30	81 30 48	Raleigh	1.0
49	37 56 21	81 21 13	Raleigh	.12
50	37 57 10	80 31 15	Raleigh	2.2
51	37 54 57	80 40 53	Greenbrier	2.0
52	37 59 05	80 42 59	Greenbrier	1.0
53	37 52 39	80 47 58	Fayette	5.4

Table C-18
Specific Capacity Data for Selected Wells in Central/Southcentral West Virginia
 (Source: Ehlke 1982)

Comparison of Water Analyses from Wells Unaffected by Mining or Salt Water.

		Specific Conductance (μmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO₃ (mg/L)	Hardness non- Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (μg/L)	Dissolved Manganese (μg/L)	No. of Wells
Alluvium	Max	710	7.3	246	29	110	200	110	433	170	60	14
	Min	100	5.5 *	12	0	11	26	0	55	0	0	
	Mean	224	6.6	57	8.7	38	77	23	136	100	19	
Upper Pennsylvania	Max	1,000	8.9	435	120	100	300	53	646	32,000	3,900	94
	Min	100	6.2 *	0	1.0	0.1	3	0	119	0	0	
	Mean	499	7.2	229	19	21	109	3.7	318	1,686	274	
Lower Pennsylvania	Max	930	8.3	435	180	88	230	75	588	16,000	8,900	191
	Min	45	4.5 *	9	0.8	0	3	0	21	10	0	
	Mean	269	7.0	94	14	34	68	6.5	152	3,266	232	
*Median Value												

Table C-18
Specific Capacity Data for Selected Wells in Central/Southcentral West Virginia
 (Source: Ehlke 1982)

Comparison of Water Analyses from Wells Unaffected by Mining or Salt Water.

		Specific Conductance (µmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO₃ (mg/L)	Hardness non- Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (µg/L)	Dissolved Manganese (µg/L)	No. of Wells
Alluvium	Max	710	7.3	246	29	110	200	110	433	170	60	14
	Min	100	5.5 *	12	0	11	26	0	55	0	0	
	Mean	224	6.6	57	8.7	38	77	23	136	100	19	
Upper Pennsylvania	Max	1,000	8.9	435	120	100	300	53	646	32,000	3,900	94
	Min	100	6.2 *	0	1.0	0.1	3	0	119	0	0	
	Mean	499	7.2	229	19	21	109	3.7	318	1,686	274	
Lower Pennsylvania	Max	930	8.3	435	180	88	230	75	588	16,000	8,900	191
	Min	45	4.5 *	9	0.8	0	3	0	21	10	0	
	Mean	269	7.0	94	14	34	68	6.5	152	3,266	232	
*Median Value												

Table C-18
Specific Capacity Data for Selected Wells in Central/Southcentral West Virginia
 (Source: Ehlke 1982)

Comparison of Water Analyses from Wells Unaffected by Mining or Salt Water.

		Specific Conductance (µmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO₃ (mg/L)	Hardness non- Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (µg/L)	Dissolved Manganese (µg/L)	No. of Wells
Alluvium	Max	710	7.3	246	29	110	200	110	433	170	60	14
	Min	100	5.5 *	12	0	11	26	0	55	0	0	
	Mean	224	6.6	57	8.7	38	77	23	136	100	19	
Upper Pennsylvania	Max	1,000	8.9	435	120	100	300	53	646	32,000	3,900	94
	Min	100	6.2 *	0	1.0	0.1	3	0	119	0	0	
	Mean	499	7.2	229	19	21	109	3.7	318	1,686	274	
Lower Pennsylvania	Max	930	8.3	435	180	88	230	75	588	16,000	8,900	191
	Min	45	4.5 *	9	0.8	0	3	0	21	10	0	
	Mean	269	7.0	94	14	34	68	6.5	152	3,266	232	
*Median Value												

Table C-18
Specific Capacity Data for Selected Wells in Central/Southcentral West Virginia
 (Source: Ehlke 1982)

Comparison of Water Analyses from Wells Unaffected by Mining or Salt Water.

		Specific Conductance (μmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO₃ (mg/L)	Hardness non- Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (μg/L)	Dissolved Manganese (μg/L)	No. of Wells
Alluvium	Max	710	7.3	246	29	110	200	110	433	170	60	14
	Min	100	5.5 *	12	0	11	26	0	55	0	0	
	Mean	224	6.6	57	8.7	38	77	23	136	100	19	
Upper Pennsylvania	Max	1,000	8.9	435	120	100	300	53	646	32,000	3,900	94
	Min	100	6.2 *	0	1.0	0.1	3	0	119	0	0	
	Mean	499	7.2	229	19	21	109	3.7	318	1,686	274	
Lower Pennsylvania	Max	930	8.3	435	180	88	230	75	588	16,000	8,900	191
	Min	45	4.5 *	9	0.8	0	3	0	21	10	0	
	Mean	269	7.0	94	14	34	68	6.5	152	3,266	232	
*Median Value												

Table C-18
Specific Capacity Data for Selected Wells in Central/Southcentral West Virginia
 (Source: Ehlke 1982)

Comparison of Water Analyses from Wells Unaffected by Mining or Salt Water.

		Specific Conductance (µmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO₃ (mg/L)	Hardness non- Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (µg/L)	Dissolved Manganese (µg/L)	No. of Wells
Alluvium	Max	710	7.3	246	29	110	200	110	433	170	60	14
	Min	100	5.5 *	12	0	11	26	0	55	0	0	
	Mean	224	6.6	57	8.7	38	77	23	136	100	19	
Upper Pennsylvania	Max	1,000	8.9	435	120	100	300	53	646	32,000	3,900	94
	Min	100	6.2 *	0	1.0	0.1	3	0	119	0	0	
	Mean	499	7.2	229	19	21	109	3.7	318	1,686	274	
Lower Pennsylvania	Max	930	8.3	435	180	88	230	75	588	16,000	8,900	191
	Min	45	4.5 *	9	0.8	0	3	0	21	10	0	
	Mean	269	7.0	94	14	34	68	6.5	152	3,266	232	
*Median Value												

Table C-18
Specific Capacity Data for Selected Wells in Central/Southcentral West Virginia
 (Source: Ehlke 1982)

Comparison of Water Analyses from Wells Unaffected by Mining or Salt Water.

		Specific Conductance (μmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO₃ (mg/L)	Hardness non- Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (μg/L)	Dissolved Manganese (μg/L)	No. of Wells
Alluvium	Max	710	7.3	246	29	110	200	110	433	170	60	14
	Min	100	5.5 *	12	0	11	26	0	55	0	0	
	Mean	224	6.6	57	8.7	38	77	23	136	100	19	
Upper Pennsylvania	Max	1,000	8.9	435	120	100	300	53	646	32,000	3,900	94
	Min	100	6.2 *	0	1.0	0.1	3	0	119	0	0	
	Mean	499	7.2	229	19	21	109	3.7	318	1,686	274	
Lower Pennsylvania	Max	930	8.3	435	180	88	230	75	588	16,000	8,900	191
	Min	45	4.5 *	9	0.8	0	3	0	21	10	0	
	Mean	269	7.0	94	14	34	68	6.5	152	3,266	232	
*Median Value												

Table C-18
Specific Capacity Data for Selected Wells in Central/Southcentral West Virginia
 (Source: Ehlke 1982)

Comparison of Water Analyses from Wells Unaffected by Mining or Salt Water.

		Specific Conductance (µmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO₃ (mg/L)	Hardness non- Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (µg/L)	Dissolved Manganese (µg/L)	No. of Wells
Alluvium	Max	710	7.3	246	29	110	200	110	433	170	60	14
	Min	100	5.5 *	12	0	11	26	0	55	0	0	
	Mean	224	6.6	57	8.7	38	77	23	136	100	19	
Upper Pennsylvania	Max	1,000	8.9	435	120	100	300	53	646	32,000	3,900	94
	Min	100	6.2 *	0	1.0	0.1	3	0	119	0	0	
	Mean	499	7.2	229	19	21	109	3.7	318	1,686	274	
Lower Pennsylvania	Max	930	8.3	435	180	88	230	75	588	16,000	8,900	191
	Min	45	4.5 *	9	0.8	0	3	0	21	10	0	
	Mean	269	7.0	94	14	34	68	6.5	152	3,266	232	
*Median Value												

**Table C-18
(Continued)**

Summary of Water Analyses from Wells in the Upper Pennsylvania System.												
		Specific Conductance (µmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO ₃ (mg/L)	Hardness non-Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (µg/L)	Dissolved Manganese (µg/L)	No. of Wells
Wells unaffected by mining or salt water	Max	1,000	8.9	435	120	100	300	53	646	32,000	3,900	94
	Min	1,750	7.4	328	78	870	950	670	1,520	7,100	640	7
	Mean	5,500	8.4	361	2,200	28	1,900	1,900	3,420	77,000	1,400	7
	Max	100	6.2	0	1.0	0.1	3	0	119	0	0	94
	Min	300	6.1	68	0.8	60	130	57	200	20	10	7
	Mean	850	7.2	0	100	0.4	6	0	529	30	0	7
Median Value	Max	499	7.2	229	19.2	20.9	109	3.7	318	1,690	274	94
	Min	1,000	7.2*	207	19	353	496	290	746	1,400	196	7
	Mean	2,150	7.9*	235	643	11	397	313	1,300	13,360	280	7

**Table C-18
(Continued)**

Summary of Water analyses from wells in the Lower Pennsylvania System (Pottsville).												
		Specific Conductance (µmhos/cm)	pH (units)	Alkalinity (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Hardness as CaCO ₃ (mg/L)	Hardness non-Carbonate (mg/L)	Dissolved Solids (sum) (mg/L)	Dissolved Iron (µg/L)	Dissolved Manganese (µg/L)	No. of Wells
	Max	930	8.3	435	180	88	230	75	588	16,000	9,900	191
	Min	2000	8.0	130	250	1,200	1,300	1,300	1,790	180,000	9,900	38
	Mean	3500	7.6	254	1,000	3.1	210	38	1,930	9,800	650	10
Wells unaffected by mining or salt water	Max	45	4.5	9	0.8	0	3	0	21	10	0	191
	Min	70	4.1	0	1.0	0.4	24	13	42	0	0	38
	Mean	650	6.7	123	140	0	32	0	385	60	10	10
* Median value	Max	269	7.0*	94	14	34	68	6.5	152	3,270	232	191
	Min	482	6.6*	32	19	172	183	150	324	16,500	4,230	38
	Mean	1,250	7.2*	174	304	1.2	100	3.8	696	2,587	196	10

**Table C-18
(Continued)**

“Typical” chemical analyses from wells not affected by mining or salt-water intrusion in the three major geologic units.																
Geologic Unit	Well No.	Date Sampled	Temp. (0°)	Specific Conductance (µmhos/cm)	pH (units)	Alkalinity (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	Cl⁻ (mg/L)	SO₄ (mg/L)	Hardness as CaCO₃ (mg/L)	Hardness non-Carbonate (mg/L)	Dis-solved solids (mg/L)	Dis-solved Iron (µg/L)	Dis-solved Manganese (µg/L)
Alluvium 382635082041401		03-24-76	14.0	235	6.6	36	25	6.6	8.5	12	29	90	54	115	30	10
UPPER PENNSYLVANIAN 382310082135401		04-21-76	16.0	500	7.1	203	49	11	43	6.8	53	170	0	307	2,500	520
LOWER PENNSYLVANIAN 380200081572701		05-04-77	16.0	230	7.1	78	25	5.0	8.0	2.3	15	83	5	122	2,600	220

Table C-19
Comparative Groundwater Quality Data for
Southwestern West Virginia (Ehlke, 1982)

Geohydrologic Unit	Hardness	Dissolved Solids	Bicarbonate	Chloride	Sulfate
10	88	204	107	27	38
11	148	424	288	65	40
12	80	141	72	9	39

Notes:

Unit 10 = Allegheny and Pottsville Group Aquifers Combined

Unit 11 = Monongahela Group and Conemaugh Formation Aquifers Combined

Unit 12 = Alluvial Aquifers

Average hardness and concentration of dissolved solids, bicarbonate, chloride, and sulfate in mg/L of groundwater in the Guyandotte River basin.

Taken from Schwietering, J.F., "Brief Description of Ground-Water Conditions and Aquifers in West Virginia", Table 4, published by WV Dept. of Natural Resources Open-File Report OF 8102, January, 1981.