

**WORK ASSIGNMENT
CONTRACT NO. 68-D5-0038**

1. **WORK ASSIGNMENT TITLE:** Environmental Impact Statement (EIS) to Minimize the Environmental Impact of Mountaintop Removal/Valley Fill Mining Operations in the Appalachia Coalfields

2. **PERIOD OF PERFORMANCE:**

Effective date: Contract Officer Notice to Proceed
Completion date: May 31, 1999

3. **EPA PROJECT OFFICERS:**

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4. **BACKGROUND**

Over the last decade, the nature and extent of coal mining operations in Appalachia has changed significantly. Increasingly, individual surface mines larger than 3,000 acres have been proposed, and technology has enabled machines to remove the tops of mountains (mountaintop removal), with excess overburden material typically disposed into adjacent stream corridors (valley fills). In some instances, valleys of up to two miles long have been completely filled, covering perennial streams, wetlands, and tracts of prime upland wildlife habitat. Cumulatively, tens of thousands of acres are believed to have been effected by these operations. Further, the steep terrain in the Appalachian coalfields, where most of this coal mining activity occurs, is believed to offer few economically feasible disposal alternatives for the excess overburden and mining spoils.

Recognizing that Appalachian surface mining projects are growing in number and scale, it has become incumbent upon Federal and State agencies to ensure that relevant regulations, policies, procedures, and guidance adequately consider the potential individual and cumulative impacts that may result from these larger scale projects. To do this, the Office of Surface Mining (OSM), the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), the U.S. Fish and Wildlife Service (FWS), and the West Virginia Department of Environmental Protection (WVDEP) have agreed to prepare a joint voluntary Environmental Impact Statement (EIS) that will examine agency policies, guidance, and decision-making processes in order to determine whether they can and do minimize, to the maximum extent practicable, adverse environmental effects from mountaintop mining operations and the disposal of excess spoil in valley fills. Other interested Appalachian coalfield states have also been

invited to participate in the development of this EIS.

The agencies undertaking preparation of this voluntary EIS implement federal and state laws with which mountaintop mining operations and associated discharges to the waters of the U.S. must comply. OSM is responsible for the national administration of the Surface Mining Control and Reclamation Act (SMCRA), and has delegated the SMCRA regulatory functions to the State of West Virginia for surface mining operations in the State. Other Appalachian coalfield states (except Tennessee) also implement delegated SMCRA authorities. The discharge of fill material into U.S. waters is regulated under Section 404 of the Clean Water Act, with permit responsibility administered by the Corps, under Section 404 regulations issued by both the Corps and EPA. Other discharges to U.S. waters are subject to Section 402 of the Clean Water Act administered nationally by EPA with authority for the program delegated to West Virginia and other Appalachian coalfield states. Mountaintop mining operators must also comply with the Endangered Species Act, administered by the FWS. In addition, the Fish and Wildlife Coordination Act (FWCA) pertains to federally-permitted, constructed, or licensed water development projects and land development projects that affect any water body. Whenever OSM, the Corps or EPA authorizes an action within the scope of the FWCA, they are required to consult with the FWS, and counterpart state agencies, to obtain recommendations on ways to mitigate adverse effects on fish and wildlife resources. As a signatory to a recent court settlement, West Virginia is participating with the federal agencies on the interagency workgroup for this project. Other interested Appalachian coalfield states with similar permitting and regulatory authorities have also been invited to participate in the workgroup and to assist with the development of this EIS.

To address the concerns about mountaintop mining and valley fills, the agencies will consider potential revisions to relevant regulations, policies, and guidance that would minimize the potential for adverse individual and cumulative impacts from these mining operations. The EIS will provide information that will help the agencies improve the permitting process to protect water quality and minimize impacts to other environmental resources; it will examine how regulations of the agencies can be better coordinated; and it will consider information on the following: the efficacy of stream restoration; the viability of reclaimed streams compared to natural waters; the impact that filled valleys have on aquatic life, wildlife and nearby residents; the biological and habitat analyses that should be done before, during, and after mining; practicable alternatives for in-stream placement of excess overburden; measures to minimize stream filling to the maximum extent practicable; and the effectiveness of mitigation and reclamation measures. In addition, federal and state agencies have become increasingly concerned over the lack of comprehensive data regarding the cumulative effects of valley fill operations, and have initiated a number of studies to address these data gaps. Accurately describing and quantifying the extent and nature of direct, secondary, and cumulative impacts related to valley fills and associated mining practices will be a specific focus area within the EIS.

This EIS will complement recent efforts to address the issues of mountaintop mining and valley fills. For example, OSM recently completed and issued a draft oversight report entitled "An Evaluation of Approximate Original Contour and Postmining Land Use in West Virginia". Also during 1998, the Governor of West Virginia established a Governor's Task Force, which held public inquiries and evaluated the impacts of mountaintop mining operations on the economy, the environment, and the people of that State. Its report was issued in December 1998. To supplement these efforts, the agencies will also conduct technical symposia and undertake technical studies and field work in support of this project. The contractor will incorporate the findings of these and other ongoing studies identified during the scoping process into the EIS as appropriate and relevant. These studies will be undertaken simultaneously with the regulatory review process described above to confirm or refute hypotheses concerning current regulatory strengths and weaknesses, and to make recommendations for improvement when deficiencies are identified. The synthesis of information from these multiple studies and reviews

will form the base level of information from which recommendations will be made in the EIS.

Development of the EIS will be a joint effort of the interagency workgroup with technical support from the contractor for such tasks as preparation of designated chapters and chapter sections, summaries of technical records, and other technical reports derived from existing records, studies, maps, photos and other such information. The contractor's primary tasks will be to compile and edit the EIS for clarity and continuity. The contractor will also be tasked to collect, compile, and prepare reports summarizing existing data from identified sources (discharge monitoring reports, federal/state files, etc). The interagency workgroup has prepared specific goals and questions the EIS should answer (see Attachment 1 to this Work Assignment). The workgroup will also prepare approaches/workplans to help answer these questions. The contractor will be provided with a copy of these workplans as developed.

5. PURPOSE AND OBJECTIVE

The purpose and objective of the EIS is to develop and analyze alternatives for modifications to federal and state agencies' policies and guidance that will provide for federal/state agency decision-making processes that are coordinated and that minimize, to the maximum extent practicable, the adverse environmental effects of mountaintop mining operations and the disposal of excess spoil in valley fill sites. The purpose of this Work Assignment is to provide the contractor information and direction for the preparation of the specific work plan for this Work Assignment.

6. STATEMENT OF WORK

The contractor is responsible for gathering all of the information necessary for preparation of the written materials as described in the following Tasks. Sources of information may include those agencies and references listed in Attachment 2. As described in the Tasks, other sources of information may be provided by the workgroup or others, through the WAM, during later stages of EIS development.

In all communications, all contractor personnel shall immediately identify themselves as contractors of EPA and shall not represent themselves in any way as employees of EPA. When in meetings with other persons, contractor personnel shall wear identification denoting themselves as contractors.

The documentation to be prepared by the contractor shall include appropriate text, maps, pictures, and data documenting the assigned Task. The documentation shall be written in plain language, succinctly presenting the assigned topic in terms of the purpose of that topic in the overall context of the EIS.

Task 1: The contractor shall prepare a Work Plan within 20 days of receiving the approved Work Assignment.

Task 2: Within 14 calendar days from receiving approval of the Work Plan, the contractor shall meet with the cooperating agencies in Philadelphia to: 1) clarify the scope of analysis for the draft EIS, 2) clarify the Sections of the draft EIS that will be supplemented by agency generated data and/or information, and 3) clarify the agencies' schedules for completing the individual technical studies and regulatory reviews which will be incorporated into the draft EIS by the contractor. At this meeting, the contractor shall provide guidance and advice to the cooperating agencies to facilitate the incorporation of these materials into the draft EIS.

Prior to meeting with the cooperating agencies, the contractor shall identify existing sources of information and/or studies to which it has access and which it can use to form a foundation for writing

various sections of the draft EIS, ie- descriptions of the study area (Appalachia coalfields) and the affected environment; descriptions of mountaintop mining/valley fill operations in Appalachia, including but not limited to alternative mining/valley fill technologies, mountaintop mining and overburden disposal economics, surface mining reclamation procedures, surface mining reclamation outcome studies, studies of the environmental consequences associated with mountaintop mining/valley fill operations (including but not limited to land use, socioeconomics, visual/aesthetics, air quality, noise, traffic/transportation, surface and groundwater, ecosystems, cultural resources, historic resources, archaeological resources, geology, topography, soils, safety, recreation, energy, and potential secondary and cumulative impacts); mitigation measures to reduce impacts from mountaintop/valleyfill operations; and other sections of the draft EIS as may be required to satisfy the purpose and intent of NEPA. The agencies may, at this meeting or at subsequent meetings, identify other potential sources of information that the contractor may be expected to collect during the preparation of the draft EIS.

Task 3: Within 21 calendar days from receiving approval of the Work Plan, the contractor shall prepare a draft Table of Contents for the draft EIS to be delivered to the Work Assignment Manager (WAM). The draft EIS shall include an Executive Summary Section, a Purpose and Need Section, an Environmental Setting Section, an Alternatives Section, and an Environmental Consequences Section.

Task 4: Upon approval of the draft Table of Contents from the WAM, the contractor shall prepare a shell outline of the draft EIS, and shall begin to write those sections for which it has or can readily obtain existing sources of information. The draft EIS shall contain the following broad topical areas:

A. Executive Summary: This section shall provide a basic summary of the draft EIS, including a description of mountaintop mining/valley fill operations and the policies, guidelines, and regulations governing these operations; the administrative process that was undertaken to evaluate the effectiveness of these policies, guidelines, and regulations in minimizing site specific and cumulative environmental impacts; and the preferred alternatives that might be undertaken to avoid/minimize the identified effects.

B. Purpose and Need Section: This section shall describe the background information leading to the development of this draft EIS, including a summary of the December 23, 1998 settlement agreement between Patricia Bragg, et al. and Colonel Dana Robertson et al.; a summary of the goals and questions document prepared by the cooperating agencies (Attachment 1); a summary of the information that has already been published in the Federal Register and/or appears in Sections 4 and 5 above, and a summary of the public involvement/scoping process undertaken for this draft EIS. A copy of the settlement agreement and the Federal Register publication referenced above will be provided to the contractor at the kick off meeting described in Task 2 above. A summary of the public involvement/scoping process undertaken for this draft EIS will be provided to the contractor by June 1999.

C. Environmental Setting: This section shall describe the environmental, socioeconomic, and regulatory setting in the Appalachia coalfield region. The approach taken in EPA's *An Ecological Assessment of the United States Mid-Atlantic Region: A Landscape Atlas* shall be one approach taken to characterize the broad ecological environmental condition within the region. A copy of this document will be provided to the contractor during the kick off meeting described in Task 2 above. Site specific data sets shall be utilized to verify these broad characterizations and/or to assess the impacts that can be associated with mountaintop mining/valley fill operations in this or later sections of the draft EIS. Per Task 2 above, the contractor shall have identified datasets currently under its control that may be utilized to verify or help characterize airsheds; watersheds; aquatic and terrestrial ecosystems; historic, cultural, and archeological resources; communities; and other resources that are effected by mountaintop mining/valley fill operations in the region. The contractor shall also have identified datasets currently

under its control that can be used to map historic, existing, and future mountaintop mining/valley fill operations in the region. This information may be used to supplement existing or planned technical studies being undertaken by the cooperating agencies and others. Finally, as part of this section, tables and/or charts shall be prepared summarizing the current statutes and regulations governing mountaintop mining/valley fill operations in the Appalachian coal fields. As necessary, copies of statutes and regulations, along with any other pertinent agency reports, will be provided to the contractor by the cooperating agencies through the WAM. The analysis shall include identification of areas of potential conflict regarding such elements as definitions and timing of regulatory processes, as well as areas where the regulatory processes complement one another.

D. Alternatives Considered: This section shall describe existing mining/valley fill operations in the context of current permitting and reclamation procedures as the “no action alternative”; various alternative policies, guidelines, and regulations governing mountaintop mining/valley fill practices that might be employed to minimize or avoid impacts (alternative mining methods; alternative engineering practices; alternative waste disposal practices or siting procedures; alternative mitigation, compensation, and/or reclamation practices; etc); and the no filling alternatives. This section shall evaluate the general benefits and costs that might be expected under each of these alternative scenarios, and identify those alternatives that are not considered feasible and which have been eliminated from further study. The specific and cumulative environmental and socioeconomic impacts of the various alternatives carried forward shall be discussed in the Environmental Consequences Section of the draft EIS.

E. Environmental Consequences: This section shall examine the site specific and cumulative environmental and socioeconomic effects associated with the alternative mountaintop mining/valley fill scenarios carried forward from Task 2.D., including the effects on air, noise, water resources, fish and wildlife resources, employment, terrestrial resources, visual and aesthetic qualities, local/State/Federal taxes and revenues, takings implications, land use, traffic and transportation, historic and archaeological resources, energy, and other areas identified in the scope of analysis prepared by the agencies. Using information from existing datasets or from field work to be undertaken by the agencies or others, the draft EIS shall examine impacts that have occurred at representative mining sites under existing regulatory processes and procedures; evaluate potential long term cumulative impacts under various mining scenarios using the Landscape Approach described above or through alternative approaches identified by the contractor and approved by the agencies; and examine the benefits/costs associated with employing different mining, engineering, mitigation, compensation, or reclamation procedures to avoid or minimize identified environmental effects.

In performing this Task, the contractor shall collect, compile, and summarize existing data found in State and/or Federal files. For example, in assessing impacts to streams under the current regulatory scenario, the contractor may be tasked with collecting, compiling, and summarizing water chemistry and/or benthic data from permit application submissions, discharge monitoring reports, and/or other reports that exist in EPA, WVDEP, or other federal/state files. From these data, comparisons of baseline chemistry and benthic data to discharge and monitoring report data could be made, changes from baseline conditions could be evaluated, and alternatives to minimize impacts might be identified. Subsections to be prepared directly by the agencies will be left open as place holders. Subsections to be supplemented with information or technical studies supplied/performed by the agencies shall be drafted initially by the contractor and revised as appropriate during later stages of draft EIS development. The contractor shall supply the WAM with an electronic version (Word Perfect 6.1) of the working draft EIS by 7/30/99.

Task 5: The contractor shall meet with the cooperating agencies in Philadelphia during the week of August 30, 1999 to discuss progress made on the draft EIS. The cooperating agencies will be prepared to

make recommendations regarding necessary revisions to the Table of Contents or to the body of the draft EIS as currently written. Technical studies or regulatory reviews that have been completed or otherwise identified by the Agencies for incorporation into the draft EIS will be submitted to the contractor at or following this meeting. In addition, new data compilation activities to be undertaken by the contractor will be identified. Finally, graphics that will be presented in the draft EIS will also be identified by the agencies for development by the contractor. As directed by Task 6 below, the contractor shall revise the appropriate sections of the draft EIS to incorporate the new information. Schedules for completion of identified "gaps" will be developed as appropriate.

Task 6: Based upon the information and comments received as the result of Task 5 above, the contractor shall make the necessary revisions to the draft EIS, including the development of any new graphics, and submit a revised working draft EIS electronically (Word Perfect 6.1) to the EPA WAM by December 31, 1999. Graphics shall be submitted in hard copy to the EPA WAM as appropriate.

Task 7: The contractor shall meet with the cooperating agencies in Philadelphia during the week of January 31, 2000 to discuss the revised draft EIS. The cooperating agencies will be prepared to make recommendations regarding necessary revisions to the body of the draft EIS as currently written, or to the graphics that have been developed. New technical studies or regulatory reviews that have been completed or otherwise identified by the Agencies for incorporation into the draft EIS will be submitted to the contractor at or following this meeting, and the contractor will revise the appropriate sections of the draft EIS to incorporate the new information during Task 8 below. Additional graphics that will be presented in the draft EIS will also be identified by the agencies for development by the contractor. Schedules for completion of identified "gaps" will be developed as appropriate.

Task 8: Based upon the information and comments received as the result of Task 7 above, the contractor shall make the necessary revisions to the draft EIS, including the development of any new graphics, and submit a revised working draft EIS electronically (word Perfect 6.1) to the EPA WAM by March 31, 2000. Graphics shall be submitted in hard copy to the EPA WAM as appropriate.

Task 9: The contractor shall meet with the cooperating agencies in Philadelphia during the week of May 1, 2000 to discuss final revisions to the revised preliminary EIS. As directed by the WAM, the contractor shall revise the appropriate sections of the EIS.

Task 10: A Camera Ready Copy of the Draft Environmental Impact Statement shall be delivered to the EPA WAM by 5/19/00. Minor revisions, if necessary, shall be completed by the contractor by 5/31/00.

7. TRAVEL

The contractor shall travel to the EPA Region III office and to other Federal, State, and local offices located in Pennsylvania, West Virginia, and other Appalachian coalfield states. Up to fifteen (15) trips are anticipated for completion of this Work Assignment. For planning purposes, trips shall consist of four (4) trips to Philadelphia, PA to meet with the cooperating agencies and to collect data and information from EPA Region III files; five (5) trips to Charleston/Nitro, WV to attend technical agency meetings and/or to collect data and information from OSM, WVDEP OMR/OWR, USGS, and/or mining company files; two (2) trips to Lexington, KY to collect data and information from KYDEP and/or KYDSMRE files; one (1) trip to Pittsburgh, PA to attend technical agency meetings and/or to collect data and information from OSM files; one (1) trip to Huntington, WV to collect data and information from Corps, Marshall University and/or mining company files, one (1) trip to State College, PA to attend technical meetings and/or to collect data and information from FWS files; and one (1) trip to

Morgantown, WV to collect data and information from WV University files.

The contractor shall follow the requirements of Subpart 31.2 of the FAR and the Federal regulations in incurring allowable travel costs under this Work Assignment, and correspondingly must at all times seek and obtain Government rates whenever available and observe current subsistence ceilings.

8. SCHEDULE OF DELIVERABLES

Task	Deliverable	Schedule
1	The contractor shall develop a Work Plan for this Work Assignment.	20 days from the approval of the Work Assignment
2	The contractor shall meet in Philadelphia with the cooperating agencies and provide a written list of existing sources of information and/or studies to which the contractor has access and from which the contractor will be able to prepare various sections of the subject EIS.	14 days from the approval of the Work Plan
3	The contractor shall prepare a draft Table of Contents for the EIS.	21 days from the approval of the Work Plan
4	The contractor shall submit an electronic version (WP 6.1) of the working draft EIS to the EPA WAM.	By July 30, 1999
5	The contractor shall meet with the cooperating agencies in Philadelphia.	Week of August 30, 1999
6	The contractor shall submit an electronic version (WP 6.1) of the revised working draft EIS and hard copy of applicable graphics to the EPA WAM.	By December 31, 1999
7	The contractor shall meet with the cooperating agencies in Philadelphia.	Week of January 31, 2000
8	The contractor shall submit an electronic version (WP 6.1) of the revised working draft EIS and hard copy of applicable graphics to the EPA WAM.	By March 31, 2000
9	The contractor shall meet with the cooperating agencies in Philadelphia.	Week of May 1, 2000
10	The contractor shall deliver a Camera Ready Copy of the Draft Environmental Impact Statement to the EPA WAM.	By May 19, 2000 with possible minor revisions to be completed by the contractor by May 31, 2000.

For planning purposes, please provide a cost estimate for the total Work Assignment, segregating costs associated under Option Period 3.

9. REPORTING REQUIREMENTS

The Contractor shall contact the Project Officer and/or the WAM by telephone to discuss any problems that may adversely affect the work on this Work Assignment. Within five calendar days, the contractor shall follow the phone call with a brief written explanation of the problem, including any actions already taken, and/or recommended solutions to correct the problem.

10. ATTACHMENTS

Attachment 1: Goals and Questions Document

Attachment 2: List of potential sources of information

COOPERATING AGENCY GOALS AND QUESTIONS TO BE ADDRESSED

I. GOALS FOR THE EIS

Goals for the EIS are expressed from several different perspectives: environmental, regulatory, and public service.

- EIS purpose. Determine the impact on environmental resources from the size and location of excess spoil disposal in valley fills associated with mountaintop mining operations, and determine the impacts of mountaintop mining on waters of the United States and fish and wildlife resources. Determine the proposed action and develop/evaluate a range of reasonable alternatives to the proposed action. Consider the impacts, some of which may be significant, that the EIS will have on existing agency programs.

- Assessment of mining practices. The EIS should show how -- by examining mining technology and comparing practices for prevention of environmental damages and reclamation that have or could have been used at selected existing mining sites -- such mining operations might be carried out in a way that minimizes adverse impacts to streams and other environmental resources and to local communities. It should assess the extent to which implementation of such practices might be limited by economic constraints; and assess the future economic benefits such practices might produce (e.g. fisheries, forestry, recreation). What are the most practical techniques? Are there insurmountable technical limitations? Or financial constraints and tradeoffs?

- Assessment of cumulative effects. The EIS should use cost-effective, state-of-the-art techniques to assess the likely cumulative environmental effects of mountaintop mining operations and associated valley fills, based on mining company projections of mining activity during at least the next 20-30 years (with projections to show sensitivity at different coal prices).

- Clarifying choices. The EIS should seek to demonstrate the extent to which, and how, proposed mountaintop mining in West Virginia and other Appalachian coalfield states can be carried out in an environmentally-sustainable manner. Are there cost effective ways to enhance existing mining, reclamation, mitigation processes and/or procedures that would assure West Virginians, for example, that they do not have to make the choice between mining jobs and irrevocable loss of their environment amenities?

- Environmental evaluation of individual mining projects. The EIS should examine how to improve environmental assessment and design of individual mining projects, starting with requirements for the mining company's own planning process and selection of mining practices, reclamation techniques, hydrologic/drainage practices, buffer zones, etc. It should identify what water quality, habitat and other environmental evaluations need to be performed prior to mining (for example, by mining companies) and used in the decision-making process by the companies and the regulators.

- Improved capacity for decision-making. The way in which the EIS process is carried out should be designed so as to improve communication among the mining companies, the regulatory

agencies, environmental groups, and landowners and enhance everyone's understanding of options and consequences. It should be organized as a progressive learning experience and capacity-building process which leaves everyone better able to make intelligent choices about the future.

- Improved regulatory tools. At the end of the EIS process, the regulatory agencies should have designed better tools for making SMCRA, 404, 402 and FWS program decisions efficiently, in a way that is coordinated, takes advantage of complementary goals in the Federal laws and regulations, and serves the public interest. They will be working towards this goal from the very beginning of the EIS process, as they work to make coordinated permit decisions in the interim, develop and share technical information through the "Four agency" studies, evaluate each others' policies and practices, and discuss regulatory improvements. (An example is to see how state SMCRA decisions could be more "NEPA-like".) This goal might be attained through monthly, facilitated sessions to review particularly important policies or to discuss procedural and communication issues.

II. SPECIFIC QUESTIONS THE EIS SHOULD ANSWER

A. Definitions and measures

- (1) What is a stream? The agencies should develop a mutually acceptable approach for reconciling the interagency and interstate differences concerning the definition of streams.
- (2) How will we measure the effects (impacts) of mountaintop mining operations and associated valley fills on streams? On aquatic life, wildlife and nearby residents?
- (3) Once effects are measured, how will we define what is "impacted" and the "significance" of that effect? How will we determine what is the impact area (watershed)?
- (4) How effectively can we assess cumulative impacts and apply threshold concepts through landscape ecology or other (cost-effective) methods?
- (5) What are the most appropriate qualitative and quantitative measures of effectiveness of stream restoration? Of forest/habitat impact and restoration?

B. Environmental impact assessment

- (1) What are the short- and long-term effects of individual mountaintop mining operations and associated valley fills on the following:
 - a. physical, chemical and biological conditions of affected streams and their watersheds, both within the area of direct impact and downstream, and including surface and groundwater. Consider both water quality and quantity. Consider changes on aquatic habitat, and stream use.
 - b. terrestrial habitats and wildlife populations (with emphasis on migratory birds and mammals) within and adjacent to the mined and filled areas?
- (2) What are the cumulative short- and long-term effects of mountaintop mining operations and associated valley fills on 1(a) and (b) above, when considered together with all other surface disturbing activities within given watersheds of varying size? The answer to this question should include a complete inventory of past and expected future stream and terrestrial area effects (i.e. miles of streams and square miles of terrestrial habitat impacted/lost.)

- (3) What are the expected effects evaluated in questions 1. and 2. likely to be on aquatic and terrestrial species of federal and state concern (i.e. listed and proposed threatened and endangered species, candidate species and species of special concern)?
- (4) What are the relative individual and cumulative effects of a single large valley fill versus multiple small headwater fills on the receptors evaluated in 1(a) and (b) above? In answering this question, assess the relative value of headwaters and their contribution to the physical, chemical and biological health of the larger watershed.
- (5) How do we reach a better scientific consensus on the water quality/aquatic habitat values of valley headwater streams so that the on-site impacts of fills, and the resulting mitigation, restoration and reclamation requirements can be judged more effectively -- both in the fill area and downstream? What does "minimize" environmental damages mean in this context?
- (6) How do we evaluate and improve stream restoration practices so that ecological health and viability are returned to waters on mined landscapes; how quickly can ecological restoration be achieved; what is the extent and nature of irreversible loss of stream habitat from mining?
- (7) How do we evaluate and improve forest reclamation practices so that forest fragmentation and habitat disruption are considered over time? If there are competing uses for mined land, what are the key indicators from an environmental standpoint for determining which areas can be developed (e.g. farming, sport hunting habitat, commercial forestry, development) and which areas should be returned to their pre-mining state (e.g. characteristic mixed hardwood forest)?
- (8) How effective have the reclamation practices and compensatory mitigation measures required to date for mountaintop removal and other mountaintop mining operations, and for valley filling, been in offsetting the adverse effects of such activities on aquatic and terrestrial environments? What have been the frequency, results and effectiveness of follow-up compliance monitoring?
- (9) What are projections for the extent of mountaintop mining in the Appalachian coalfields in the future. What impacts will the future projections have on environmental resources, including waters of the U.S. and fish and wildlife? What are the regional, national and worldwide trends in mining technology and economics that are driving Appalachian coalfield developments? Are they readily reconcilable with environmental protection and restoration?
- (10) After evaluating the combined effects of mining and other surface disturbing activities, and the offsetting effects of reclamation and compensatory mitigation, what are the expected net cumulative effects of existing, ongoing and all viable future mountaintop mining operations on the aquatic and terrestrial environments of the Appalachian coalfields region? What impacts will the future projections have on environmental resources, including waters of the U.S. and fish and wildlife?
- (11) If regulatory action limits mountaintop mining and/or associated valley fills, what impacts would the possible alternative mining methods have on environmental and socio-economic resources?
- (12) What are the socio-economic impacts, both positive and negative, associated with mountaintop mining and valley fills? These may include values associated with postmining land use change, removal from market of coal not economically accessible by other mining methods (and associated takings claims), aesthetics, tourism, the heritage of mountain residents, and other factors.
- (13) How well are the existing processes meeting the desired outcomes of the regulations?

C. Preliminary Actions and alternatives

- (1) What environmental analyses should be required before a mining plan is submitted? During mining? After mining and reclamation end?
- (2) What criteria should be used to determine whether a fill may be placed in a stream?
- (3) What alternatives to valley filling are available to industry?
- (4) To what degree are the drainage control measures being established on fills able to replace aquatic habitats that existed prior to construction of the fill, and can designs be modified to further enhance or accomplish this?
- (5) Are fills adequately stable under the current regulatory scheme? If not, why and what alternatives are available?
- (6) Regarding the success of current reclamation plans for mountaintop mines and valley fills in replacing premining terrestrial habitats, can designs be modified to further enhance or accomplish this?
- (7) Regarding the effectiveness of existing forms of mitigation associated with valley fills in replacing or providing substitute resources, can existing forms of mitigation be modified to further enhance or accomplish this?
- (8) What areas of regulation, policy, technical guidance, communications and procedures can be improved to meet the goal of minimizing adverse environmental impacts associated with mountaintop mining operations? Are the improved regulatory systems changes feasible to implement and how? How can we design a regulatory process that is both more effective -- in terms of quality and timeliness of decisions -- and also less burdensome in terms of agency expenditures?
- (9) Agencies need to ascertain and consider how the public will judge the effectiveness of the EIS.

ATTACHMENT 2

LIST OF POTENTIAL SOURCES OF INFORMATION

<i>Title</i>	<i>Author</i>	<i>Description</i>	<i>Location</i>	<i>comments</i>
Multi-Resolution Land Characteristics Interagency Consortium		various publications and projects http://www.epa.gov/mrlc		source of landscape information
Determination of Aquifer Characterization in Spoil Generated by Mountaintop Removal: Valley Fill Coal-Mining Process	Dinger, J.S. and D.R. Wunsch (KY Geological Survey); 9/91		KY Dept. for Surface Mining Reclamation & Enforcement	
Aerial Photo Interpretation of Valley-fills in Selected Quads of WV	EPIC, 1998	ArcView summary of drainage way impacts	EPAIII (Rider/West)	draft, 20 quads
Regionalization as a tool for managing environmental resouces.	Gallant, A.L., T.R. Whittier, D.P. Larsen, J.M. Omernik, and R.M. Hughes. USEPA Environmental Research Lab, Corvallis, OR. 152p.1989.	EPA publication EPA/600/3-89/060		
Shear Strength Parameters for Excess Spoil Disposal	Hribar, J. A. and P. M. Winberly, (GAI Consultants, Inc.); 7/86		OSM	
Hydrogeology, Hydrogeochemistry, and Spoil Settlement at a Large Mine-spoil Area in Eastern KY: Star Fire Tract	Kentucky Geological Survey, Wunsche, D.R; et al., 1996	Report of Investigations 10, Series XI, 1996	EPAIII	missing pages

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LIST OF POTENTIAL SOURCES OF INFORMATION

<i>Title</i>	<i>Author</i>	<i>Description</i>	<i>Location</i>	<i>comments</i>
An Overview of New Surface Mining Methods of Steep Slopes in the Appalachia Region	Lusk, B.E., Pres. WV Surface Mining & Reclamation; 9/22-25/74		SME at AIME	
Level III ecoregions of the continental United States, Map M-1	National Health and Environmental Health Effects Research Laboratory, Corvallis, OR, 1995	revised Map of ecoregions		
Disposal of Excess Spoil from Coal Mining & Surface Mining Control and Reclamation Act of 1977	National Research Council; 1981		OSM	
Surface Coal Mining Effects on Ground Water Recharge	National Research Council; 4/90	assessment of technologies to assess ground water		
Analysis of the Permitting Requirements of the Surface Mining Control and Reclamation Act and the Corps of Engineers 404 Program	Neville, A.G. and J.K. Sullivan; Smithsonian Institution; 4/84	OSM initiated study to compare regulatory requirements		
Ecoregions of the coterminus United States. Map (scale 1:7,500,000). Annals of the Association of American Geographers 77(1):118-125.	Omernik, J.M., 1987	Map of ecoregions		
Handbook on Procedures for Implementing the National Environmental Policy Act	Orellania, A. M. (Hart Associates, Inc.); 1981	NEPA handbook for OSM		

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LIST OF POTENTIAL SOURCES OF INFORMATION

<i>Title</i>	<i>Author</i>	<i>Description</i>	<i>Location</i>	<i>comments</i>
Four Agency Fills Committee/State Meeting	OSM, December 8, 1998	Outline Materials distributed at meeting; Barborsville, WV	EPA III	looseleaf form
Monitoring environmental quality at the landscape scale.	O'Neill, R.V., C.T. Hunsaker, K.B. Jones, K.H. Riitters, J.D. Wickham, P. Schwarz, I.A. Goodman, B. Jackson, and W.S. Baillargeon. BioScience 47(8):513-519.			
A Landscape atlas of the Chesapeake Bay Watershed. Second Edition	Riitters, K.H., J.D. Wickham, and K.B. Jones. Tennessee Valley Authority, Norris, TN. 29p. 1996		EPAlII	
Assessing habitat suitability at multiple scales: a landscape-level approach.	Ritters, K.H., R.V. O'Neill and K.B. Jones. Biol. Cons. 81:191-202. 1997			
Evaluation of Methods for Handling and Burial of Toxic Strip Mine	Robins & Associates; 8/14/81	Spoil - Phase II Report	OSM	
Inventory of West Virginia Valley Fills	SAIC, 1998	spreadsheet of miles of streams impacted in WV. From CHIA maps provided By Dan Ramsey, USFWS	EPAlII	draft, only selected counties
Analysis of Valley Fill Impacts using Benthic Macroinvertebrates	SAIC, 1998	Report comparing post filling water quality and benthic macroinvertebrates with pre-mining conditions	EPAlII	draft, limited by lack of data

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Environmental Assessment of Surface Mining Methods: Head-of-Hollow Fill and Mountaintop Removal. Vol 1.	Skelly and Loy for USEPA, 1984	EPA-600/7-84-010a, 1984 “State of the art” review for date	EPAn	
Development of New Design Concepts for Construction of Valley-Fills	Skelly and Loy Consultants; 10/78		OSM	
Environmental Assessment of Surface Mining Methods: Head-of-Hollow Fill and Mountaintop Removal. Vol 2.	Skelly and Loy for USEPA, 1984	EPA-600/7-84-010b, 1984 long-term stability	EPAn	
Benthic Evaluation for: Pigeonroost Branch, Oldhouse Branch, and White Oak Branch	Sturm Environmental Services, 1998	Hobet Mining, Inc. Spruce No. 1 Surface Mine	EPAn	bio survey for permit
State of the mid-Atlantic forests.	US Forest Service, Southern Research Station, Research Triangle Park, NC, 1999	Forest landscape analysis		Draft (1999)
Engineering and Design Manual for Disposal of Excess Spoil	USDI, OSM; 5/83			
Mid-Atlantic State of the Streams	USEPA, Western Ecology Division, National Health and Environmental Effects Research Laboratory, Corvallis, OR, 1999			in progress (1999)
Effectiveness of Surface Mine Sedimentation Ponds	USEPA, Industrial Environmental Research Laboratory, ORD	EPA-600/2-76-117, 1976 Properly constructed and maintained ponds are effective in protecting streams.	EPAn	

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Ecological Risk Assessment	USEPA Region III, (Kutz, Esher)	Establish on-site evaluation procedures	EPA III	Proposal in progress
Statement of Mutual Intent	USEPA, COE, OSM, FWS	Inter-agency agreement ncludes scope of work for 5 technical study areas.	OSM	Draft-October 8, 1998 unsigned
An Ecological Assessment of the United States Mid-Atlantic Region: A Landscape Atlas	USEPA, Office of Research and Development, Washington, DC. 104p. 1997	EPA publication EPA/600/R-97/130	EPAn	
Valley Fill/Mountaintop Removal Technical Report	USEPA Region III, December 4, 1998	Summary of internal EPA investigations	EPAn	Bundled draft report
Aerial Photography study	USEPA, EPIC, 1998	Survey of 20 USGS Quads for valley-fill impacts. CD data base includes ArcView format: disturbed area, drainageway impacts, forest impacts.	EPAn	
Landscape Ecology	USEPA Region III, (Pomponio, Esher)	Description affected EIS environment	EPA III	Proposal in progress
Forest Fragmentation Assessment	USEPA Region III, (Forren, Esher)	Investigate forest changes	EPA III	Proposal in progress
Stream Restoration Opportunities	USEPA Region III, (Bryant)	Evaluate impact of restored streams	EPA III	Proposal in progress

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Areawide Environmental Assessment for Issuing New Source NPDES Permits	USEPA Region III by WAPORA, Inc., 1980-81.	7 watershed volumns: Coal/Kanawha; Monongahela; Guyandotte; Gauley; N. Branch Potomac; Ohio; Elk	EPA III (Lib/Rider)	technical basis for standard environmental reviews of new source coal mine permit applications as required by NEPA and CWA
Preliminary Habitat Evaluation for Hobet Spruce No. 1 Mine Site, Logan County, West Virginia	USFWS, State College November 11, 1998 (draft)	Abbreviated HEP study	EPA III	Draft
Permitted Stream Losses Due to Valley Filling in KY, PA, VA, and WV: A Partial Inventory	USFWS Ecological Services Field Offices, 1998	documents 897 miles of impacted streams but is not exhaustive, actual losses is expected to be higher	EPAn	includes only 5 counties in WV
Water-Quality Assessment of the Kanawha-New River Basin, WV, VA, and NC - Review of Water Quality Literature Through 1996	USGS, Terrence Messinger, 1997	Surface water-quality has been affected by coal mining, improper waste disposal and industrial activities in this 12,223 square mile drainage area.	EPAn	summary of references
Preliminary Valley Fill Inventory	WVDEP Office of Mining and Reclamation	table listing proposed and existing mining associated fillsincluding length of drainage ways to top of ridge.	EPAn	60+ pages