ENVIRONMENTAL PROTECTION AGENCY
EPA-R03-OW-2009-0985
Proposed Determination to Prohibit, Restrict, or Deny the Specification, or the Use for Specification (including Withdrawal of Specification), of an Area as a Disposal Site; Spruce No. 1 Surface Mine, Logan County, West Virginia
AGENCY: Environmental Protection Agency (EPA)
ACTION: Notice

SUMMARY: Pursuant to Section 404(c), the United States Environmental Protection Agency Region III (EPA) is requesting public comments on its proposal to withdraw or restrict use of Seng Camp Creek, Pigeonroost Branch, Oldhouse Branch, and certain tributaries to those waters in Logan County, West Virginia to receive dredged and/or fill material in connection with construction of the Spruce No. 1 Surface Mine (Spruce No. 1 Mine or the project).

An important part of EPA's mission is to ensure our environment and public health are protected and restored for current and future generations. Among ways that EPA carries out its mission is by ensuring appropriate implementation of the Clean Water Act. Section 404(c) of the Clean Water Act (CWA) authorizes the U.S. Environmental Protection Agency (EPA) to prohibit, restrict, or deny use of any defined area in waters of the United States for specification (including the withdrawal of specification) for the discharge of dredged and/or fill material whenever it determines, after notice and opportunity for public hearing, that use of such sites to receive dredged and/or fill material would have an unacceptable adverse impact on various resources, including fisheries, wildlife, municipal water supplies, and recreational areas. This authority is often referred to as EPA's authority to "veto" a CWA Section 404 permit to discharge dredged and/or fill material to waters of the United States.

The Spruce No. 1 Mine is one of the largest surface mining operations ever authorized in Appalachia. In connection with this project, Mingo Logan Coal Company (permittee) has been authorized by the U.S. Army Corps of Engineers, Huntington District (Corps) (Department of the Army Permit No. 199800436-3 (Section 10: Coal River)) to construct six "valley fills" and numerous sedimentation ponds in Seng Camp Branch (already partially constructed), Pigeonroost Branch (not yet constructed), Oldhouse Branch (not yet constructed), and certain tributaries to those waters by discharging excess overburden (or spoil) generated by surface coal mining operations. The project as authorized will directly impact 2,278 acres, including more than seven miles of stream, and indirectly impact other waters. EPA Region III acknowledges the project has undergone extensive regulatory review and has been modified from the original proposal in order to reduce impacts. EPA Region III is taking this action because it believes, despite all the regulatory processes intended to protect the environment, that construction of Spruce No. 1 Mine as authorized would destroy streams and habitat, cause significant degradation of on-site and downstream water quality, and could therefore result in unacceptable adverse impacts to wildlife and fishery resources. These impacts are described in more detail in Section IV below.

The goal of protecting water quality, plant and animal habitat, navigable waterways, and other downstream resources requires the careful protection of headwater streams and life they support. These streams are like the capillaries within our circulatory system. They are the largest network of waterbodies within our ecosystem and provide the most basic and fundamental building blocks to the remainder of the aquatic and human environment.

Applying the lessons of the past, we now know that failure to control mining practices has resulted in persistent environmental degradation in the form of acid mine drainage and other impacts that cost billions to remedy. While the Surface Mining Control and Reclamation Act (SMCRA), the CWA, and other laws have put in place controls addressing some environmental impacts, including acid mine drainage, recent studies and experience point to new environmental and health challenges that were largely unconsidered until more recently. We know the regulatory controls currently in place have not prevented adverse water quality and aquatic habitat impacts from other surface mining operations. We also know the same types of impacts as those anticipated from this project have had previously unforeseen environmental consequences.

Public health issues surrounding the types of impacts associated with the Spruce No. 1 project are not well understood. EPA has been presented with household-specific and anecdotal information that suggests individual and possibly public surface water and ground water supplies could be adversely impacted by surface coal mining activities. In addition, recent published studies directly relate intensity of surface mining activities within Appalachia to degraded public health and mortality. EPA has been presented with a petition from a variety of local stakeholders that outlines many of these concerns and further relates them to issues of environmental justice.

Ultimately, EPA's process will result in one of three outcomes: (1) EPA could withdraw specification of the site as a disposal site and decide to use its discretion to prohibit any discharges from the project, including the construction of valley fills; (2) EPA could restrict specification of the site as a disposal site and decide the project cannot go forward under the permit as currently issued, but could go forward under a modified permit with more environmentally protective conditions; or (3) EPA could decide the permit as currently issued is sufficiently protective.

EPA seeks comment on this proposed Section 404(c) determination to withdraw, prohibit or restrict use of Seng Camp Creek, Pigeonroost Branch, Oldhouse Branch, and their tributaries in Logan County, West Virginia, to receive dredged or fill material in connection with construction of the Spruce No. 1 Surface Mine as currently authorized by the January 22, 2007 Department of the Army (DA) Permit No. 199800436-3 (Section 10: Coal River). See Solicitation of Comments, at the end of the public notice, for further details.

Dates: Comments must be received in writing by ***[insert by the Federal Register: date 60 days from FR publication].***

Addresses: Submit your comments, identified by Docket ID No EPA-R03-OW-2009-0985, by one of the following methods:

1. **Federal eRulemaking Portal** (recommended method of comment submission): http://www.regulations.gov. Follow the online instructions for submitting comments.

2. **E-mail: ow-docket@epamail.epa.gov**. Include the docket number, EPA-R03-OW-2009-0985, in the subject line of the message.

3. **Mail**: ''EPA-R03-OW-2009-0985, Spruce No. 1 Surface Mine,''
U.S. Environmental Protection Agency
EPA Docket Center Water Docket, Mail Code 28221T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

4. **Hand Delivery or Courier**: Director, Office of Environmental Programs; Environmental Assessment and Innovation Division; U.S. Environmental Protection Agency, 3EA30 Region III; 1650 Arch Street, SW; Philadelphia, Pennsylvania 19103. Such deliveries are accepted only during the Regional Office's normal hours of operation, which are Monday through Friday, 8:30 a.m. to 4:30 p.m., excluding federal holidays.

5. **Submit at Public Hearing**: see PUBLIC HEARING section below. Instructions: Direct your comments to Docket ID No. EPA-R03-OW-2009-0985.

EPA's policy is that all comments received will be included in the public docket without change and may be made available online at http://www.regulations.gov, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit through http://www.regulations.gov or e-mail, information that you consider to be CBI or otherwise protected. The http://www.regulations.gov website is an ''anonymous access'' system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through http://www.regulations.gov, your e-mail address will be automatically captured and included as part of the comment placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at http://www.epa.gov/epahome/dockets.htm.

Docket: All documents in the electronic docket are listed in the http://www.regulations.gov index. Although listed in the index, some information is not publicly available, i.e., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will

be publicly available only in hard copy form. Publicly available docket materials are available either electronically in http://www.regulations.gov or in hard copy at the Office of Environmental Programs; Environmental Assessment and Innovation Division; U.S. Environmental Protection Agency, Region III; 1650 Arch Street; Philadelphia, Pennsylvania 19103. EPA requests that if at all possible, you contact the office listed in the FOR FURTHER INFORMATION CONTACT section to schedule your inspection. The EPA Region III Office's official hours of business are Monday through Friday, 8:30 a.m. to 4:30 p.m., excluding federal holidays.

Public Hearing: In accordance with EPA regulations at 40 CFR 231.4, the Regional Administrator may decide that a public hearing on a proposed Section 404(c) determination would be in the public interest. A separate public notice will be published in advance of any hearing in the Federal Register and local newspapers to announce the date, time and location of the hearing and describe hearing procedures. Written comments may be presented at the hearing.

FOR FURTHER INFORMATION CONTACT: For information regarding this notice of proposed Section 404(c) determination, contact the Office of Environmental Programs; Environmental Assessment and Innovation Division; U.S. Environmental Protection Agency, Region III; 1650 Arch Street; Philadelphia, Pennsylvania 19103. The telephone number is 215-814-2760. The Office can also be reached via electronic mail at R3_Spruce_Surface_Mine@epa.gov. This is for information on the notice only and is not the official comment submission forum. Please see the previous section for directions on submitting comments on the Proposed Determination.

SUPPLEMENTARY INFORMATION:

Throughout this document, references to "EPA," "we," "us" or "our" are references to the Environmental Protection Agency. References to the "Corps" refer to the U.S. Army Corps of Engineers. References to "WVDEP" refer to the West Virginia Department of Environmental Protection. References to Seng Camp Creek, Pigeonroost Branch and Oldhouse Branch also refer to tributaries to those waters that would be impacted by the project as authorized. The supplementary information is arranged as follows:

B. Wildlife
    1. Invertebrates
    2. Vertebrates
        a. Salamanders
        b. Fish
        c. Birds
        d. Bats

IV. BASIS FOR PROPOSED DETERMINATION

A. Section 404(c) Standards
B. Adverse Impacts of the Proposed Project
    1. Impacts to Wildlife
        a. Freshwater Macroinvertebrates
        b. Salamanders
        c. Fish
        d. Birds
        e. Bats
    2. Impacts to Water Quality
        a. Selenium
        b. Total Dissolved Solids/Conductivity
    3. Potential to Contribute to Conditions that Support Growth of Toxic Golden Algae
    4. Proposed Mitigation May Not Offset Anticipated Impacts to an Acceptable Level
    5. Consistency with the 404(b)(1) Guidelines
        a. Alternatives
        b. Water Quality

V. PROPOSED DETERMINATION

VI. OTHER CONSIDERATIONS

A. Environmental Justice
B. Cumulative Effects

VII. SOLICITATION OF COMMENTS

I. SECTION 404(C) PROCEDURE

The Clean Water Act (CWA) 33 U.S.C. 1251, et seq., prohibits the discharge of pollutants, including dredged or fill material, into waters of the United States (including wetlands) except in compliance with, among other provisions, Section 404 of the CWA, 33 U.S.C. 1344. Section 404 authorizes the Secretary of the Army, acting through the Chief of Engineers (Corps), to authorize the discharge of dredged or fill material at specified disposal sites. This authorization is conducted, in part, through application of environmental guidelines set forth in regulations developed by EPA in conjunction with the Corps under Section 404(b) of the CWA, 33 U.S.C. 1344(b) (Section 404(b)(1) Guidelines).

Section 404(c) of the CWA authorizes EPA to prohibit specification (including the withdrawal of specification) of any defined area as a disposal site, and EPA is authorized to restrict or deny use of any defined area for specification (including withdrawal of specification) as a disposal site, whenever it determines, after notice and opportunity for public hearing, that the discharge of such materials into any defined 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.

Procedures for implementing Section 404(c) are set forth in 40 CFR Part 231. Under those procedures, if the Regional Administrator has reason to believe that use of a site for discharge of dredged or fill material may have an unacceptable adverse effect on one or more of the aforementioned resources, he may initiate the Section 404(c) process by notifying the Corps and applicant/permittee (and/or project proponent and landowner(s)) that he intends to issue a proposed determination. Each of those parties then has 15 days to demonstrate to the satisfaction of the Regional Administrator that no unacceptable adverse effects will occur, or that corrective action to prevent an unacceptable adverse effect will be taken. If no such information is provided to the Regional Administrator, or if the Regional Administrator is not satisfied that no unacceptable adverse effect will occur, the Regional Administrator will publish a notice in the Federal Register of his proposed determination, soliciting public comment, and offering opportunity for a public hearing. Today's notice represents this step in the process.

Following the public hearing and close of the comment period, the Regional Administrator will decide whether to withdraw his proposed determination or prepare a recommended determination. A decision to withdraw a proposed determination may be reviewed at the discretion of the Assistant Administrator for Water at EPA Headquarters. If the Regional Administrator prepares a recommended determination, he then forwards it and the complete administrative record compiled in the Regional Office to the Assistant Administrator for Water. The Assistant Administrator makes the final determination affirming, modifying, or rescinding the recommended determination.

EPA Region III recognizes this action represents one of the few times EPA has initiated a Section 404(c) action to withdraw specification after a permit has been issued by the Department of the Army. It is EPA's preference to initiate procedures pursuant to

Section 404(c) prior to permit issuance. Nevertheless, Section 404(c) authorizes EPA to withdraw use of a defined area for specification, and therefore, EPA has the ability to initiate a Section 404(c) action after permit issuance. As set forth in the Preamble to EPA's implementing regulations, EPA recognizes the seriousness of initiating a Section 404(c) action after the Corps has issued a permit and does so only when unacceptable impacts from the project are of commensurate seriousness. In addition, EPA recognizes that a portion of the project located in the Seng Camp Creek subwatershed already has been constructed pursuant to the permit issued by the Department of the Army. This action is not intended to withdraw or restrict specification to the extent that dredged or fill material already has been discharged as of the date of this notice pursuant to a Department of the Army (DA) Permit No. 199800436-3 (Section 10: Coal River).

II. PROJECT DESCRIPTION AND BACKGROUND

A. Project History

The Spruce No. 1 mining project is a proposed mountaintop mining operation with valley fills (MTM/VF). In this type of mining operation, forests on the mined site are cleared and stripped of topsoil, and explosives are used to break up tops of mountains to expose the coal seams. Excess overburden is pushed into adjacent valleys, where it buries streams. The Spruce No. 1 Mine as currently authorized by DA Permit No. 199800436-3 (Section 10: Coal River), is one of the largest mountaintop mining projects ever authorized in West Virginia and includes six valley fills. The proposed Spruce No. 1 Mine was originally advertised as a Hobet Mining Inc. project, a subsidiary of Arch Coal, Inc. Effective December 31, 2005, Arch Coal, Inc. transferred Spruce No. 1 Mine holdings and responsibilities to its Mingo Logan Coal Company (Mingo Logan) subsidiary. The project as originally proposed in 1998, would have directly impacted a total footprint area of 3,113 acres and 57,755 linear feet (more than ten miles) of stream (not including indirect impacts to remaining downstream waters). At that time, the Corps approved the project under a nationwide permit, which was subsequently enjoined by a federal district court. As a consequence of that action, the Corps retracted the previously proffered nationwide permit for the project, and the permittee, Mingo Logan, advised the Corps it would submit an individual permit application. Because the decision whether to issue the permit was a major federal action with potential to significantly affect the quality of the human environment, an Environmental Impact Statement (EIS) was prepared for the Spruce No. 1 project by the Army Corps of Engineers Huntington District pursuant to the National Environmental Policy Act, 42 U.S.C. §§ 4332(C). The original project application also launched events that led to the Interagency Mountaintop Mining/Valley Fills in Appalachia Programmatic EIS which was finalized in October 2005 (PEIS). The PEIS is available at www.epa.gov/Region3/mtntop/eis2005.htm.

In accordance with Section 309 of the Clean Air Act (CAA), EPA reviews all EISs and provides comments to the lead agency, in this case, the Corps' Huntington District, that identify and recommend corrective actions for significant environmental impacts associated with the proposal. EPA also reviews the adequacy of information and

analyses contained in the EIS, as needed to support this objective. The initial 2002 Spruce No. 1 Draft EIS evaluated a project similar in scope and size to the original project. EPA's review of the Draft EIS found gaps in the analyses of the proposed mine and related adverse environmental impacts. EPA was particularly concerned by the lack of information regarding the nature and extent of impacts to the high quality streams that would be buried under valley fills, and recommended additional evaluation to support the analysis of less environmentally damaging alternatives. EPA Region III, in a letter dated August 12, 2002, indicated the EIS contained inadequate information for public review and decision-makers.

Partly as a result of EPA's concerns, a revised 2006 Spruce No. 1 Draft EIS was prepared and the project was reconfigured to reduce impacts. The permittee, Mingo Logan, revised the plan to avoid impacts to White Oak Branch, a very good quality stream and the project area was reduced from 3,113 to 2,278 acres with direct stream impacts reduced to 7.48 miles. According to the 2006 EIS, the proposed project would include mining an average of 2.73 million tons of bituminous coal annually via mountaintop mining methods. The Spruce No. 1 Mine would result in a total surface disturbance of 2,278 acres of land and discharge of approximately 110 million cubic yards of dredged and fill material into waters of the United States over a period of 15 years.

In its June 16, 2006, letter of comment on the 2006 Draft EIS, EPA recognized that impacts from the proposed mine had been reduced and the quality of EIS information had improved. However, the letter also noted that EPA had remaining environmental concerns associated with the proposed Spruce No. 1 Mine, including potential adverse impacts to water quality (specifically, the potential to discharge selenium and the known correlation between similar mining operations and degradation of downstream aquatic communities), uncertainties regarding the proposed mitigation, need for additional analysis of potential environmental justice issues, and lack of study related to the cumulative impact of multiple mining operations within the Little Coal River watershed. EPA continued to stress its belief that corrective measures should be required to reduce environmental impacts and that other identified information, data, and analyses should be included in the final EIS.

Concerns regarding the Spruce No. 1 project were also raised by the U.S. Fish and Wildlife Service (FWS), Ecological Services West Virginia Field Office in a letter dated May 30, 2006 from the Department of Interior, Philadelphia to the Huntington District Army Corps of Engineers. In that letter, the FWS expressed concerns over the permittee's compensatory mitigation plan. The FWS claimed there was inadequate compensatory mitigation proposed for the project because the assessment methodology used by the permittee to evaluate stream impacts considered only the physical characteristics of the impacted streams, without considering the equally important biological or chemical characteristics. The FWS expressed concern the project would impact healthy, biologically functional streams and the proposed mitigation included erosion control structures designed to convey water that would not replace the streams' lost ecological services.

The Corps issued the Spruce No. 1 Final EIS on September 22, 2006. On October 23, 2006, EPA commented on the Final EIS, noting continuing concerns with the proposed project's contribution to cumulative impacts within the Little Coal River watershed, and highlighting concerns over adequacy of mitigation proposals and limited analyses of potential impacts to low-income and minority communities. In a letter dated November 30, 2006, EPA offered its assistance to the Corps in developing a stream functional assessment protocol and willingness to work with Mingo Logan through EPA's Conflict Prevention and Resolution Center to develop a cumulative impact assessment and watershed restoration plan for the Little Coal River watershed.

Despite concerns raised by EPA and the FWS, on January 22, 2007, the Corps issued a Clean Water Act § 404 Permit (DA Permit No. 199800436-3 (Section 10: Coal River)) to Mingo Logan for its Spruce No. 1 Mine. On January 30, 2007, a number of environmental groups filed a complaint against the Corps in federal district court challenging its decision to issue the permit. That litigation remains pending.

In addition to its DA Permit No. 199800436-3 (Section 10: Coal River), the project received authorizations from the West Virginia Department of Environmental Protection (WVDEP), including authorization pursuant to the State's surface mining program approved under the Surface Mining Control and Reclamation Act of 1977 (SMCRA), 30 U.S.C. §§ 1201-1328 (SMCRA permit), and a National Pollutant Discharge Elimination System (NPDES) permit for discharges of pollutants from 25[1] outfalls pursuant to Section 402 of the Clean Water Act, 33 U.S.C. § 1342.

In early 2007, Mingo Logan commenced limited operations on Spruce No. 1 pursuant to DA Permit No. 199800436-3 (Section 10: Coal River) subject to an agreement with the environmental groups who are plaintiffs in the litigation. Pursuant to that agreement, Mingo Logan has been operating in a portion of the project in the Seng Camp Creek drainage area, including construction of one valley fill. Under the agreement, Mingo Logan must give plaintiffs 20 days' notice before expanding operations beyond the area subject to the agreement, and has done so once without objection from the plaintiffs.

B. Project Description

The project as authorized is located in the East District of Logan County, West Virginia at Latitude 38°52'39" and Longitude 81°47'52" depicted on the United States Geological Survey 7.5-minute Clothier and Amberstdale Quadrangles. The mine site is located approximately two miles northeast of Blair, in Logan County, West Virginia. The project as authorized would result in discharge of dredged or fill material into Right Fork of Seng Camp Creek, Pigeonroost Branch, Oldhouse Branch, and several of their unnamed tributaries (hereafter, references to Seng Camp Creek, Pigeonroost Branch, and Oldhouse Branch also include all tributaries to those waters that would be impacted by the project as authorized). Streams on-site exhibit surface water connections to Spruce Fork of the

[1] In the most recent NPDES permit (WV1017021) issued August 8, 2007, the outfalls number up to 28, but there are no outfalls numbered 11, 13, or 16.

Little Coal River, which ultimately flows into the Coal River, a navigable (Section 10) water of the United States.

The Spruce No. 1 project would result in a total surface disturbance of 2,278 acres of land with approximately 500 acres actively mined at any one time, based on sequential backfilling and concurrent reclamation of mined areas. The mining process would remove 400 to 450 vertical feet or 501 million cubic yards of overburden material. Nearly 391 million cubic yards would be placed within the mined area and the remaining 110 million cubic yards placed in 6 proposed valley fills. The proposed Spruce No. 1 Mine would result in the discharge of approximately 110 million cubic yards of dredged and fill material into waters of the United States over a period of 15 years. A detailed discussion of Spruce No. 1 project can be found in the 2006 Spruce No. 1 Draft EIS on pages 2-35 through 2-61.

According to its Draft EIS, the Spruce No. 1 project is a mountaintop mining project targeting bituminous coal seams overlying and including the Middle Coalburg coal seam in the western portion of the proposed project area. In the eastern portion of the project area, mountaintop mining would be limited to those seams including and overlying the Upper Stockton seam, with contour mining in conjunction with auger and/or highwall/thin-seam mining utilized to recover the Middle Coalburg seam. The project would disturb a total of 2,278 acres and recover seventy-five percent (75%) of the coal reserve targeted for extraction within the project area during fifteen (15) phases. The applicant describes its proposal as placing dredged and fill material into approximately 0.12 acre of emergent wetland, 10,630 linear feet (1.83 acres) of ephemeral stream channels (all permanent), and 28,698 linear feet (6.12 acres) of intermittent stream channels (26,184 linear feet [5.77 acres] permanent and 2,514 linear feet [0.35 acre] temporary), and 165 linear feet (0.034 acre) of perennial stream channel (all temporary), in conjunction with the construction, operation and reclamation of the Spruce No.1 Mine [Surface Mining Control and Reclamation Act (SMCRA) Permit S-5013-97, Incidental Boundary Revision (IBR) 2]. As set forth more fully below, EPA does not agree that the Spruce No. 1 EIS accurately describes and quantifies stream resources that will be impacted. The foregoing summary of impacts from the Spruce No. 1 EIS is set forth here for descriptive purposes.

Including operations being conducted in the Seng Camp Creek area (including construction of Fill 1A), the mining plan is described in the Spruce No. 1 EIS as a fifteen-phase mining and reclamation plan, which generally includes “Construction” (Phases 1 and 2), “Operations” (Phases 3-13), and “Closure and Reclamation” (Phases 14-15). As initially proposed, the phases are described in the Spruce No. 1 EIS. DA Permit No. 199800436-3 (Section 10: Coal River) which authorizes construction of six valley fills: Valley Fills 1A and 1B in Seng Camp Creek; Valley Fills 2A, 2B, and 3 in Pigeonroost Branch; and Valley Fill 4 in Oldhouse Branch, and numerous sedimentation ponds, minethroughs and other fills.

Additional components of the project include requirements for compensatory mitigation to offset adverse project impacts. The November 2006 Compensatory Mitigation Plan

(CMP) submitted by Mingo Logan describes on-site, in-kind mitigation at a minimum 1:1 ratio on a linear footage basis to compensate for permanent and temporary impacts to waters of the United States through stream channel reclamation and off-site mitigation. This mitigation is intended to restore, reconstruct, or enhance segments of Spruce Fork and Rockhouse Creek. On-site compensation would include restoration of 7,132 linear feet of stream segments temporarily impacted by sedimentation ponds, and creation of 43,565 linear feet of stream channel within the project area. Off-site compensation includes stream enhancements (11,272 linear feet) to Spruce Fork and Rockhouse Creek through a combination of physical, aquatic habitat, and stream stabilization improvements. The CMP proposes to direct surface water flow from the project area in existing drainage ways to promote the development of more defined channels, thus creating 26,625 linear feet of streams (existing, non-jurisdictional drainageways).

III. Characteristics and Functions of the Impacted Resources

The project will be located in Logan County, West Virginia. Logan County is located in the Cumberland Plateau and the Mountains Major Land Resource Area, which is dominated by very steep, rugged side slopes, which are broken by strongly sloping to steep ridgetops and very narrow bottoms along streams. The project site is predominantly forested. The nearest town is Blair, located 2 miles away. The project would be located in the Coal River sub-basin. The project as authorized would directly impact (by discharge of fill material) the Right Fork of Seng Camp Creek, Pigeonroost Branch, Oldhouse Branch and several of their unnamed tributaries. These on-site streams are tributaries of and exhibit surface water connections to Spruce Fork of the Little Coal River, which ultimately flows into the Coal River.

The following subsections describe the characteristics and functions of the resources that could be impacted if the Spruce No. 1 Mine is constructed as currently authorized. Section IV then will describe the impacts that could be caused if the Spruce No. 1 Mine is constructed as currently authorized.

While the following subsections discuss watershed and stream conditions and wildlife in separate sections, it is important to remember that the two are closely interrelated. Wildlife living in or depending upon streams will be adversely impacted by adverse changes in water quality.

EPA derives its understanding of the potentially impacted resources and the predicted impacts of the project from several sources. The Draft (June 2003) and Final (October 2005) Interagency Mountaintop Mining/Valley Fills in Appalachia Programmatic EIS (PEIS) represent an important inter-agency effort designed to inform more environmentally sound decision-making for future permitting of mountaintop mining/valley fills. It had a geographic focus of 12 million acres encompassing most of eastern Kentucky, southern West Virginia, western Virginia, and scattered areas of eastern Tennessee, and included the Spruce No. 1 project area and the Coal River sub-basin. EPA also consulted information gathered by the WVDEP, including an assessment of the Coal River sub-basin conducted in 1997, data collected to support the

2006 Coal River sub-basin total maximum daily load (TMDL),[2] and WVDEP and nationally available GIS data. EPA also reviewed the 2006 Spruce No.1 EIS, and other sources of data including studies conducted by EPA scientists and discharge monitoring reports generated by Mingo Logan. In addition, EPA consulted a wide range of peer-reviewed studies and literature. A Technical Support Document containing more specific data, maps of the watershed, and an index of references is included in the docket as supporting material.

A. Watershed and Stream Conditions

1. The Coal River Sub-basin

The Spruce No. 1 Mine project area is located in the unglaciated portion of the Appalachian Plateau physiographic province of West Virginia. The Appalachian Plateau province is where the majority of the mineable coal in WV is located. The specific project area is located within the upper headwaters of the Spruce Fork of the Little Coal River Watershed, which is a tributary of the Coal River.

The Coal River sub-basin is a component of the larger Kanawha River Basin and encompasses nearly 891 square miles within West Virginia. Major tributaries include Marsh Fork, Clear Fork, Pond Fork, Spruce Fork, Little Coal River, and the Coal River. The Coal River sub-basin has approximately 283 miles of designated "high quality" streams, which are designated as such because they have five or more miles of desirable warm water fish populations or have native or stocked trout populations that are utilized by the public. The Coal River Sub-basin has approximately 51 species listed as endangered, threatened or state rare species. Many of these species rely on the aquatic ecosystems for all or part of their life cycle.

The Coal River sub-basin has been impacted by present and past surface mining. Based upon the National Land Cover Database (NLCD) change product for 1992-2001 and WVDEP's GIS mining files, more than 257 past and present surface mining permits have been issued in the Coal River sub-basin, which collectively occupy more than 13% of the land area. Some sub-watersheds in the Coal River sub-basin have more than 55% of the land occupied by surface mine permits. Trend analysis indicates mountaintop mining and valley fills as a percentage of the land cover will continue to increase in the Coal River sub-basin.

In 1997, the West Virginia Department of Environmental Protection (WVDEP) performed its first comprehensive ecological assessment of the Coal River sub-basin. WVDEP assessed three major aspects of watershed health when it performs an ecological assessment: water quality, habitat condition, and benthic macroinvertebrate community status. The subsequent report, An Ecological Assessment of the Coal River Watershed (1997), indicated that sediments, coal mining and inadequate sewage treatment were the major stressors on streams in this watershed. As a result of that assessment WVDEP

[2] A TMDL is a calculation of maximum amount of a pollutant that a waterbody can receive and still meet water quality standards

identified as a priority the need to "[l]ocate and protect the few remaining high quality streams in the Coal River watershed…." The assessment indicates that because the watershed is becoming increasingly impaired due to stressors such as mining there is a great need to protect the remaining quality resources.

The 1997 WVDEP assessment reported that the Little Coal River watershed (including the Little Coal River, Spruce Fork, and Pond Fork) had a higher rate of impairment (defined as failure to achieve compliance with water quality standards, including the aquatic life use and narrative criteria) than areas elsewhere in the Coal River sub-basin.

WVDEP collected additional biological and chemical data throughout the Coal River sub-basin in 2002-2003 in order to investigate causes and sources of impairments and to develop Total Maximum Daily Loads (TMDLs). These assessments indicated numerous impairments caused by mining related and other pollutants throughout the Coal River watershed and the Spruce Fork sub watershed.

2. The Spruce Fork Sub-watershed

The Spruce No. 1 Mine is located in the Spruce Fork sub-watershed. As authorized, the Spruce No. 1 Mine would impact substantially all of the Right Fork of Seng Camp Branch, Pigeonroost Branch and Oldhouse Branch, all of which are tributaries of and flow to Spruce Fork. Spruce Fork is a fourth order tributary that combines with Pond Fork to form the Little Coal River. Spruce Fork is located in the southwestern portion of the Coal River watershed and drains approximately 126.4 square miles. The dominant landuse in the Spruce Fork watershed is forest. Other important landuse types include urban/residential and barren/mining land. The Spruce Fork watershed lies entirely within the Central Appalachian Ecoregion. This ecoregion is more rugged and forested and is cooler than the Western Allegheny Plateau Ecoregion to the north. Extraction of coal, oil, and natural gas is common and has degraded stream habitat in much of this ecoregion. However, some small streams disturbed by past logging or ongoing oil/gas extraction, such as those located in and around the Spruce No. 1 impact area (including Oldhouse Branch), still function at a high level and are currently of reference quality based on WVDEP reference criteria.

The Spruce Fork sub-watershed has been impacted by past and present surface mining activity. According to WVDEP Division of Mining and Reclamation (DMR) permit maps, within the Headwaters Spruce Fork subwatershed there are more than 34 past and present surface mine permits issued which collectively occupy more than 33 % of the land area. Trend analysis indicates mountaintop mining and valley fills as a percentage of the land cover will continue to increase in the Headwaters Spruce Fork sub-watershed and forest area will continue to decrease as a result. From 1992 to 2009 forest coverage has decreased from approximately 73% to 61% and can be expected to decrease to 53 % of the sub-watershed in the reasonably foreseeable future.

The EPA sampled several streams within the Spruce Fork sub-watershed for the previously referenced interagency PEIS. The results of the PEIS studies indicate that the

streams within and near the project area are currently good quality streams based on the benthic macroinvertebrate and water quality data.

Focusing on the Spruce No. 1 project area, the streams that will be filled, particularly Oldhouse Branch and Pigeonroost Branch, are generally healthy, functioning streams with good water quality. A useful comparison is to the nearby White Oak Branch. White Oak Branch, which flows into Spruce Fork upstream of the Spruce No. 1 Mine site, was identified from the WVDEP 1997 surveys as a high quality stream. White Oak Branch was part of the original Spruce No. 1 impact area but was subsequently avoided when the project was reconfigured because of it high quality designation. WVDEP has, in fact, adopted White Oak Branch as a reference site and has stated that "It is also important that the agency make a concerted effort to find the apparently few remaining streams within the watershed that have not been significantly impacted by human disturbances."

Oldhouse Branch, which would be filled if the Spruce No. 1 Mine is constructed as currently authorized, lies adjacent to White Oak Branch and exhibits similar healthy biological diversity and water quality (U.S. EPA data). Using the West Virginia Stream Condition Index (WVSCI), an assessment method developed for use in West Virginia to help evaluate the health of benthic macroinvertebrate communities at the family level in wadeable streams, both Oldhouse Branch and White Oak Branch scored comparably well, meaning that both were of similar quality and supporting similar aquatic communities. The two streams also score comparably well when the benthic macroinvertebrate community is considered at the genus (as opposed to family) level. For instance, Oldhouse Branch shared 55 total genera (many of them pollution intolerant) with White Oak Branch (EPA data) indicating a diverse and healthy aquatic community in Oldhouse Branch similar to the high quality communities of White Oak Branch.

Pigeonroost Branch, which also would be filled if the Spruce No. 1 Mine is constructed as currently authorized, also shares many macroinvertebrate genera (many of them pollution intolerant) in common with the high quality community in White Oak Branch, again indicating the comparable health of the aquatic community in Pigeonroost Branch. The WVSCI assessment of Pigeonroost indicates water quality is relatively good despite some minor historic mining in the watershed.

The DA Permit also authorizes placement of fill into Right Fork Seng Camp Creek. While the WVSCI assessment of the lower Seng Camp Creek does not indicate a high quality designation, benthic data available to EPA show that many sensitive aquatic insects occur in the forested headwater reaches of the tributaries of Seng Camp Creek (Valley Fill 1B).

In summary, the streams that would be filled if the Spruce No. 1 Mine were constructed as authorized by the DA permit are high functioning streams supporting healthy aquatic communities. By way of comparison, Oldhouse Branch and Pigeonroost Branch are healthier than other streams in the Spruce Fork sub-watershed that have been impacted by mining operations similar to the Spruce No. 1 Mine. The 2006 and 2008 WVDEP 303(d)

lists of impaired waters[3] and the 2006 TMDL report for the Coal River sub-basin indicate that several streams in the Spruce Fork watershed are impaired and already have TMDLs developed for mining related pollutants which include selenium, iron and aluminum. Four of these impaired streams are directly northwest of the Spruce No. 1 project, on the west side of Spruce Fork, and in part, are impacted by the Mingo Logan Dal-Tex Mining Operation. Spruce Fork itself, which will receive discharges flowing from the Spruce No. 1 project, is already listed as impaired by mining related pollutants. Seng Camp Creek, a tributary to Spruce Fork, which will be directly impacted by and will drain the Spruce No. 1 project, also has documented water quality impairments.

The results of PEIS studies and other data described above indicate that the streams within and near the project area represent streams that WVDEP has stated need protecting within the Coal River watershed.

B. Wildlife

The Central Appalachians ecoregion where the Spruce No. 1 project will be located has some of the greatest aquatic animal diversity of any area in North America, especially for species of amphibians, fishes, mollusks, aquatic insects, and crayfishes. Salamanders in particular reach their highest North American diversity in the Central Appalachian ecoregion. The area includes one of the most prominent biodiversity hot spots identified by the Nature Conservancy. It has been documented that other specialized wildlife such as some neotropical migrant birds and forest amphibians rely on the natural headwater stream condition and adjacent forest types exhibited by Pigeonroost Branch and Oldhouse Branch for maintenance of their populations.

1. Invertebrates

In a body of water, benthic macroinvertebrates are the bottom-dwelling (benthic) organisms that are large enough to be seen without the aid of microscopes (macro), and are not equipped with backbones (invertebrate). Freshwater macroinvertebrates, such as mayflies and stoneflies, serve as indicators of ecosystem health, and play a vital role in food webs and in the transfer of energy in river systems. These organisms essentially convert plant material into food sources (fats and proteins) essential for the maintenance of healthy fish and amphibian populations, and for foraging terrestrial vertebrates such as birds, bats, reptiles, and small mammals. Because of their productivity and secondary position in the aquatic food chain, macroinvertebrates play a critical role in the delivery of energy and nutrients along a stream continuum. They also are instrumental in cleaning excess living and nonliving organic material from freshwater systems, a service that contributes to the overall quality of the resource.

Stream order typically dictates the community structure of the resident aquatic life. Headwater streams harbor primarily benthic macroinvertebrate communities. In the southern Appalachian Mountains, macroinvertebrates of several orders including

[3] According to WV water quality standards a stream is designated as impaired by WVDEP if it does not fully support one or more of its designated uses.

Ephemeroptera, Plecoptera and Trichoptera (mayflies, stoneflies and caddiflies, all pollution sensitive groups), have been found to be rich in species, including many endemic species and species considered to be rare. This diversity and unique assemblage has been attributed to the unique geological, climatological and hydrological features of this region.

Macroinvertebrates are good indicators of watershed health and are used by West Virginia, states in the Mid-Atlantic and nationally to determine compliance with water quality standards. They are good indicators because they live in the water for all or most of their life. Macroinvertebrates can be found in all streams, are relatively stationary and cannot escape pollution. They also differ in their tolerance to the amount and types of pollution. Macroinvertebrate communities integrate the effects of stressors over time and some taxa (i.e., taxonomic category or group such as phylum, class, family, genus, or species) are considered pollution-tolerant and will survive in degraded conditions. Some taxa are pollutant-intolerant and will die when exposed to certain levels of pollution. Thus, the composition of communities informs scientists about the quality of the water.

Different taxa are more sensitive to pollution and other stressors than other taxa. In a healthy stream, one would expect to find a high diversity of taxa and a large number of different taxa including species that are more sensitive to (i.e., less tolerant of) stressors. Using the mayfly as an example, some genera of mayfly are more sensitive than others. The presence of a large number of individuals from the more sensitive mayfly genera indicates good water quality conditions.

Mayflies (Insecta: Ephemeroptera) in particular have long been recognized as important indicators of stream ecosystem health. Mayflies are a very important part of the native organisms in these streams. In Appalachian headwater streams, they routinely make up between 30%-50% of the insect assemblages in certain seasons. Numerous studies demonstrate that mayfly community structure reflects the chemical and physical environment of watercourses.

Not only do trout rely on mayflies and stoneflies, but a group of colorful benthic fishes known as Darters (Percidae) feed primarily on mayflies. A dietary study of small stream fishes in the Appalachian coalfields of Kentucky showed that gut contents of several darters contained mostly mayflies. Darters are an important part of the fish assemblage and many are hosts for mussel larvae. Several darter species inhabit Spruce Fork in the immediate vicinity of the project area.

Sampling data included in the PEIS, the Spruce No. 1 EIS and from the WVDEP monitoring database indicate that macroinvertebrates are diverse in the Spruce No. 1 project area. This diversity suggests that the streams in the project area are healthy. Data collected in Oldhouse Branch indicates that the quality of the macroinvertebrate community in Oldhouse Branch is in the top 5% of all streams in the Central Appalachia ecoregion. In 1999-2000, EPA collected eighty-five (85) macroinvertebrate genera in riffle complexes of Pigeonroost Branch and Oldhouse Branch. Data from EPA and the permittee's consultants (Sturm Env. Services, BMI, Inc.) from the Spruce No. 1 EIS

show that collectively, Pigeonroost, Seng Camp, and Oldhouse Branch contain a high number of sensitive mayfly genera and individuals. A total of 21 genera have been identified from these three headwater streams, indicating that these systems offer high water quality and habitat. Many of these mayfly genera are not shared with the receiving Spruce Fork, making these headwater streams unique to the permit area (those few genera shared with Spruce Fork are moderately pollution-tolerant genera such as *Baetisca*, *Baetis*, and *Isonychia*). This count represents only an estimate of mayfly richness in these streams; several other genera have been found by WVDEP in other Spruce Fork tributaries and are potentially present in the project area. As many as nine genera of mayflies have been collected in Oldhouse Branch in any one season-specific sample, with an average of seven genera across multiple samples. These data, cited above, are significant and indicate that less than 5% of all other streams in this ecoregion have more mayflies than Oldhouse Branch. Previous government and academic research on the effects of Appalachian coal mining on mayfly communities indicate that the Spruce No. 1 Mine may eradicate most of the species currently occupying the project area and in the immediate downstream receiving waters.

Stoneflies (Plecoptera) also represent an important group of aquatic insects in the structure and functioning of stream ecosystems. Stoneflies fill important trophic roles in stream ecosystems, as displayed by their detritivory (decomposers) and predatory nature. Stoneflies are primarily stenothermic, meaning they require cool to cold water and high oxygen concentration to survive. Data compiled from EPA, WVDEP, and the permittee's consulting firms show that Oldhouse, Pigeonroost, and Seng Camp collectively yielded 16 genera of stoneflies. Oldhouse and Pigeonroost both had 11 genera. Only 2% of stream samples in all of Central Appalachia had more stonefly genera than Oldhouse within a single sampling event.

Based on this information, the headwater streams draining the proposed Spruce No. 1 project area appear to contain high richness and abundance of sensitive macroinvertebrate wildlife and indicate a healthy aquatic ecosystem that is vital to downstream waters and the fish and wildlife that depend on them. Moreover, because of the high degree of taxonomic similarity between these streams and White Oak Creek (a DEP-designated high quality water), and the strong evidence that many of the sensitive taxa have been eliminated from the adjacent Dal-Tex mine discharges, EPA believes that as proposed, the Spruce No. 1 Mine could cause or contribute to unacceptable degradation of this sensitive aquatic life and the ecosystem that depends on them.

2. Vertebrates

Two important groups of vertebrates, fish and salamanders, are the major stream-dwelling vertebrates in the project area.

a. Salamanders

Salamanders are a diverse and unique form of Appalachian wildlife and are an important ecological component in the mesic forests of the ecoregion. Ecologically, salamanders

are intimately associated with forest ecosystems acting as predators of small invertebrates and serving as prey to larger predators. They are often the most abundant group of vertebrates in both biomass and number. Some species of salamanders are aquatic; others are semi-aquatic, splitting their lives between forests and headwaters and depending upon intact forest-headwater connections for movement. Typically, salamanders occupy small, high-gradient headwater streams while fish occur farther downstream.

The PEIS identified thirty-one (31) species of salamanders in the West Virginia portion of the study area. Of these, 21 species are known to occupy cove hardwood forests while 25 species are known to inhabit mixed mesophytic hardwood forests like those present within portions of the Spruce No. 1 project area. Petranka (1993) presented a conservative estimate that there are about 4,050 salamanders per acre of mature forest floor in Eastern forests. Twice as many larval salamanders are estimated to occur (~8,000/acre) in these same areas.

The southern Appalachians, where the Spruce No. 1 project is located, have one of the richest salamander fauna in the world. Nearly ten percent of global salamander diversity is found within streams of the southern Appalachians. Most of the species found in the project area belong to the family Plethodontidae, the lungless salamanders, which require high moisture retaining leaf-litter, dense shade, and cool flowing streams to survive and reproduce.

With respect to the Spruce No. 1 project area, salamanders have been surveyed in White Oak Branch. White Oak Branch had good numbers of Northern Dusky (9 adult, 7 larvae), Appalachian Seal (15 adult, 12 larvae), and Two Lined salamanders (1 adult and 15 larvae). Although not specifically sampled, the salamander populations in Pigeonroost and Oldhouse Branch are likely very similar to those in White Oak Branch. Applying these numbers from White Oak Branch, EPA would expect abundant and diverse salamander populations (~5 per square meter) in the project area.

b. Fish

WVDNR fish assemblage data in the mainstem of Spruce Fork indicate that the fishery is in relatively good condition, and that it is an important ecological and recreational resource that should be protected. Spruce Fork is a locally important rock bass and smallmouth bass fishery. Rock Bass and Smallmouth Bass are moderately sensitive gamefish species. Although impacted by mining, fish assemblage data collected in 2007 in the mainstem of Spruce Fork indicate that the assemblage is still in relatively good condition.

c. Birds

Many terrestrial species depend on the headwater streams like those of the Spruce Fork for their survival. The ecotone (transition area) between terrestrial and aquatic habitats results in diverse flora and fauna. For example, unique avifauna assemblages can be found along the riparian zone of headwater streams. The Acadian flycatcher (*Empidonax*

virescens) is commonly encountered throughout the region, but despite the large expanse of existing forest habitat, it is primarily restricted to forested tracts with understory vegetation along small headwater streams, where it can feed on emergent aquatic insects. Spruce Fork [appears to] meet[s] these habitat requirements. Neotropical migrant songbirds are also often attracted to headwater streams for breeding areas because of the diversity of the habitat and the availability of emergent aquatic insects.

The Louisiana waterthrush (*Seirus motacilla*), another neotropical migrant song bird, is considered an obligate headwater riparian songbird (an example of water-dependent wildlife) because its diet is comprised predominantly of immature and adult aquatic macroinvertebrates found in and alongside these streams and it builds its nest in the stream banks. Breeding waterthrushes nest and forage primarily on the ground along medium- to high-gradient, first- to third-order, clear, perennial headwater streams flowing through closed-canopy forest. Good water quality is a key component of the species breeding habitat. Headwater streams like those of Spruce Fork that support healthy macroinvertebrate communities would be important food sources for species such as the Louisiana waterthrush.

The Appalachian Mountain Bird Conservation Region (AMBCR), which extends from southeastern New York south to northern Alabama, is thought to support a substantial portion of the Louisiana waterthrush's breeding population, perhaps as much as 45 percent. West Virginia, the only state that lies entirely within the AMBCR, encompasses the largest contiguous area of high relative breeding abundance over the species' entire breeding range, based on North American Breeding Bird Survey (BBS) data from 1994-2003. The West Virginia population may serve as a source for populations elsewhere in the breeding range. The Louisiana waterthrush is also an area-sensitive species, requiring undisturbed forest tracts of 865 acres to sustain a population. The most effective management protocol for the Louisiana waterthrush would appear to be protection of forest tracts and water systems inhabited on both breeding and wintering areas particularly moderate- to high-gradient headwater streams, which compose 75-80% of stream length in a typical watershed

Bird species that rely on mature forest habitats that are on the Audubon watch list as declining species and are listed as probable in the area include the Swainson warbler (*Limnothlypis swainsonii*), Kentucky warbler (*Oporornis formosus*), and Cerulean warbler (*Dendroica cerulean*). The woodthrush was a confirmed breeder in this area and is declining at 1.7% per year, according to the Audubon Watch List. A primary cause of the decline is forest fragmentation, which leads to increased nest parasitism by the brown headed cowbird (*Molothrus ater*).

The Cerulean warbler in particular is considered an area-sensitive species; it is thought to require large (> 30 sq miles) tracts of mature interior forest habitat to support stable breeding populations. It is a canopy-foraging insectivorous neotropical migrant songbird that breeds in mature deciduous forests with broken, structurally-diverse canopies across much of the eastern United States and winters in middle elevations of the Andes Mountains of northern South America. Important among a number of breeding season constraints are the loss of mature deciduous forest, particularly along stream valleys, and

fragmentation and increasing isolation of remaining mature deciduous forest. The cerulean warbler appears to be more sensitive than most other North American birds to landscape-level changes in habitat. The U.S. Fish and Wildlife Service has designated the cerulean warbler a Species of Management Concern and a Species of Conservation Concern throughout its range. It has also been preliminarily designated by the Appalachian Mountains Joint Venture as a Species of Highest Conservation Priority within the Appalachian Mountains Bird Conservation Region, which encompasses West Virginia. The AMBCR is thought to support about 80 percent of the species' entire breeding population, and the AMBCR breeding population likely functions as a source for populations elsewhere in the breeding range.

d. Bats

Thirteen species of bats are found in West Virginia. Most North American bats are insectivorous, which capture their prey by foraging on the wing, catching flying insects from a perch, or collecting insects from plants.

Different species of bats often have distinct life history traits and behaviors. Some bats are solitary and hang in tree foliage, attics, barns, and other protected places during the day. Other bats are colonial and cluster in caves and mine tunnels. Bats have one of the slowest reproductive rates for animals their size. Most bats in northeastern North America have only one or two pups a year and many females do not breed until their second year. This low reproductive rate is somewhat offset by a long life span, often over 20 years. The little brown bat, common in North America and in West Virginia, is the world's longest lived mammal for its size, with a maximum life-span over 32 years.

During the winter, some bats migrate south in search of food, while others hibernate through the cold weather when insects are scarce. Bats that do migrate usually travel less than 200 miles, often following the same routes as migratory birds.

Species that have potential to be found in the area of south-Central West Virginia include the northern bat (*Myotis septentrionalis*), big brown bat (*Eptesicus fuscus*), red bat (*Lasiurus borealis*), eastern small-footed bat (*Myotis leibii*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*) and the Indiana bat (*Myotis sodalis*). Both the Indiana and Virginia big-eared bats are listed as endangered under the Endangered Species Act.

Indiana bats have been described as once one of the most common mammals in the Eastern United States. Between 1960 and 2004, biologists have documented a 56 percent population decline in Indiana bats. Indiana bats feed solely on emerged aquatic and terrestrial flying insects. They are habitat generalists and their selection of prey reflects the environment in which they forage. In a study in the Allegheny Mountains, activity in non-riparian upland forest and forests in which timber harvest had occurred was low relative to forested riparian areas. This evidence suggests that the forested riparian zones of the project area would be more suitable habitats for Indiana bat populations than active or restored mining sites.

IV. BASIS FOR PROPOSED DETERMINATION

A. Section 404(c) Standards

The CWA requires that exercise of the final Section 404(c) authority be based on a determination of "unacceptable adverse effect" to municipal water supplies, shellfish beds, fisheries, wildlife, or recreational areas. While EPA strongly prefers to initiate the Section 404(c) process prior to issuance of a permit, Section 404(c) and EPA's implementing regulations clearly authorize EPA to initiate the Section 404(c) process after a permit has been issued.

Section 404(c) authorizes the Administrator "to prohibit the specification (*including the withdrawal of specification*) of any defined area as a disposal site." (emphasis added). Section 404(b) makes clear that disposal sites are specified for each permit by the Secretary of the Army (and such specification must be consistent with the 404(b)(1) Guidelines). Thus, EPA's implementing regulations make clear that under Section 404(c) "the Administrator may exercise a veto over the specification by the U.S. Army Corps of Engineers or by a state of a site for the discharge of dredged or fill material." 40 CFR 231.1(a); see also definition of "withdraw specification," 40 CFR 231.2(a).

EPA's regulations at 40 CFR 231.2(e) define "unacceptable adverse effect" as:

> Impact on an aquatic or wetland ecosystem which is likely to result in significant degradation of municipal water supplies or significant loss of or damage to fisheries, shellfishing, or wildlife habitat or recreation areas. In evaluating the unacceptability of such impacts, consideration should be given to the relevant portions of the Section 404(b)(1) Guidelines (40 CFR Part 230).

Among other things, the Section 404(b)(1) Guidelines require consideration of whether there are less damaging practicable alternatives to meet the project purpose; whether the project would violate other environmental standards, including applicable water quality standards; whether the project would cause or contribute to significant degradation of the Nation's waters; and whether the project as authorized fails to adequately minimize and compensate for impacts to aquatic resources.

Specifically, those portions of the Guidelines which are particularly important in evaluating the unacceptability of environmental impacts in this case are described below and further detailed in this proposed determination

- Less environmentally damaging practicable alternatives (230.10(a))
- Water quality impacts (230.10(b))
- Significant degradation of waters of the United States (230.10(c))
- Minimization of adverse impacts to aquatic ecosystems (230.10(d))
- Impacts on existing indigenous aquatic organisms or communities (230.10(e))
- Cumulative effects (230.11(g)); and

- Secondary effects (230.11(h))

The purpose of the Clean Water Act is to "restore and maintain the physical, chemical, and biological integrity of the Nation's waters." 33 U.S.C. § 1251(a). Part of the concept of protecting the "biological integrity" of the Nation's waters is protection of the indigenous, naturally occurring community. This goes beyond protecting the function performed by various members of the aquatic community and extends to protection of the quality of the aquatic community itself. See Alameda Water & Sanitation District v. EPA, 930 F. Supp.486 (D. Colo. 1996).

West Virginia has defined an aquatic life designated use for its waters, and has adopted or developed numeric and narrative water quality standards to protect resident aquatic life. While numeric criteria help protect a water body from the effects of specific chemicals, narrative criteria protect a water body from the effects of pollutants that are not easily measured, or for pollutants that do not yet have numeric criteria, such as chemical mixtures, suspended and bedded sediments and floatable debris. Narrative criteria have the same effect and importance as numeric criteria, and interpretation of narrative criteria fills an important gap in Clean Water Act protection. See 54 Fed. Reg. 23868, 23875 (June 2, 1989).

B. Adverse Impacts of the Proposed Project

The impacts from the Spruce No. 1 project will occur through several different pathways. There will be direct impacts caused by the discharge of fill (excess spoil and construction of valley fills) into headwater streams. Loss of this habitat will impact wildlife that depend on headwater streams for all or part of their lifecycles. The loss of streams and wildlife will have an effect on other areas by the removal of functions (such as contribution of flow and nutrients) performed by these areas and by discharges from the fill that may contribute pollutants to downstream waters. The project could contribute to conditions that would support blooms of golden algae that release toxins that can kill fish and other aquatic life. In addition, impacts from the project could contribute to cumulative impacts from multiple surface mining activities in the Coal River sub-basin.

An understanding of the adverse impacts of the proposed project requires an understanding of the nature and importance of headwater streams and their contribution to the overall health of the watershed and to wildlife living in the watershed. Headwater streams play a significant role in the ecology of the Appalachian region. They are sources of clean, abundant water for larger streams and rivers and provide active sites for biogeochemical processes that support both aquatic and terrestrial ecosystems. The benefits of healthy headwaters are cumulative as the critical ecological functions of many small streams flowing into the same river system are necessary to maintain ecological integrity of the larger stream and river systems. Ecosystem functions performed by headwaters are lost when the headwater stream is buried or removed. These functions are lost not only to the headwater stream itself, but also to downstream ecosystems. Some of the functions of Appalachian headwater streams include interfacing with the terrestrial environment and transformation of organic matter from the surrounding landscape (such

as leaf litter) into nutrients; storing and retaining nutrients, organic matter, and sediments; exporting water and nutrients downstream; and moderating flow rate and temperature.

In addition, as set forth below, the project has the potential of not only removing the ecosystem functions performed by the impacted areas, but also turning the impacted areas into sources discharging pollutants and degradation into the downstream ecosystem.

In order to predict the impacts of the proposed Spruce No. 1 project, EPA has examined impacts caused by similar projects both in the Coal River sub-basin and elsewhere, including but not limited to the similar and nearby Mingo Logan Dal-Tex operation. The impacts from the Spruce No. 1 Mine as authorized are likely to be similar to those caused by the Mingo Logan Dal-Tex operation. This was acknowledged in the Spruce No. 1 EIS, which stated: "The past and present impacts to topography, geology, and mineral resources of the previous mining along the western side of Spruce Fork are similar to the anticipated impacts of the Spruce No. 1 Mine, as mining is proposed to occur in the same strata." EPA also has considered information related to impacts from the portions of the Spruce No. 1 Mine that have been constructed. Unless modified, the Spruce No. 1 project as currently authorized could cause impacts similar to the impacts caused by the Mingo Logan Dal-Tex Operation and other mining activity in the watershed.

Thus, EPA believes that the predicted impacts from the Spruce No. 1 Mine if constructed, as currently authorized, could have unacceptable effects on wildlife and fisheries. Consistent with the agency's implementing regulations, EPA has given consideration to the relevant portions of the Guidelines and we also believe that the project is inconsistent with the 404(b)(1) Guidelines.

1. Impacts to Wildlife and Fisheries

Impacts from the Spruce No. 1 project will occur in several ways. First there will be discharge of excess spoil and construction of valley fills that will result in the loss of headwater streams of the Right Branch of Seng Camp Branch, Pigeonroost Branch, and Oldhouse Branch, all tributaries to Spruce Fork. Wildlife that live in those streams or within the footprint of the valley fills, including ecologically valuable aquatic organisms, will be buried. Loss of these types of headwater streams by valley fills may cause permanent loss of ecosystems that play a critical role in ecological processes. Disruptions in the biological processes of first- and second-order streams impact not only aquatic life within the stream, but also the functions aquatic life contributes to downstream aquatic systems in the form of nutrient cycling, food web dynamics, and species diversity.

Additionally, the removal of Pigeonroost Branch and Oldhouse Branch as sources of freshwater dilution combined with potential pollutant discharges from the project could adversely affect downstream water chemistry, which in turn could have an adverse impact on aquatic and water-dependent wildlife. Associated disturbances caused by the project (clearing, road construction, etc.) may impact habitat and result in discharges that could adversely affect water chemistry.

Large-scale deforestation proposed at Spruce No. 1 Mine may adversely affect habitat and result in adverse effects on terrestrial wildlife. Approximately 2,278 acres of deciduous forests will be destroyed by the Spruce No. 1 Mine. Appalachian forests support some of the highest biodiversity in North America. Additionally, these forested headwaters are important components of the overall ecosystem and provide valuable services, such as contributing organic matter from coarse wood to dissolved organic matter, which provides sustenance to stream biota and contributes to habitat structure. Loss of this valuable input to downstream waters could have an adverse impact on aquatic organisms that depend on these ecological processes for maintenance of their populations.

a. Freshwater Macroinvertebrates

As previously described, macroinvertebrates are diverse in the Spruce No. 1 project area and because of their productivity and secondary position in the aquatic food chain; they play a critical role in the delivery of energy and nutrients along a stream continuum. They also are instrumental in cleaning excess living and nonliving organic material from freshwater systems, a service that contributes to the overall quality of the watershed. The Spruce No. 1 project may adversely impact most of the mayfly, stonefly, and caddisfly genera that currently inhabit waters in or downstream of the project area through both burying their stream habitats and increasing chemical loading to receiving waters.

Data from other MTM/VF related studies within this subecoregion show a correlation between MTM/VF activity and downstream patterns of extirpation with many of these genera. Aquatic life is unlikely to survive in the erosion control ditches proposed for mitigating the loss headwater streams because of extreme chemical conditions, temperature extremes, and the overall lack of a lotic (flowing) flow regime. Some of the most sensitive genera will likely be extirpated or drastically reduced from the sites due to chemical and habitat degradation.

As previously noted, it is useful for predictive purposes to consider the impact from similar, nearby mining operations. EPA compared benthic collections from the Spruce No. 1 site to Mingo Logan's nearby Dal-Tex Mining site. Both areas had equal numbers of benthic samples collected. Eighty-five (85) total genera were collected from Pigeonroost Branch and Oldhouse Branch between 1999-2000, while only 55 generally opportunistic genera were collected from Beech Fork and Left Fork Beech Fork that drain now-idled Dal-Tex operations. This represents a significant loss of macroinvertebrate genera. In particular, the decrease in the number of genera and individuals from more sensitive genera indicates degrading water quality conditions. These conditions can be expected to occur in the Spruce No.1 Mine if the project proceeds as authorized.

The EPA also sampled several streams within the Spruce Fork watershed for the PEIS. Eight monitoring stations were established within the watershed. Three monitoring sites were located within or near the Spruce No. 1 project area (White Oak Branch, Oldhouse Branch, and Pigeonroost Branch), and three were located in areas that historically had been impacted by mining (Rockhouse Creek, Beech Creek, and Left Fork of Beech Creek). The remaining two monitoring stations were located on the mainstem of Spruce Fork and other stressors such as residences may have influenced the water quality and biological communities.

The results of the PEIS studies indicate that the streams within and near the project area currently support high quality benthic macroinvertebrate communities and water quality, while the streams located in historically MTM/VF mined areas are impaired based on the WVSCI and presence/absence of indicator macroinvertebrate taxa. One can predict from these data sets that the high quality streams in the project area (i.e., Oldhouse Branch and Pigeonroost Branch) could be unacceptably adversely impacted by the Spruce No. 1 Mine.

b. Salamanders

The southern Appalachians, where the Spruce No. 1 project is located, have one of the richest salamander fauna in the world. Impacts from the activities authorized as part of the project could have a significant adverse impact on this wildlife group located within the project area. The Spruce No. 1 Mine will have significant adverse impacts on the salamander community either through direct burial, habitat degradation, or discharges of toxic chemicals.

As previously stated, thirty-one (31) species of salamanders are known from the West Virginia portion of the PEIS study area. Of these, 21 species are known to occupy cove hardwood forests while 25 species are known to inhabit mixed mesophytic hardwood forests like those present within portions of the Spruce No. 1 project area. Petranka (1993) presented a conservative estimate of about 4,050 salamanders per acre in mature forest floors in Eastern forests. Twice as many larval salamanders are estimated to occur (~8,000/acre) in these same areas.

Applying these conservative estimates to the Spruce No.1 Mine project area indicates that more than 20 million salamanders could be buried by the authorized valley fills and adjacent mined uplands. In stark contrast, recent data from Gingerich (2009) showed that coal mine erosion control ditches (like those proposed for mitigation in the Spruce No.1 permit) between three and 20 years old had strikingly different amphibian communities than undisturbed sites. Specialist salamander species present in undisturbed sites were replaced with more generalist frog species on the reclaimed sites. Frogs are not ecological equivalents of headwater salamander species. The loss of specialist salamanders and the specific functions they provide, therefore, may result in significant adverse impacts to the aquatic ecosystem.

Additional data from a USFWS study conducted in MTM/VF areas of the Appalachian mountains found salamander assemblages in valley-filled streams had lower SPAR index scores (a salamander index of biological integrity) than non-filled streams. A 2004 study by FWS compared unmined White Oak Branch to the mine-impacted Rockhouse Creek. The salamander assemblage in Rockhouse Creek scored a 6.7 on the SPAR compared to a perfect 10 of White Oak Branch. No larval Northern Dusky or Appalachian Seal salamanders were found in Rockhouse Creek, which may indicate reproductive effects on these sensitive species. Moreover, salamanders in Rockhouse Creek as well as in other valley filled streams had higher concentrations of selenium than salamanders from non-filled streams.

These data indicate that salamanders decline or disappear from surface mined areas and that certain mining mitigation measures do not offset these impacts. Because salamanders represent the main vertebrate predator in these headwater channels and will be eradicated under the proposed project, EPA believes that a key component of the aquatic food web will be lost from the aquatic ecosystem which may have unacceptable adverse affects on wildlife and fish resources in the project area.

c. Fish

The fish assemblage in Spruce Fork is currently considered healthy. While fish are less sensitive to water chemistry changes with respect to TDS/conductivity, it is important to ensure that the currently healthy fish assemblage is protected. Some studies have shown that mountaintop mining for coal and creation of valley fills has had a harmful effect on the composition of stream fish communities. Comparison of streams without mining in the watershed and sites downstream of valley fills in Kentucky and West Virginia indicate that streams affected by mining had significantly fewer total fish species and fewer benthic fish species than streams without mining in the same areas. A similar pattern of fewer taxa in streams affected by mining was observed with respect to species richness.

Fulk et al. (2003) used the Mid-Atlantic Highlands Index of Biotic Integrity (IBI - a multi-metric index used to assess biotic health) to analyze fish data from 27 streams in West Virginia. In this study streams were classified based on existing levels of disturbance (e.g., no mining in the watershed, sites downstream of valley fills, sites with mountaintop mining in the watershed, sites downstream of valley fills, and sites with residential development in the watershed) and compared fish health among stream classes. The study showed that assessment scores from the sites downstream of valley fills were significantly lower than scores from sites without mining in the watershed, indicating that fish communities were degraded in sites downstream of valley fills.

EPA believes that the loss of 2,278 acres of forest and healthy headwater streams of Spruce Fork and the permanent loss of their ecological processes such as nutrient cycling and production of organic matter for downstream food webs may result in adverse impacts to downstream fishery resources.

Furthermore, due to the removal of freshwater dilution currently being provided by Pigeonroost Branch and Oldhouse Branch to Spruce Fork there is the potential for pollutants such as selenium to bioaccumulate and be toxic to fish and wildlife. Adverse impacts of increased levels of selenium include birth defects in fish and other aquatic life and can also result in toxic affects to embryos, resulting in abnormal development or death for those organisms. WVDEP is currently conducting several studies on the sublethal effects of selenium on fish. Other studies suggest a link between the degradation of fish health and mountaintop mining activities. As a result of these studies, EPA believes that Spruce No. 1 as authorized has the potential to have unacceptable adverse affects on fish resources.

d. Birds

Approximately 2,278 acres of deciduous forests will be destroyed by the Spruce No. 1 Mine and 7.48 miles of headwater stream will be buried as a result of valley fills authorized by the project. Loss of headwater streams from the project could impact water dependent birds, such as the Louisiana waterthrush, that require forested headwater streams for foraging on insects and nesting by elimination of the headwater areas associated with Pigeonroost and Oldhouse Branch. The West Virginia Breeding Bird Atlas (1984-1989) lists the Louisiana waterthrush as a probable breeder in the Spruce No. 1 project area.

As indicated previously, the Appalachian Mountain Bird Conservation Region (AMBCR) is thought to support a substantial portion of the species' breeding population, perhaps as much as 45 percent. Due to the large proportion of the population that breeds there and the threats to habitat and water quality posed by a variety of land and water uses that are predicted to intensify in coming years (including large-scale loss of habitat and water quality degradation associated with Appalachian surface mining), the U.S. Fish and Wildlife Service has designated the Louisiana waterthrush a Species of Management Concern and a Species of Conservation Concern within the AMBCR.

The Louisiana waterthrush's diet is comprised predominantly of immature and adult aquatic macroinvertebrates found in and alongside headwater streams. Studies indicate that breeding territory density and occupancy were reduced along streams where benthic macroinvertebrate communities had been degraded due to anthropogenic land uses and acidification. Lower breeding territory densities occurred along streams impacted by acid mine drainage than along circumneutral streams. Similarly, some indices of benthic macroinvertebrate integrity were higher where breeding Louisiana waterthrushes were present than areas from which they were absent. Stream reaches where breeding birds were detected had a greater proportion of pollution-sensitive benthic macroinvertebrates than reaches where they were not detected supporting the concept that good water quality is a key component of the species breeding habitat.

In addition to stream pollution from anthropogenic land uses, elevated predator numbers from landscape-scale forest fragmentation and the loss of riparian forest canopy could also negatively impact future population levels of the Louisiana waterthrush. Ongoing

impacts associated with landscape disturbances, including defoliation, increased stream temperatures, and compositional shifts in benthic macroinvertebrate communities, also could reduce populations in the AMBCR. Therefore, measures of Louisiana waterthrush distribution and reproduction may be useful indicators of both stream and forest ecosystem integrity.

Management for this species has focused on protecting core wooded riparian habitat, including establishment of undisturbed riparian forest cover, and preservation and improvement of water quality to ensure aquatic insect biomass and diversity. Data from the PEIS showed that most of these forest-specific bird species were eliminated from the adjacent Dal-Tex mine area. For water-dependent wildlife, like the Loiusiana waterthrush, preservation of large tracts of forest containing headwater streams is needed for the conservation of this species in the central Appalachians.

The project also could impact other bird species that rely on mature forest habitats. Bird species that rely on mature forest habitats that are abundant in the Appalachian region are Kentucky warblers in the understory; and wood thrush, Swainson's warbler, Acadian flycatcher, and ovenbirds in mesic hardwoods. These and many other avian species are all impacted by forest fragmentation and habitat loss caused by surface coal mining.

Most notable is the Cerulean warbler, a species that has declined rapidly over the last 40 years, which relies on mature forests, and whose core range mirrors the Appalachian Coalfields. Analyses of North American Breeding Bird Survey (BBS) data for the cerulean warbler indicate that the species declined sharply and steadily by 3-3.2% per year from 1966-2005, the steepest rate of decline of any North American warbler monitored by the BBS. Geostatistical analysis of BBS data concluded that declines in the species' abundance was concentrated in areas of formerly high abundance within the breeding range. The species is now absent or much reduced in some portions of its range, and the overall population trend is one of rapid range-wide decline. Today's population of Cerulean warblers is more than 75% lower than the population in 1966.

The decline of the cerulean warbler is likely related to habitat loss and degradation on both the wintering and breeding ranges. Up to 60 percent of the species' wintering habitat may have already been converted from primary forest to other land uses, and loss, fragmentation, and degradation of eastern North American forests represent a threat to its reproductive success.

Recent studies have documented poor reproductive success for this species in areas with low overall forest cover and high degrees of forest fragmentation. Recommended conservation strategies focused on minimizing habitat loss in more productive forested habitats. Others studies found that cerulean warbler abundance increased with distance from edges created by surface mining in southwestern West Virginia, and that abundance was positively correlated with large blocks of mature deciduous forest and low amounts of edge in the landscape. The authors concluded that mountaintop mining-valley fills altered the spatial configuration of forest habitats and created edge and area effects that

negatively impacted the abundance and occurrence of cerulean warblers in the vicinity of reclaimed mines.

Additional investigators found that the Cerulean warbler breeding population in forested areas of southern West Virginia, which constitutes a substantial portion of the overall population, may be threatened by loss and degradation of forested habitats from mountaintop mining-valley fill activities. These investigators reported that territory density was about 6.5 times higher in intact forests (4.6 territories per 10 ha) than in fragmented forests (0.7 territories per 10 ha). They also found that territories occurred more frequently on ridges than at mid-slope or in valleys, and suggested that mountaintop mining-valley fill may have a greater impact on breeding populations of cerulean warblers than other types of forest fragmentation because it removes these ridges. Investigators concluded that the species was negatively affected by mining activities from loss of forested habitat, particularly ridge tops, and from the degradation of remaining forests, as indicated by lower territory density in fragmented forests and lower territory density closer to mine edges.

Spatial analyses of the effect of Appalachian mountaintop mining on interior forest indicate that the loss of interior forest is 1.75-5.0 times greater than the direct loss of forest due to mountaintop mining. Investigators concluded that the loss of Southern Appalachian interior forest is of global significance due to the rarity worldwide of large expanses of temperate deciduous forest.

The Spruce No. 1 Mine will impact mature forested habitat, over a long timeframe, replacing the impacted areas with reclaimed areas dominated by grasses and herbaceous species. Many reclaimed areas such as those expected at Spruce No. 1 show little or no regrowth of woody vegetation even after 15 years. The PEIS found significant differences in bird populations between forested and reclaimed sites, namely the loss of the above mentioned species, and subsequent replacement by more opportunistic grassland species. Also, the loss of the healthy headwater areas of Spruce Fork will reduce the feeding and foraging areas available to specialist Central Appalachian bird species thereby potentially impacting their viability in the Spruce Fork watershed and the greater Central Appalachian ecoregion.

Additional impacts to avian species may be realized by elevated levels of selenium in the Spruce Fork waters that are feeding areas for birds. In some freshwater food webs, selenium has bioaccumulated to four times the level considered toxic,which can expose birds to reproductive failure when they eat fish or insects with high selenium levels.

As a result of the potential for these impacts to occur to avian species within the project area, EPA believes that the Spruce No. 1 project as authorized has the potential to cause or contribute to unacceptable adverse impacts to wildlife.

e. Bats

Large-scale mountaintop removal/valley fill mining has been listed among the threats to bat species in the region according to information supplied to EPA by the FWS. Loss of

the bat's habitat, foraging areas, and food sources – in conjunction with recently indentified concerns related to white-nose syndrome – may result in unacceptable adverse impacts to wildlife resources.

In the time since the Spruce Fork No. 1 EIS was produced and the SMCRA and CWA Section 404 permits were issued, white-nose syndrome (WNS), a fungal infection, was first reported among hibernating bats in West Virginia. In the winter of 2008-2009, WNS was found in 4 caves in West Virginia, including known hibernation locations for Indiana bats (*Myotis sodalis*) and Virginia big-eared bats (*Corynorhinus townsendii virginianus*). Both the Indiana and Virginia big-eared bats are listed as endangered under the Endangered Species Act.

If WNS affects West Virginia bats as it has bats in other states, and if large die-offs occur, it will further complicate the already complex challenge of conserving bat species. Previous mining and logging activities and forest loss have also been identified as having adverse affects on bat populations. Commonly used reclamation techniques, many of which are designed to minimize erosion and provide backfill stability, are incompatible with re-establishment of trees necessary for successful roosting by bats. Such reclamation techniques have the potential to further stress bat populations.

2. Impacts to water quality

In considering water quality, it is important to recognize that adverse changes in water chemistry frequently have a corresponding impact on wildlife and fisheries that live in or depend upon the water. Potential adverse impacts to water chemistry are considered because they may affect the native aquatic and water-dependent communities in the Spruce Fork watershed. Additionally, the 404(c) regulations require consideration of whether the project would violate other environmental standards, including applicable water quality standards and as such EPA has considered the potential adverse impacts of the project on water quality of Spruce Fork and its contributing watershed.

a. Selenium (Se)

Discharges from the Spruce No. 1 project are likely to increase selenium loading to downstream waters. Selenium is a naturally occurring chemical element that is an essential micronutrient, but excessive amounts of selenium can also have toxic effects. Adverse impacts of increased levels of selenium include birth defects in fish and other aquatic life and can also result in toxic affects to embryos, resulting in abnormal development or death for those organisms. For aquatic animals, the concentration range between essential and toxic is very narrow, being only a few micrograms per liter in water. As described above, selenium toxicity is primarily manifested as reproductive impairment due to maternal transfer, resulting in embryotoxicity (embryonic death) and teratogenicity (birth defects) in egglaying vertebrates. The most sensitive toxicity endpoints in fish larvae are teratogenic deformities such as skeletal, craniofacial, and fin deformities, and various forms of edema. Embryo mortality and severe development abnormalities can result in impaired recruitment of individuals into populations.

WVDEP has also studied fish larval deformity rates and selenium concentrations within fish eggs, although not in the vicinity of the Spruce No. 1 project area. This draft study indicates that elevated selenium concentrations in fish eggs, increased larval deformity rates and increased deformity rates in mature fish were all associated with elevated water column selenium, indicating unacceptable adverse effects on fisheries. The sedimentation ponds traditionally used to treat drainage from mining operations generally are not effective in removing selenium from the discharge.

West Virginia has established a numeric chronic water quality criterion for selenium of 5 ug/l to protect instream aquatic life. Current exceedances of West Virginia's numeric water quality criterion for selenium within the Coal River sub-basin generally and the Spruce Fork sub-watershed have been identified by WVDEP. These confirmed exceedances of the numeric water quality criterion for selenium demonstrate that the geology in the area of the Spruce No. 1 Mine is likely to release selenium during mining. In West Virginia, coals that contain the highest selenium concentrations are found in a region of south central West Virginia where the Allegheny and Upper Kanawha Formations of the Middle Pennsylvanian are mined. WVDEP reports that some of the highest coal selenium concentrations are found in the central portion of the Coal River watershed where significant active mining and selenium impaired streams are located, in the immediate vicinity of the Spruce No. 1 project.

Water quality monitoring data from streams draining the nearby Dal-Tex mine and from the outfalls draining the currently operational portions of the Spruce No. 1 Mine indicate levels of Se that exceed the chronic numeric water quality criterion of 5 ug/l. The data from the Dal-Tex mine do not indicate any decrease in Se concentrations over time (from 2000-2007). These data strongly suggest that the Spruce No. 1 Mine is likely to cause exceedances of the Se water quality criterion and lead to significant degradation of water quality.

In addition, as noted above, portions of the Spruce No. 1 project have been constructed in the Seng Camp Creek sub-watershed. The NPDES permit issued for the Spruce No. 1 project imposes effluent limitations for selenium in only four of 25 outfalls and requires only monitoring (no limitations) for selenium at the remaining outfalls. Recent NPDES discharge monitoring reports show that the constructed portion of the Spruce No. 1 project is discharging selenium at levels that exceed West Virginia's numeric water quality standard.

This project-specific data from both Dal-Tex and the current operational portions of Spruce No. 1 confirms EPA's concern based on data from nearby projects and other water quality data for the Sub-basin that the project may discharge high levels of selenium to downstream receiving waters. WVDEP data from several years of sampling in the Beech Creek watershed where the majority of the mining has occurred, has revealed Se levels that range from 5.6 ug/l to 22 ug/l, exceeding the chronic water quality criterion for selenium of 5 ug/l to protect instream aquatic life. EPA has reason to believe, based on existing and adjacent mine data that Spruce No. 1 has the potential to

cause or contribute to discharges of selenium that could cause unacceptable adverse impacts to fish and wildlife resources.

In some freshwater food webs, Se has bioaccumulated to four times the toxic level; this can cause teratogenic deformities in larval fish, leave fish with Se concentrations above the threshold for reproductive failure (4 ppm), and expose birds to reproductive failure when they eat fish with selenium concentrations greater than 7 ppm. An important aspect of selenium residues in aquatic food chains is not direct toxicity to the organisms themselves, but rather the dietary source of selenium they provide to fish and wildlife species that feed on them.

b. Total Dissolved Solids/Conductivity

Discharges from the Spruce No. 1 project are likely to include high levels of total dissolved solids (TDS), which will increase instream specific conductivity downstream of the project and adversely affect the naturally occurring aquatic communities. Several studies have documented significant and strong correlations between degraded instream resident biota and high specific conductivity or TDS concentrations downstream of mining operations. The scientific literature indicates that several ions can be toxic, and they have varying relative toxicity to aquatic life. Furthermore, mixtures of ions can have ameliorative, synergistic or additive effects, depending on the mix of ions. Typical Central Appalachian alkaline mine drainage includes several component ions (magnesium, sulfate, bicarbonate, potassium) that can be toxic to aquatic life individually or as a mixture. Conductivity is an excellent indicator of the mixture of ions and is also a good predictor of aquatic life use impairment. Increases in conductivity impair aquatic life use, are persistent over time, and cannot be easily mitigated or removed from streams.

To understand the impacts, it is helpful to understand the relationship among salinity, TDS, and specific conductivity. Salinity reflects the amount of TDS in water. The majority of TDS in many waters are simply salts. Salinity is the mass of salt in a given mass of water, and is normally reported in parts per thousand (ppt) or parts per million (ppm). TDS is a measure of the combined content of all inorganic and organic substances contained in a solution in molecular, ionized or micro-granular (colloidal) suspended form and is normally reported in the units mg/l. Specific Conductivity (hereafter referred to as conductivity) is the ability of a solution to carry an electric current at a specific temperature (normally 25º C) and is normally reported in the units uS/cm. Conductivity and TDS both increase as the concentration of ions in a solution increase and are very strongly correlated. Normally, conductivity is reported by state and federal monitoring agencies because it is an instantaneous measurement that can be collected in situ with a meter, does not require a laboratory analysis, and is precise and accurate.

Natural waters in the Spruce No. 1 project area have very low conductivity (50-100 uS/cm) and TDS and are considered fresh water. However, water impacted by alkaline mine drainage such as those exhibited at Dal-Tex and anticipated for Spruce No. 1 has

been shown to have elevated conductivity. Several component ions of alkaline mine drainage (magnesium, sulfate, bicarbonate) are known to be toxic to aquatic life and models have been developed to predict the acute toxicity of mixtures of ions to aquatic organisms. EPA Region III research based on ion toxicity models indicates that ion concentrations in alkaline mine drainage in the Central Appalachians (such as those likely to be discharged by the Spruce No. 1 Mine) commonly reach levels that could cause acute toxicity in native aquatic organisms.

Neither WVDEP nor EPA has numeric water quality criteria designed to protect aquatic life from elevated TDS (which can be measured by conductivity). However, there is strong scientific evidence that indicates what levels of conductivity would likely protect aquatic life. These data and science can be used to assess current conductivity levels in nearby mines and to predict the effects from the proposed Spruce No. 1 Mine. As described below, current instream water quality in the proposed project area is in excellent/good condition, and conductivity levels are less than the most protective level suggested by the data. In contrast, conductivity levels in the previously mined streams adjacent to the project area exceed the highest of the levels suggested by the data, which means there is potential for degradation of water quality and a high likelihood of harm to aquatic life. The table below, summarized from WVDEP data and scientific literature, identifies conductivity levels at which adverse impacts may occur.

Conductivity Levels for Evaluating the Potential for Adverse Impacts	
Level at which conductivity ruled out as a possible stressor in WV TMDL analysis	<327uS/cm
High probability of impairment to native biota	>500 uS/cm
Corresponds to levels of TDS identified as likely to support growth of toxic golden algae	>714 uS/cm
Level at which conductivity may be a "moderate" stressor in recent TMDL studies	>767 uS/cm

Data from WVDEP indicates the average conductivity values for the unmined streams on the Spruce No. 1 project area are very low. Oldhouse Branch had an average conductivity level of 90 uS/cm; White Oak Branch had an average conductivity level of 118 uS/cm. Both of these conductivity values indicate excellent water quality. Sulfate concentrations in these streams are also low (28 mg/l in Oldhouse and 24 mg/l in White Oak Branch). Two of the streams draining the project area (Pigeonroost Branch and Seng Camp Creek) contain small amounts of historical mining in their watersheds. WVDEP data indicate the average conductivity for Piegeonroost Branch was 199 uS/cm and sulfate was 99 mg/l, and in Seng Camp Creek conductivity was 189 uS/cm and sulfate was 61 mg/l. The slightly elevated average conductivity and sulfate values reflect the relatively small amount of historical mining landuse in these watersheds.

By contrast, the average conductivity and sulfate levels are elevated in other tributaries to Spruce Fork where historical mining is similar to what would occur if Spruce No. 1 Mine was constructed as authorized. For example, the streams draining mined areas to the west

of Spruce Fork have the following average conductivity and sulfate values: Rockhouse Creek, 1012 uS/cm conductivity, 407 mg/l sulfate; Left Fork of Beech Creek, 2426 uS/cm conductivity, 1019 mg/l sulfate; Beech Creek, 1432 uS/cm conductivity, 557 mg/l sulfate; and Trace Branch, 971 uS/cm conductivity, 569 mg/l sulfate.

The average conductivity and sulfate concentrations in the mainstem of Spruce Fork are also strongly elevated to as much as ten times above the natural background levels in Oldhouse Branch. The average conductivity at almost every monitoring site on the mainstem Spruce Fork exceeded 500 uS/cm. Only one site had an average conductivity of < 500 uS/cm, which was located upstream of the project area, upstream of Adkins Fork, and southeast of Blair, WV.

Conductivity values for several tributaries draining the Spruce No. 1 project currently indicate excellent water quality. These waters with lower conductivity, such as Pigeonroost Branch and Oldhouse Branch, may be providing freshwater dilution to Spruce Fork thereby preventing conductivity levels in Spruce Fork from becoming even more elevated. Discharges from valley fills into Pigeonroost Branch and Oldhouse Branch would both remove sources of freshwater dilution to Spruce Fork and create new sources of TDS/conductivity.

Additionally, WVDEP data from 2002-2003 strongly indicate that any assimilative capacity for TDS or conductivity and component ions on the main stem of Spruce Fork has already been used by other mining discharges in the watershed. In light of the known relationship between elevated levels of TDS/conductivity and extirpation of portions of the native assemblages, any additional TDS or conductivity added to the mainstem of Spruce Fork by the project could cause unacceptable adverse impacts to the receiving streams and to Spruce Fork.

Increases in conductivity associated with the Spruce No.1 project could also increase the likelihood of an outbreak of toxic golden algae. This is supported by evidence of a recent algal bloom of an invasive, brackish-water golden algae species (linked to increased conductivity) in the northern coalfields of WV, which caused a devastating aquatic life kill (fishes, mussels, salamanders).

3. Potential to Contribute to Conditions that Support Growth of Toxic Golden Algae

The Spruce No. 1 project is likely to contribute to instream conditions (including increased instream total dissolved solids/conductivity and construction of sedimentation ponds) in or near Spruce Fork that may support golden algae *Prymnesium parvum* that releases toxins that kill fish and other gill-breathing aquatic organisms.

P. parvum is associated with an extensive and severe aquatic life kill that killed thousands of fish, mussels, and other aquatic organisms in Dunkard Creek, West Virginia and Pennsylvania in September 2009. At the time of the Dunkard Creek aquatic life kill, biologists reported observations of not only dead organisms, but also fish and other

aquatic life behaving aberrantly in an effort to escape the toxin. Biologists reported mud puppies (an aquatic salamander that lives its entire life underwater) crawling out of the water and onto rocks and the shoreline in an apparent attempt to escape from the toxic water. These organisms, which are obligate aquatic organisms with no functioning lung system, also died from effects of golden algae. Field biologists observed numerous individuals as dried-up carcasses on rocks and along the shoreline. Fish were observed avoiding the mainstem of Dunkard Creek by practically "stacking up" in the mouths of tributaries, subjecting themselves to feeding by blue heron rather than escaping to the mainstem of Dunkard Creek.

The identification of *P. parvum* in 2009 in Dunkard Creek, on the Pennsylvania and West Virginia border near Morgantown, WV, was the first identification of this invasive aquatic species in the Mid-Atlantic States. The factors that are most closely associated with this risk are believed to be:

- Proximity to a known source of *Prymnesium parvum*;
- TDS in high enough amounts to support *P. parvum* (estimated to be between 500 and 1000 mg/l (conductivity 714-1428 uS/cm);
- Nutrients of great enough amount to initiate a bloom of *P. parvum;*
- pH greater than 6.5. Risk increases with increasing pH;
- Areas of habitat that are pooled (large beaver dams, natural residual pools, or manmade ponds).

WVDEP has identified Spruce Fork as a "water of concern" because of its potential (due to already high levels of TDS/conductivity) to support golden algae blooms. Other waters of concern near the Spruce No. 1 project include the Little Coal River and West Fork/Pond Fork.

Golden algae was identified (in very high numbers) in Cabin Creek of the Kanawha drainage, only 25 miles over the ridge to the East. Because this alga can easily move with waterfowl, the risk of introducing *P. parvum* in the Spruce drainage is high. As described above, the Spruce No. 1 project is likely to increase levels of TDS/conductivity in Spruce Fork, thus creating conditions more favorable to golden algae. In addition, numerous sedimentation ponds will be constructed, which could create areas of pooled habitat more favorable to golden algae.

Because of the likelihood that the Spruce No.1 project as authorized will create pooled water in the form of sedimentation ponds and discharge high levels of TDS to the remainder of Pigeonroost Branch, Oldhouse Branch and Spruce Fork, the project could contribute to conditions, especially in Spruce Fork, that could support *P. parvum* with the resultant possibility of aquatic life kills including fish. Based on this information EPA believes that Spruce No. 1 as authorized could result in unacceptable adverse impacts to fish and wildlife resources.

4. Proposed Mitigation may not offset anticipated impacts to an acceptable level

Compensatory mitigation involves actions taken to offset unavoidable adverse impacts to wetlands, streams and other aquatic resources authorized by Clean Water Act Section 404 permits and other Department of the Army (DA) permits.

While we recognize that the project includes mitigation (including stream creation and enhancement of existing streams) to compensate for unavoidable adverse impacts, EPA believes that the quality and function of the impacted resources were not appropriately assessed and accounted for in the mitigation plan. EPA is therefore concerned that the mitigation proposed for the Spruce No. 1 project may not offset the anticipated impacts to an acceptable level.

In order to develop an effective compensatory mitigation plan the following steps are required:

- Fully assess the range of physical, chemical and biological features that contribute to the pre-project level of function of targeted ecological systems. This would include areas both directly affected (e.g., filled streams and valleys), and indirectly affected (e.g., downstream receiving waters, stream reaches targeted for enhancement).
- Develop a range of mitigation practices that fully compensate for all lost or modified features (physical, chemical, biological) and the concomitant loss of both function and areal extent.
- Develop a protocol for monitoring the extent (over space) and rate (over time) of compensatory practices. This should include remedial practices to offset any unplanned failure in the compensatory mitigation plan.

An adequate compensatory mitigation plan should be based upon a delineation of on-site impacts to ephemeral, intermittent, and perennial stream-types in the Spruce Fork watershed. EPA is concerned that the proposed mitigation underestimates the impacts to perennial and intermittent streams by misclassifying them, thereby resulting in an insufficient baseline to begin designing adequate stream compensation. These determinations made by consultants for the project do not correspond with current scientific information concerning the designation of these stream types.

EPA is concerned that the approved delineation of streams-types in the project area may not accurately reflect the stream-types exhibited on-site. The delineations are now nine years old and EPA believes new field studies using more up-to-date assessment tools would provide a better representation of proposed impacted water resources. EPA compared lengths of stream channel in Pigeonroost, Seng Camp, and Oldhouse from USGS estimates to estimates made by the permittee. The median drainage areas for ephemeral/intermittent (14.5 acres) and intermittent/perennial (40.1 acres) have been documented by USGS. Further studies by US EPA Office of Research and Development, US EPA Region III and University of Kentucky show that these USGS drainage area

estimates are accurate. Using this information and on-the-ground field observations in the Spruce No. 1 project area, EPA believes that the proposed valley fills will likely impact a greater quantity (by thousands of feet) of intermittent and perennial stream channels than is proposed to be compensated by the project's Compensatory Mitigation Plan (CMP).

In addition, the CMP utilized an assessment referred to as the Stream Habitat Unit (SHU) method to calculate debits and credits. This assessment is a combination of linear footage of impact, habitat assessment scores, and stream hydrological status. EPA believes that such a calculation of debits and credits inadequately quantifies the mitigation needed for this project. The SHU as presented in the CMP only accounts for the physical aspects of stream condition and completely ignores the interrelationship of water chemistry and biological resources in stream functioning, in contravention of the multiple factor assessment approach noted above. In addition, while the current DA permit refers to biological success criteria, it is not clear that it requires replacement of lost biological function and comparable stream chemistry in order to meet adequate compensatory mitigation success criteria.

The FWS also expressed concern regarding the proposed CMP in a letter dated May 30, 2006 from the Department of Interior, Philadelphia to the Huntington District Army Corps of Engineers. Determinations made by the FWS at that time concluded that (partially excerpted here):

> "The Stream Habitat Unit (SHU) assessment methodology selected by the applicant only considers the physical characteristics of the stream. It does not include biological or chemical characteristics of the stream. Without those attributes, the assessment does not meet the requirements of a "functional" assessment. The Service recommends that the applicant use an assessment method that incorporates biological and chemical, as well as habitat, characteristics to determine the true function of the stream."

Since the permittee applied the SHU methodology to describe the streams, the compensatory mitigation also only addresses the physical component of the streams. Compensatory mitigation must replace the aquatic resource function lost or adversely affected by authorized activities. Therefore, to conclude that the functions are being replaced, the compensatory mitigation must create streams that are capable of sustaining the same biological, chemical, and physical characteristics of the streams that have been eliminated by mining activity.

The project's compensatory mitigation plan is unlikely to sustain the biological, chemical, and physical characteristics of the affected streams for two primary reasons. First, it is difficult to replace the stream functions when they have not been adequately assessed in the first place. Second, creating streams using on-site drainage ditches, employing enhancement measures that include channel or habitat improvement and changing the classification of a stream from intermittent to perennial are not sufficient to replace the quality of the streams impacted.

Although the permittee considers on-site erosion control structures equivalent to existing streams, drainage ditches are designed strictly with a physical component and lack a replacement of stream function. The resources that are being lost are healthy, biologically functional streams. The erosion control structures are designed to convey water and, thus, cannot replace the streams' lost ecological services. Erosion control structures lack groundwater-derived and nutrient-rich base flow, temperature regimes, habitat diversity, gradient, floodplains, connectivity to downstream ecosystems, and other critical features of natural streams.

The permittee indicates that the streams will be enhanced by additional flow, changing them from intermittent to perennial. However, many species rely on intermittent streams as part of their life history strategy.

The permittee also proposes to improve channel or habitat on nearby streams. Streams are complex systems whose hydrogeomorphic behavior and biotic recovery are not easily predicted. Extensive, long-term monitoring is required to demonstrate enough ecological benefit to already-functioning streams to offset the proposed losses. Such actions would have to be taken at a ratio substantially greater than 1:1 to raise the mitigation areas' functions enough to compensate for the loss of stream functions.

The permittee has not indicated that water quality and biological diversity monitoring will be conducted after completion of the proposed project. Water chemistry and biological diversity should be used as indicators of project success. The project will be successful when the function of the restored streams (chemistry and biological diversity), is equivalent to that of the impacted streams. Without a thorough functional assessment prior to initiation of the project, it is impossible to determine when the mitigation is successful.

In summary, the current proposal is problematic for several reasons: first, it fails to recognize the true functioning of healthy headwater streams and so therefore fails to replace the streams' lost ecological services; and second, the planned control structures are waste treatment systems designed to control poor quality waters and then convey those waters offsite. These systems have the potential to export poor-quality water to downstream waters, in direct contrast to current headwater streams that provide fresh water to downstream reaches and to Spruce Fork.

EPA also believes that other proposed stream channels located at the project impact area also have the potential to export poor water quality to downstream waters. If water quality in these created channels and the erosion control channels are taken into account, they not only fail to replace true stream function, but they could cause additional adverse impacts downstream.

Although more recent efforts have been made to more fully assess some physical and biological attributes of regional headwater stream systems, the instream biota and chemistry component continue to be effectively ignored. In effect, the baseline starting

point for developing an adequate compensatory mitigation plan has not been developed.

Studies have demonstrated, moreover, that replacement of streams is among the most difficult and frequently unsuccessful forms of mitigation. Even if stream structure and hydrology can be replaced, it is not clear that replacing structure and hydrology will result in true replacement of functions, especially the native aquatic community and headwater functions. Moreover, the mitigation does not account or compensate for many of the downstream impacts caused by the project. Finally, there is no evidence in the peer-reviewed literature that the type of stream creation proposed in the CMP will successfully replace lost biological function and comparable stream chemistry.

As a result of these concerns, EPA believes that the adverse impacts associated with the Spruce No. 1 project as authorized, are not adequately offset by the CMP and as such we believe the project may have unacceptable adverse impacts to fish and wildlife resources as described throughout this notice.

5. Consistency with the 404(b)(1) Guidelines

The CWA requires that exercise of final Section 404 (c) authority be based on a determination of "unacceptable adverse effect" on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas at 40 CFR 231.2(e) including taking into account:

> …all information available to him (the Administrator), including any written determination of compliance with the Section 404(b)(1) Guidelines made in 40 CFR Part 230.

The Guidelines prohibit the discharge of dredged or fill material into waters of the United States if there is a less environmentally damaging practicable alternative, if it would cause or contribute to a violation of a state water quality standard, or if it would cause or contribute to significant degradation of waters of the United States. As described above, those portions of the Guidelines which are particularly important in evaluating the unacceptability of environmental impacts in this case are:

- Less environmentally damaging practicable alternatives (230.10(a));
- Water quality impacts (230.10(b));
- Significant degradation of waters of the United States (230.10(c));
- Minimization of adverse impacts to aquatic ecosystems (230.10(d));
- Impacts on existing indigenous aquatic organisms or communities (230.10(e));
- Cumulative effects (230.11(g)); and
- Secondary effects (230.11(h)).

a. Alternatives

As indicated in EPA's letter dated October 16, 2009, EPA believes that this project may be modified in a way that will address the environmental impacts described herein. EPA

believes that additional avoidance and minimization of anticipated impacts may be achieved by constructing the project sequentially and allowing monitoring data from each portion of the project to inform decisions regarding the remainder of the project. These monitoring data would then be used as a basis for specific actions in response to adverse changes in water quality.

b. Water Quality

With respect to water quality and significant degradation, neither the Corps nor WVDEP considered information demonstrating that surface mining with valley fills in Central Appalachia is strongly related to downstream water quality degradation. Specifically, the Corps apparently did not consider the relevance of impairment to waters draining the nearby Dal-Tex operation. The water quality degradation caused by nearby mining operations is an important source of information for predicting the impacts from the Spruce No. 1 project.

The Spruce No. 1 EIS recognizes that discharges from the Spruce No. 1 Mine are likely to be similar to those from the Dal-Tex mine: "The past and present impacts to topography, geology, and mineral resources of the previous mining along the western side of Spruce Fork are similar to the anticipated impacts of the Spruce No. 1 Mine, as mining is proposed to occur in the same strata." While the EIS notes that the water quality draining the Dal-Tex complex is alkaline, it does not consider the water quality impairments (including violations of the iron and selenium numeric criteria and adverse biological impacts) identified by WVDEP in the streams draining the Dal-Tex operation.

The Corps and WVDEP also failed to consider adequately the potential for discharges of TDS from Spruce No. 1 to raise instream conductivity levels downstream from the project, resulting in impairment to the naturally occurring aquatic community. The Spruce No. 1 EIS states: "Total dissolved solids may increase in mine area discharges, depending on the nature and timing of groundwater contributions to sediment pond/storm water management system. However, discharges during the life of the mine would be anticipated to meet the requirements of the CWA Section 401 and 402 water quality standards. If discharges would exhibit concentrations out of compliance with effluent limits, the discharges would be treated as necessary to meet WVNPDES and state water quality standards." The EIS does not consider that the 402 permit does not include an analysis pursuant to 40 CFR 122.4(d)(1), an analysis of the project's reasonable potential to cause or contribute to an impairment of the aquatic life use as described in West Virginia's narrative water quality criteria and does not include controls (or even monitoring) for TDS/conductivity. The Corps also did not consider whether the Section 401 certification for Spruce No. 1 considered TDS nor did the Corps consider data showing increased levels of conductivity downstream of the Dal-Tex operation and other mines.

Data from operations at the project site show that the project is likely to discharge selenium at levels above West Virginia's chronic exposure water quality criterion. That

information was not available to and therefore was not considered by the Corps or WVDEP.

In addition, the Corps and WVDEP did not consider the potential for discharges from the Spruce No. 1 project to contribute to conditions that could potentially support golden algae blooms as described in this proposed determination.

V. PROPOSED DETERMINATION

The Regional Administrator proposes to recommend that the discharge of dredged or fill material to Pigeonroost Branch and Oldhouse Branch for the purpose of constructing the Spruce No. 1 Surface Mine as currently authorized by DA Permit No. 199800436-3 (Section 10: Coal River) be prohibited or restricted. Based on current information, the Regional Administrator has reason to believe that the Spruce No. 1 Surface Mine as currently authorized could result in unacceptable adverse impacts and that these adverse impacts can be reduced or avoided through appropriate modification of the project.

This proposed determination is based on unacceptable adverse impacts to wildlife pursuant to Section 404(c). EPA has reason to believe the project as currently authorized would cause or contribute to significant degradation of waters of the United States and violate the Section 404(b)(1) Guidelines. There will be discharge of excess spoil and construction of valley fills that will bury headwater streams. Wildlife that live in those streams or within the footprint of the valley fills will be buried. Other wildlife will lose important habitat on which they depend for all or part of their lifecycles. The streams and wildlife that will be buried cannot be viewed in a vacuum. When those streams and wildlife are buried, there will be effects to downstream waters and downstream wildlife caused by the removal of functions performed by the buried resources and by transformation of the buried areas into sources that may contribute pollutants to downstream waters. In addition, the project could contribute to conditions that would support blooms of golden algae that release toxins that can kill fish and other aquatic life. There also will be an effect from deforestation of the project site on terrestrial wildlife. In addition, impacts from the project could contribute to cumulative impacts from multiple surface mining activities in the Coal River sub-basin.

VI. Other Considerations

A. Environmental Justice

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. In this case these goals are promoted through the requirement that all agencies of the Federal government shall include an analysis of environmental justice issues when considering the impacts related to the Spruce No. 1 project. Although the Spruce No. 1 Draft EIS contained some

information regarding environmental justice, EPA remains concerned that these issues were not adequately addressed in the Final EIS.

Spruce No. 1 is located in a Census block group where the per capita income is roughly half that of the national average and $6,000 less than the West Virginia state average. Moreover, 24% of the residents of Logan County live below the poverty line which also exceeds state and national averages. Accordingly, additional analysis of the potential for disproportionately high and adverse effects on these low-income populations needs to be conducted.

Specifically, a characterization of the economic status of residents near the site and the conditions they face including any effects relating to the proximity of the blasting zone, locations of discharges of fill material, truck traffic, noise, fugitive dust, and habitat loss needs to be conducted. Additional consideration must also be given to these activities' potential impacts on subsistence fishing, hunting, foraging and gardening in the area. Additional information is needed concerning sources of drinking water for the affected populations (including municipal water supplies and private sources of drinking water including streams and/or wells).

Furthermore, the cultural implications of mountaintop mining must not be ignored. The mountains being affected by Spruce No. 1 are considered a cultural resource by many residents. The mountains influence residents' daily lives and in many cases have helped define Appalachian society. Removing them may have profound cultural changes on area residents, so it is important that cultural impacts be considered as well.

It is important that consideration be given as to whether these impacts will range over a broad area or will be concentrated in particular areas. Detailed maps outlining the residential areas in relation to these activities may help in conducting this evaluation. It is also important that the effects be considered both independently and cumulatively. Considering the effects cumulatively provides the most realistic "snapshot" of what the community will be facing when the project reaches fruition. Having this information readily available will help engage the affected communities during public outreach and ensure that they can be meaningfully involved.

B. Cumulative Effects

The Clean Water Act Section 404(b)(1) Guidelines require that "no discharge of dredged or fill material shall be permitted if it causes or contributes, after consideration of disposal site dilution and dispersion, to violation of any applicable State water quality standard." In addition, the Guidelines prohibit any discharge of dredged or fill material that would cause or contribute to significant degradation of the aquatic ecosystem, with special emphasis placed on the persistence and permanence of effects, both individually and cumulatively. Cumulative impacts are "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions." (40 CFR 1508.7) Individual adverse impacts from an action may be

insignificant individually, but may accumulate over time from one or more origins and collectively result in significant adverse impacts that degrade important natural resources. The cumulative impacts of a particular action can be viewed as the total effects on natural resources (including wildlife), socioeconomic resources, human health, recreation, quality of life aspects, and cultural and historical resources of that action and all other activities affecting those resources, compounding the effects of all actions over time. Surface mining of coal has the potential to cumulatively impact natural resources, both aquatic and terrestrial. In the West Virginia portion of the PEIS study area, the projected loss of riparian habitat from MTM/VF is 30.72 km^2, 3.2% of the baseline. Approximately 42% of these projected losses occur in headwater (first and second-order) streams.

As currently authorized, the Spruce No. 1 project is one of the largest mountaintop mining projects authorized in West Virginia. The project would directly impact nearly seven and one-half miles of valuable headwater streams, and would indirectly impact Spruce Fork and potentially other downstream waters in the Coal River Sub-basin. These indirect impacts can include but are not limited to discharges of pollutants from the valley fills, such as total dissolved solids (TDS) and selenium and removal of freshwater dilution currently being provided by Pigeonroost Branch and Oldhouse Branch.

Spruce No. 1 project lies within the Little Coal River watershed within the Coal River sub-basin. The Little Coal watershed contains 98 miles of impaired streams, representing 33% of the streams in the watershed, and the Coal River sub-basin has 743 miles of impaired streams, representing 30% of the streams in the sub-basin. Stream segments are listed for selenium and biological impairment by WVDEP, indicating that the relationship between mining and watershed quality is strong.

In addition to impacts from discharges and removal of riparian habitat and sources of freshwater dilution, there also will be an adverse effect from deforestation of the project site on terrestrial wildlife. Approximately 2,278 acres of deciduous forest will be destroyed by the Spruce No. 1 Mine. Forests like these in Appalachia support some of the highest biodiversity in North America and are unique in its expansiveness. In its natural condition, the Appalachian landscape is dominated by interior forest. A decrease in forest cover by mining followed by conversion to grasslands or other less valuable land cover has the potential to shift the fauna of the region from that found in intact, high elevation forests to one dominated by grassland and edge dwelling species.

Numerous studies have demonstrated that the region is losing forest, especially ecologically valuable interior forest, at a significant pace due largely to surface mining operations. Studies conducted in connection with the PEIS concluded that surface mining had deforested 1,540 km^2 or 380,542 ac (3.4%) of the study area during the 10 years between 1992 and 2002. An estimated 5,700 km^2 or 1,408,500 ac (11.5%) of the PEIS study area was projected to be deforested by 2012, an area 1.4 times the size of the state of Rhode Island. A 3-fold increase has been shown in acres classified as “surface mining/quarries/gravel pits indicating a degrading land-use change at the expense of the natural condition of the area.

Because of fragmentation of forests by mountaintop mining activities, the area of interior forest lost was 1.75–5.0 times greater than the direct forest lost between 1992 and 2001. Such an increase in habitat fragmentation has the potential to isolate natural populations, reduce population sizes, reduce gene flow, increase the risk of extirpation or extinction of rare species, and increase the rate of invasion by exotic species, especially plants. Fragmentation of the terrestrial environment due to mining, projected from land cover data in the West Virginia Gap Analysis Program (GAP) and the permit rates observed during the 10 years preceding the publication of the PEIS, indicates:

- 40% increase in the number of isolated forest habitat fragments
- 41% decrease in the average size of habitat fragments from 24.64 to 14.3 acres
- 2.7% increase in the amount of edge habitat, caused by fragmentation of interior forests

The Spruce No. 1 project will destroy approximately 2,278 acres of functional deciduous forests replacing it with grasslands or other land cover. According to WVDEP Division of Mining and Reclamation (DMR) permit maps, within the Headwaters Spruce Fork sub-watershed, where Spruce No. 1 is to be located, there are more than 34 past and present surface mine permits issued which collectively occupy more than 33 % of the land area. From 1992 to 2009 forest coverage decreased from approximately 73% to 61% and can be expected to decrease to 53 % of the sub-watershed in the reasonably foreseeable future. Additionally, other sub-watersheds in the Coal River sub-basin have more than 55% of the land occupied by surface mine permits.

Within the Coal River sub-basin there are more than 257 past and present surface mining permits issued which collectively occupy more than 13% of the land area. Furthermore, EPA is aware of at least 11 additional mining operations either proposed or authorized but not constructed in addition to Spruce No.1 in the Coal River sub-basin. The Spruce No. 1 proposal along with these 11 additional projects in the Coal River Sub-basin, if constructed as proposed, would impact approximately 29.4 miles of stream channels resulting in potential impairment to more streams in the Coal River sub-basin.

Trend analysis indicates mountaintop mining and valley fills as a percentage of the land cover will continue to increase in the Coal River sub-basin and forest area will continue to decrease as a result. These 11 additional projects, if constructed, have not been assessed and factored in the regulatory decision-making for Spruce No. 1 in terms of their cumulative affects on water quality, aquatic, and forest resources of the region. EPA believes that the Spruce No. 1 project, in conjunction with the numerous other mining operations either under construction or proposed for the Coal River sub-basin, will contribute to the cumulative loss of water quality, aquatic and forest resources. The Coal River sub-basin is already heavily mined and substantially impaired. Landscape and site specific assessments reveal that past and current mountaintop mining has caused substantial, irreplaceable loss of resources and an irreversible effect on these resources within the Coal River sub-basin.

At the sub-basin level, surface mining of coal has the potential to cumulatively impact natural resources, both aquatic and terrestrial, and the number of mining operations, permitted or proposed, in the Coal River watershed have the potential to have significant cumulative effects on the aquatic ecosystem as described above. The cumulative effects of these operations in the Coal River sub-basin and its contributing watersheds have resulted in many miles of headwater stream destruction, downstream water quality degradation, and the destruction and fragmentation of many acres of productive and functional forests. EPA believes these impacts have not been sufficiently acknowledged or analyzed by the permittee or the Corps of Engineers for this project.

Additional data from the PEIS's Landscape-Scale Cumulative Impact Study modeled terrestrial impacts based on past surface mine permit data. These data suggest that for the entire 22-year period from 1992 to 2013, the estimated forest clearing in the study area would be 1,189 square miles (761,000 acres). Should these forests not be adequately restored, invaluable water quality and ecological services will be permanently lost.

Forest losses of this magnitude, although largely temporary (on the scale of decades), are not inconsequential. In addition to the popularly appreciated wildlife, recreational, and timber resources associated with forests systems; many ecological services can be attributed to forest systems. We are just beginning to understand and assign value to these ecological services. For example, forests are known to be natural areas of carbon sequestration. The cumulative loss of 1,189 square miles of forest would conservatively equate to the loss of 1.7M tons of carbon dioxide sequestration potential per year or the equivalent of taking 300,000 cars off the road. Additionally, forests dampen flooding potential and act as natural nutrient sinks. One study estimates that forest cover of 1,189 square miles cumulatively provides approximately $138 million in aquatic nutrient-cycling and waste treatment services.

VII. SOLICITATION OF COMMENTS

EPA today is soliciting comments on all issues discussed in this notice. In particular, we request:

(1) Additional information on the likely adverse impacts to fish and values of the receiving waters that will be directly (Right Fork of Seng Camp Creek, Pigeonroost Branch, Oldhouse Branch) or indirectly affected (Spruce Fork, Little Coal River, Coal River) by the Spruce No. 1 Surface Mine as currently authorized in DA Permit No. 199800436-3 (Section 10: Coal River).

(2) Additional information pertaining to the water quality, flora, fauna and hydrology of the waters identified in no. 1 above, and information on the fish and wildlife species which would be affected by changes in the aquatic ecosystem if the project is constructed.

(3) Additional information about drinking water (including municipal water supplies and private sources of drinking water including streams and/or wells).

(4) Additional information about recreational uses of the project area and how they would be impacted if the project were constructed.

(5) Additional information on the potential for mitigation to reduce the impacts of the project.

(6) Additional information describing the known or potential cumulative impacts to human health and the environment within the Coal River sub-basin and the Spruce Fork sub-watershed.

(7) Consistent with Executive Order 12898, information about low-income and minority populations likely to be affected by the Spruce No. 1 Surface Mine and the disproportionately high adverse human health or environmental effects, if any, on these populations if EPA makes a final determination to rescind the proposed determination or to prohibit or restrict the use of Seng Camp Creek, Pigeonroost Branch and Oldhouse Branch as disposal sites for dredged or fill material in connection with the project.

(8) During the course of the past year, various techniques have been identified to or by EPA as means by which impacts from this project or other similar projects may be reduced to an acceptable level. As indicated in EPA's letter dated October 16, 2009, EPA has not ruled out the possibility that this project may be modified in a way that will address the environmental impacts described herein. Accordingly, in addition to the information sought in items 1-7 above, EPA is seeking comment on potential techniques to reduce or mitigate the environmental impacts described herein.

(9) Whether the discharge should be permanently prohibited, allowed as authorized by the Corps, or restricted in time, size or other manner.

All relevant data, studies, knowledge of studies, or informal observations are appropriate.

The record will remain open for comment until ***[inserted by Federal Register: date 60 days from FR publication].*** All comments will be fully considered in reaching a decision to either rescind the proposed determination or forward to EPA Headquarters a recommended determination to prohibit or restrict the discharge of dredged or fill material into Pigeonroost Branch and Oldhouse Branch in connection with construction and operation of Spruce No. 1 Surface Mine.

Shawn M. Garvin
Regional Administrator

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