COVER SHEET

Responsible Agency: U.S. Department of Energy

Title: Western Greenbrier Co-Production Demonstration Project, Final Environmental Impact Statement (DOE/EIS-0361)

Location: Rainelle, West Virginia

Contact:

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Abstract:

The Final Environmental Impact Statement (EIS) for the Western Greenbrier Co-Production Demonstration Project provides information about the potential environmental impacts of the U.S. Department of Energy's (DOE's) proposal to provide federal financial assistance for the construction and demonstration of a 98 megawatt (MWe) net power plant and ***cement*** manufacturing facility to be located in the municipality of Rainelle, Greenbrier County, West Virginia. Western Greenbrier Co-Generation, LLC (WGC) proposes to design, construct, and operate an atmospheric pressure circulating fluidized-bed (CFB) power plant that would generate electricity and steam by burning approximately 3,000 to 4,000 tons per day of coal refuse from several local sites as fuel ***sources***. The facility would be constructed and demonstrated through a cooperative agreement between DOE and WGC under the Clean Coal Power Initiative Program. DOE's support would amount to approximately $107.5 million (up to 50%) of the development cost for the proposed facility. The proposed power plant would be the first commercial application within the United States of a CFB combustor featuring a compact inverted cyclone design.

DOE determined that the proposed demonstration project constitutes a major federal action within the meaning of the National Environmental Policy Act (NEPA) of 1969, as amended. The *Federal Register* "Notice of Intent To Prepare an Environmental Impact Statement for the Western Greenbrier Co-Production Demonstration Project, Rainelle, WV and Notice of Floodplain/Wetlands Involvement" was published on June 3, 2003 (68 *FR* 33111). DOE held a public scoping meeting on June 19, 2003 in Charmco, West Virginia. The Final EIS evaluates the environmental consequences that may result from the Proposed Action and reasonable alternatives, including potential impacts on air quality, groundwater supply, noise and visual resources, wetlands, and floodplains. The EIS also analyzes the No Action Alternative, under which DOE would not provide financial assistance to WGC.

Public Participation:

DOE encourages public participation in the NEPA process. Comments were invited on the Draft EIS for a period of 45 days after publication of the Notice of Availability in the Federal Register on December 1, 2006. DOE considered all comments to the extent practicable. DOE conducted a formal public hearing to receive comments on the Draft EIS in Crawley, West Virginia on January 4, 2007. An informational session was held prior to the hearing for the public to learn more about the proposed project. The public was encouraged to

provide oral comments at the hearings and to submit written comments to DOE by the close of the comment period on January 18, 2007. In preparing the Final EIS, DOE considered both oral and written comments.

Changes from the Draft EIS:

Vertical lines in the right margin of a page indicate where text in the Draft EIS has been deleted, revised, or supplemented for this Final EIS, except for Volume 3, which contains the comments and responses on the Draft EIS. Additionally, revised and supplemented text in Volumes 1 and 2 are shown in boldface italics font (as in this paragraph). Sections that include revisions are also identified in the Table of Contents.

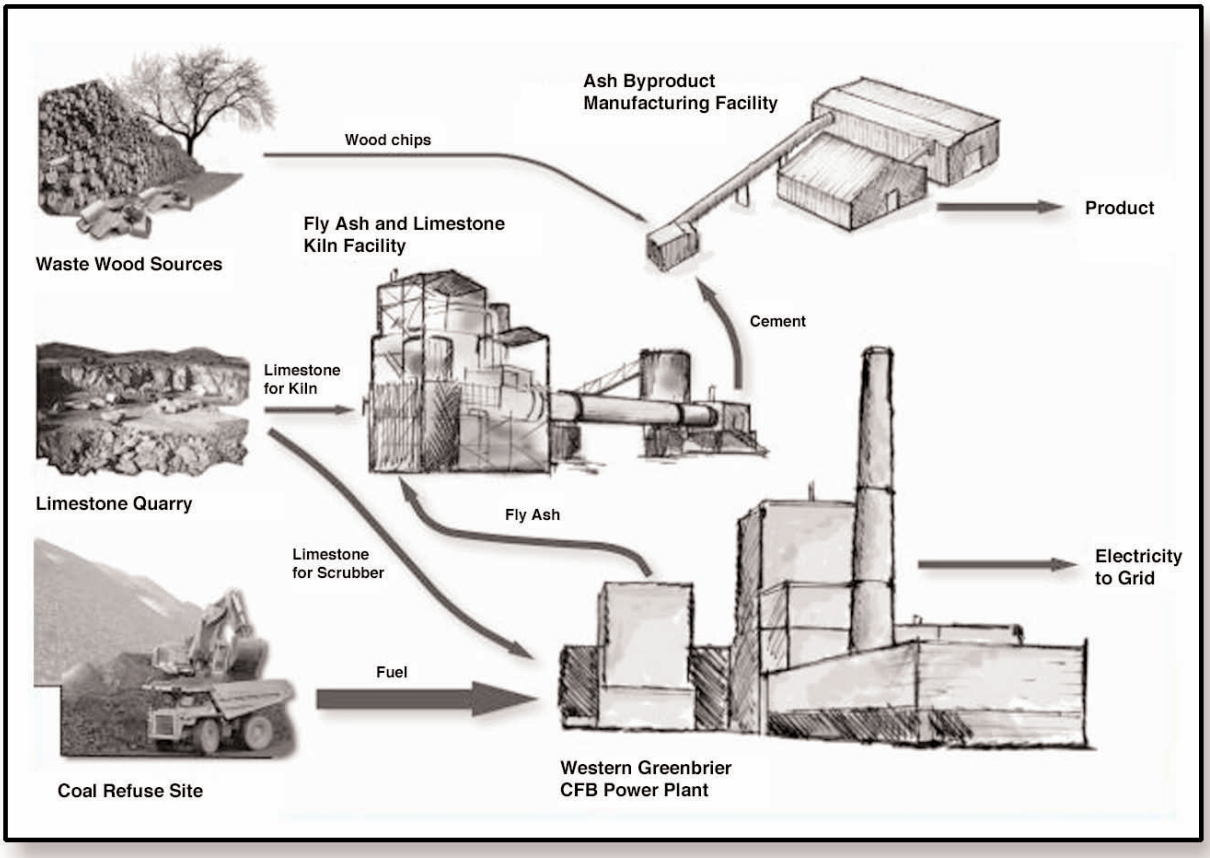
U.S. Department of Energy

WESTERN GREENBRIER CO-PRODUCTION DEMONSTRATION PROJECT

FINAL ENVIRONMENTAL IMPACT STATEMENT

VOLUME I OF 3

DOE / EIS-0361



NOVEMBER 2007

Office of Fossil Energy
National Energy Technology Laboratory

SUMMARY

This Environmental Impact Statement (EIS) has been prepared by the United States Department of Energy (DOE), in compliance with the National Environmental Policy Act of 1969 (NEPA) as amended (42 USC 4321 et seq.), to evaluate the potential environmental impacts associated with the construction and demonstration of a 98-megawatt (MWe) net power plant and cement manufacturing facility (the "Co-Production Facility"). The responsible organization for the federal action is the National Energy Technology Laboratory (NETL), a multi-purpose laboratory owned and operated by DOE.

Proposed Action

The Proposed Action is for DOE to provide financial assistance to Western Greenbrier Co-Generation, LLC (WGC) through a cooperative agreement under the Clean Coal Power Initiative (CCPI) Program for a Co-Production Facility to be located at Rainelle in Greenbrier County, West Virginia (Figure S-1). The facility would be designed for long-term commercial operation (at least 20 years) following completion of the cooperative agreement. The DOE support could be approximately ***$107.5*** million for the project. It is anticipated that DOE's share of project costs would be paid back over a 20-year period following the one-year demonstration period based on a Repayment Agreement negotiated between DOE and WGC.

WGC proposes to design, construct, and operate a 98-MWe (net) power plant that would generate electricity and steam by burning fuel derived from the beneficiation ***(the process of washing or otherwise cleaning coal to increase the energy content by reducing the ash content)*** of approximately 3,000 to 4,000 tons (2,720 to 3,630 metric tons) per day of coal refuse (hereafter referred to as the "WGC Project" or "Co-Production Facility") (WGC, 2005a,b). The proposed power plant would be the first commercial application within the United States of an atmospheric circulating fluidized-bed (ACFB) combustor featuring a compact inverted cyclone design. The design would require less steel ***than a plant configured with a conventional cyclone*** and facilitate erection by reducing the boiler system footprint and height. These innovations could reduce steel costs by approximately 40 percent and shorten construction time by approximately 10 percent.

Fuel for the power plant would be obtained from several coal refuse sites in the area including Anjean, Joe Knob, Donegan, and Green Valley (Figure S-1). Coal refuse removed from these sites would be beneficiated in a coal prep plant to improve the quality for use as a fuel. The semi-mobile prep plant would be assembled near the initial active coal refuse site and would be relocated to process coal refuse from subsequent active sites. Heavy-haul trucks would transport the fuel to the power plant site on local roads. By processing the fuel near the coal refuse sites, WGC would substantially reduce the volume of truck traffic that otherwise would be generated by the project and also reduce on-site fuel processing and handling activities at the power plant site.

The power plant would generate electricity for distribution on the national grid ***via a new transmission line and corridor*** and produce an alkaline ash from fuel combustion. A portion of the ash would be returned to coal refuse piles to facilitate remediation and reclamation efforts (neutralizing acid mine drainage) at each of the coal refuse sites in accordance with agreements between WGC and West Virginia Department of Environmental Protection (WVDEP). The balance of the ash would be combined with limestone in a coal-fired rotary kiln associated with the power plant to produce cement for use in construction applications (e.g., structural brick). In addition to electricity and cement, the proposed plant would co-produce steam and hot water and would serve as the anchor tenant for a proposed, environmentally balanced industrial park ("EcoPark") to be located on an adjacent property in Rainelle. If successfully demonstrated, the technology could be applied in many regions of the country for reclaiming coal refuse piles.

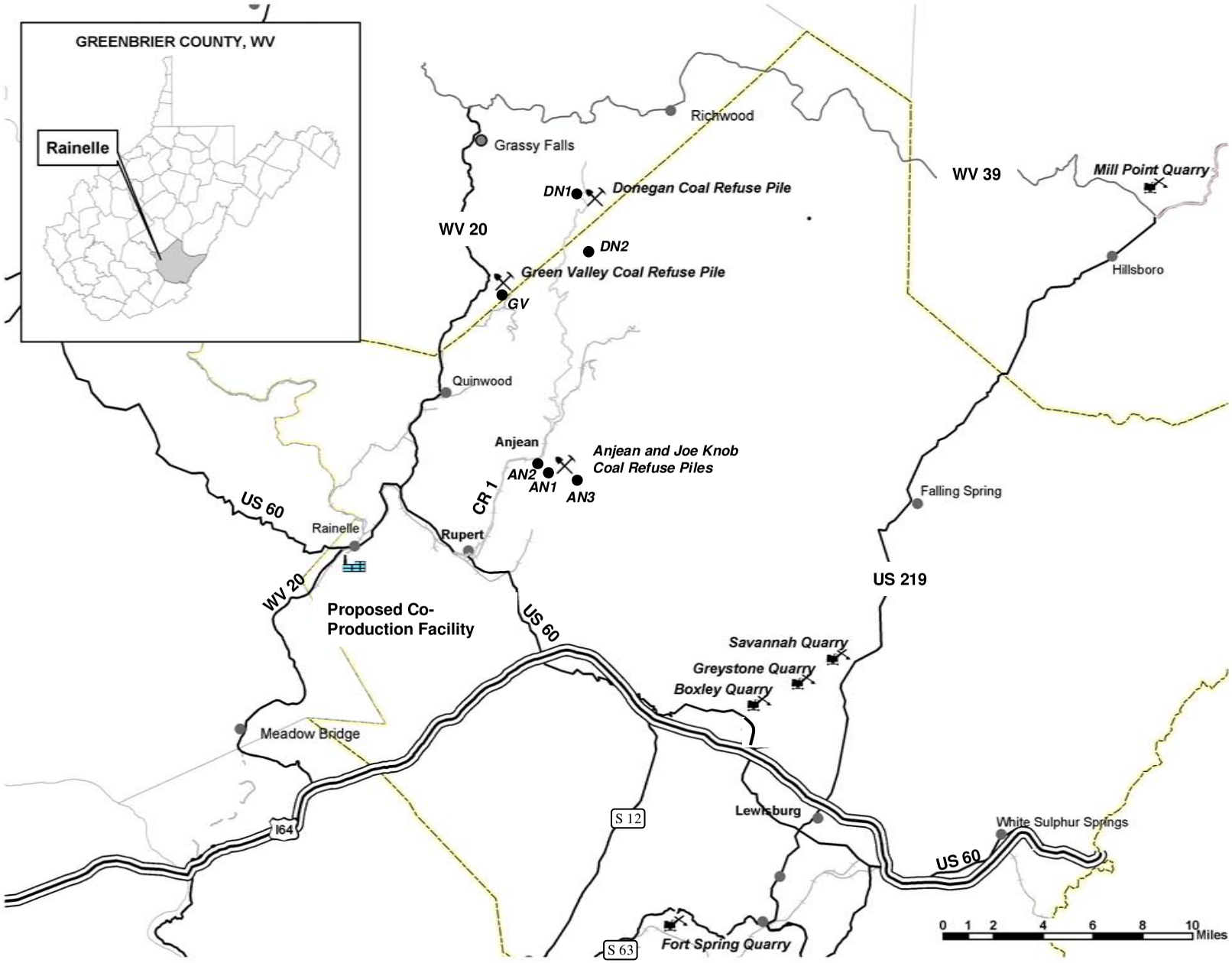


Figure S-1.
General Location Map

U.S. Department of Energy
National Energy Technology Lab

Western Greenbrier Co-Production Demonstration Project

Environmental Impact Statement

Purpose and Need for the Action

DOE Purpose and Need

DOE needs to accelerate deployment of innovative clean coal technologies that can meet near-term energy and environmental goals, reduce risk in the business community to an acceptable level, and provide incentives to the private sector for innovative research and development projects directed at solving various energy supply problems. Since the early 1970s, DOE and its predecessor agencies have supported research and development programs that include long-term, high-risk activities for the development of a wide variety of innovative coal technologies through the proof-of-concept stage. However, the availability of a technology at the proof-of-concept stage is not sufficient to ensure its continued development and subsequent commercialization. Before any technology can be considered for commercialization, it must be demonstrated. The financial risk associated with technology demonstration is, in general, too high for the private sector to assume in the absence of strong incentives.

Public Law 107-63, enacted in November 2001, first provided funding for the CCPI. CCPI is a multi-year program to accelerate the commercial readiness of advanced multi-pollutant emissions control, combustion, gasification, and efficiency improvement technologies to retrofit or re-power existing coal-based power plants and for deployment in new coal-based generating facilities. CCPI implements national energy policy to advance the nation's energy security and energy independence by overcoming technical, environmental, and economic challenges associated with coal so that the nation can continue to rely on its abundant domestic reserves of coal for electric power generation (NETL, 2006). Clean coal technologies emerging from the program contribute toward satisfying the following national technological and environmental initiatives:

- ***Clear Skies Initiative to cut nitrogen oxides (NO_x), sulfur dioxide (SO_2), and mercury (Hg) emissions by 70 percent over the next 15 years;***
- ***Global Climate Change Initiative to cut greenhouse gas intensity 18 percent by the year 2012;***
- ***Hydrogen Fuel Initiative to reverse the growing dependency on foreign oil by developing the technologies and infrastructure to produce, store, and distribute hydrogen (H_2); and***
- ***FutureGen Initiative to establish the technical feasibility and potential economic viability of coproducing electricity and H_2 fuel from coal while capturing and sequestering carbon dioxide (CO_2) and greatly reducing other air emissions.***

Accelerating commercialization of clean coal technologies also positions the U.S. to supply advanced coal-based power generation and pollution control technologies to a rapidly expanding world market. Congress provided for competitively awarded demonstration projects in the CCPI. These are not federal projects seeking private investment. Under the CCPI solicitation, private entities propose projects that meet their needs and those of their customers and also further national goals and objectives embodied in the CCPI. Projects within the CCPI portfolio become private-public cost-sharing partnerships that satisfy a wide set of industry and government needs. Industry satisfies its short-term need to retrofit or re-power a facility or develop new power generating capacity for the benefit of its customers. By providing financial incentive for emerging clean coal technologies, the government supports the verification of commercial readiness leading toward the long-term objective of transitioning the nation's existing fleet of electric power generating plants to the next generation of more efficient, environmentally sound, and cost competitive facilities (NETL, 2006).

The WGC Project is one of eight candidates selected for further consideration by DOE in January 2003 from among 33 applicants during the first round of proposals submitted for the Program. In addition to demonstrating the first commercial application of the compact, inverted cyclone CFB design

in the United States, the project offers a novel approach to converting some waste ash into commercial building products while also integrating power generation with remediation of coal refuse piles.

WGC Purpose and Need

WGC was established as a non-profit, limited liability company (LLC) owned by the municipalities of Rainelle, Rupert, and Quinwood in Greenbrier County, West Virginia. The municipalities are located in an economically depressed coal-mining region of southern West Virginia. In recent decades, area businesses have been closing and job opportunities have been shrinking as local coal and timber industries continue to decline. West Virginia is also challenged by mine land remediation and reclamation needs resulting from several hundred abandoned mine sites and from an estimated 300 to 400 million tons of coal refuse. West Virginia Department of Environmental Protection officials have characterized coal refuse as the state's primary environmental hazard, which will cost an estimated $2 to $3 billion for cleanup (WGC, 2002).

With the intent of addressing these challenges to the local communities, WGC's needs for the proposed Co-Production Facility are to:

- Create economic and social revitalization in western Greenbrier County through the development of an ecologically balanced and sustainable industrial park;
- Provide a low cost, reliable supply of steam and hot water for use by the industrial park;
- Provide electrical energy for distribution to the national electric grid using coal refuse as fuel; and
- Demonstrate an economical coal refuse cleanup strategy by using the coal refuse as a fuel source and using the coal ash for both remediation of acid drainage from coal refuse piles and for production of cement to be used in the manufacture of building materials.

NEPA Scoping Process

DOE published the Notice of Intent (NOI) to prepare this EIS in the *Federal Register* on June 3, 2003 (68 *FR* 33111). A scoping meeting was held on June 19, 2003, at Greenbrier West High School in Charmco, West Virginia, attended by 228 individuals. The formal scoping meeting was preceded by an informal information session, during which DOE and WGC representatives were available to answer questions about the project and EIS. There were 22 attendees who spoke at the meeting, and 44 individuals submitted comment cards. In addition to the comments received during the formal scoping meeting, 13 comments were received by telephone, eight comments were submitted via e-mail, and four letters were received via the U.S. Mail during the June 2003 public scoping period. Comments received during the scoping period pertained to the following issues:

- Demonstration of need for the proposed project based on demand for electricity in Greenbrier County.
- Consideration of alternatives other than coal refuse combustion (use of higher-grade fuels, wind or solar power, energy conservation).
- Apparent dependence of power plant cost-effectiveness on the success of associated operations (EcoPark, ash byproducts production, use of ash for remediation).
- Air emissions of the proposed facility based on dispersion models, ability to obtain air permits, impacts on attainment of National Ambient Air Quality Standards (NAAQS) (especially ozone), use of Best Available Control Technology (BACT), increased smog and acid rain, water vapor plumes and fog from cooling towers, air impacts on natural areas.

- Human health impacts of air emissions, impacts on sensitive populations, impacts from the use of treated sewage effluent for power plant operations.
- Water resources impacts from disturbance of the Anjean site and temporary storage of coal refuse piles, elevated stream temperatures from disposal of waste heat, reduced stream flow due to diversion of treated sewage effluent for power plant use, acid rain and mercury deposition in streams.
- Impacts on wetlands and floodplains from project siting; impacts on property owners caused by wetland mitigation requirements.
- Impacts on protected plant and animal species, terrestrial and aquatic ecosystems, including facility construction and operation as well as operations at the Anjean site.
- Transportation and roadway infrastructure impacts from truck transport of coal refuse and ash, impacts on traffic, and roadway safety resulting from the use of overweight trucks.
- Noise impacts along potential truck and rail routes for coal refuse and ash hauling; noise impacts from construction and operation of power plant and associated facilities.
- Socioeconomic impacts on the community and county, local employment, potential effects on tourism, reductions in property values near facilities, vulnerability of project economic success due to dependence on EcoPark success, impacts on taxpayers to support the project.
- Environmental justice issues due to the predominance of low-income households in the region.
- Potential impacts on historic and archeological resources.
- Materials and waste management impacts associated with Anjean site reclamation, storage areas for coal refuse at the plant, ash disposal and other waste products, potential radiation exposure associated with ash byproducts.
- Impacts on viewsheds, especially at nearby parklands, due to visible vapor plumes; other potential impacts on recreational resources.
- Cumulative impacts from the construction of additional co-production plants in the region based on the successful demonstration of the proposed plant; cumulative impacts from coal mining and limestone quarrying to support the proposed plant.

Comments on the Draft EIS

EPA's Notice of Availability of the Draft EIS was published in the Federal Register on December 1, 2006 (71 FR 69562), and DOE's Notice of Availability of the Draft EIS was published in the Federal Register on December 4, 2006 (71 FR 70371 – 70372). DOE conducted a public hearing at the Western Greenbrier Middle School in Crawley, West Virginia on January 4, 2007. The public was encouraged to provide oral comments at the hearings and to submit written comments to DOE.

Comments received on the Draft EIS are detailed in Volume 3 ("Comments and Responses on the Draft EIS"). DOE has responded to these comments, including providing further information in the Final EIS, as appropriate. A summary of the major comments and revisions in the Final EIS is provided below:

- ***Innovative technology and funding under the CCPI Program – Public concerns were raised about this project being selected as a facility that uses innovative BACT, and whether to use federal tax money to fund this project as a 'clean coal' project was questioned. In response to these concerns regarding funding, DOE has provided General Response 4.1.1 in Volume 3 that reiterates DOE's purpose and need for this project. DOE has provided individual responses to***

comments on the specifics of the technology as they arise in a comment document in Volume 3. A number of commenters also questioned whether the funds for this project would be better used for another purpose. General Response 4.1.4 of Volume 3 discusses the goals of the CCPI Program and reiterates WGC's purpose for this project. Furthermore, Section 1.2 of Volume 1, which discusses the CCPI Program in more depth, has been added.

- ***Financial viability of the project - Many commenters expressed concern about the financial viability of the proposed project based on factors such as the availability of adequate fuel supplies and cooling water, as well as the marketability of the raw cement product. These comments expressed concerns about the plant being abandoned prematurely and leaving the local governments with an undue economic burden. General Response 4.1.2 is provided in Volume 3 that addresses these concerns.***
- ***Need for power supply – Several commenters questioned whether another power plant is needed to supply power in West Virginia and expressed the opinion that the state has all the power it needs. The purpose and need for this project are reiterated in General Response 4.1.3 of Volume 3.***
- ***Selection of alternatives analyzed – Various commenters stated that they would like to see additional alternatives analyzed, noting that the Council on Environmental Quality's (CEQ's) NEPA regulations [40 CFR 1502.14] require an agency to consider reasonable alternatives, including those not within the lead agency's jurisdiction. New text has been added to Section 2.6 of Volume 1 that discusses the selection of alternatives in more detail. General Response 4.1.5 of Volume 3 discusses how the alternatives to be analyzed were chosen and why the use of alternative fuels or other energy resources were not analyzed for this EIS.***
- ***Coal refuse piles and prep plant – DOE received a number of comments related to the use of coal refuse as a fuel, activities that would be undertaken to remove coal refuse materials from Anjean and other coal refuse sites, and reclamation activities that would be undertaken at the sites. To address these concerns, the responses under General Response 4.2 of Volume 3 presents additional information and clarification on several key topics: demonstration of 20-year supply (General Response 4.2.1); refuse site and prep plant operations (General Response 4.2.2); success of similar applications of ash (General Response 4.2.3); leachate of arsenic (General Response 4.2.4); and the management of prep plant spoils (General Response 4.2.5). Additionally, the Memo of Understanding (MOU) and the Waste Coal Access Agreement for the Anjean site have been included as Appendix N. Supporting material on case studies regarding the use of ash application as a remediation technique has been added as Appendix P. New text discussing potential water quality issues at the coal refuse sites has been added to Section 4.6.3.5 of Volume 1.***
- ***Air and health-related issues – Several commenters raised concerns about air and health-related topics. To address these concerns, the responses under General Response 4.3 of Volume 3 presents responses on the following key topics: the BACT analysis (General Response 4.3.1); fuel quality and impacts to air pollution and global warming (General Response 4.3.2); and mercury and acid deposition (General Response 4.3.3). A final court ruling by the West Virginia Air Quality Board (AQB) affirmed the issuance of WGC's air permit by WVDEP. A testimonial given by an air modeling expert and the findings of the AQB's final ruling have been added as Appendix O2 and O3, respectively. New text, which discusses the BACT analysis and the AQB's court ruling, has been added to Section 4.3 of Volume 1. Additionally, Sections 4.3 and 4.14 (Volume 1) includes new discussions on the HCl and HF calculations in WGC's air permit and, in light of a new $PM_{2.5}$ standard, a reevaluation of the $PM_{2.5}$ originally estimated in the Draft EIS.***
- ***Water use – DOE received public comments related to the use of the Meadow River and local groundwater sources for plant process water. Concerns were also expressed about the potential***

adverse effects to the Gauley River watershed and uncertainties that were communicated in the EIS related to groundwater studies and modeling. The responses provided in General Response 4.4 of Volume 3 addresses these water use concerns. The results of a recent pumping test are discussed in Section 4.6.3.4 of Volume 1 and the report has been added as Appendix D2. New text regarding the West Virginia Division of Natural Resources' (WVDNR's) guidelines and clarification on the use of the Meadow River has been added throughout Volume 1 (Chapter 2, Section 4.4.3.3 and Section 4.6.3.4).

- ***Discharge of heated effluent – Several commenters expressed concerns about the impacts to streams from the discharge of heated effluent from the proposed facility. General Response 4.5 of Volume 3 addresses this issue.***
- ***Impacts on flooding – Several commenters expressed concerns that the facility would impact the floodplain. General Response 4.6 of Volume 3 addresses this issue.***
- ***Truck traffic and impacts on safety, noise, and dust – Several commenters expressed concerns that, due to the increased truck traffic related to construction and plant operations, certain roads and bridges may experience a decrease in the level of service (LOS). Also, commenters were concerned that the use of overweight trucks would increase the rates of damage to roadways, and that the increased truck traffic would cause increased noise, air pollution, accident risks and traffic congestion for local residents. These issues are addressed in General Response 4.7 of Volume 3.***
- ***Incomplete and unavailable information – Several commenters raised the issue of incomplete and missing data in the EIS and stated that a revised Draft EIS or supplemental EIS should be issued. DOE has responded to these comments in General Response 4.8 of Volume 3, which also summarizes the areas where data is unavailable or incomplete in the EIS.***
- ***Biological impacts resulting from the new transmission corridor – Comments were made on quantifying the wetlands impacts and discussing wildlife impacts from the new transmission corridor in the EIS. New text has been added to Section 4.7 of Volume 1 that expands on discussions that were included in the Draft EIS. The new text provides an update on WGC's wetlands encroachment permitting status with USACE and on impacts to wildlife and habitat fragmentation from the new transmission corridor.***

Volume 3 contains copies of all comment letters that were received by DOE. Individual responses to comments raised in each comment document are provided with the comment letters.

Key Features of the WGC Project

The proposed WGC Project and related elements of the Co-Production Facility cover a number of areas in the vicinity of Rainelle, West Virginia (see Chapter 2 of the EIS). The major components of the WGC Project are summarized in the following paragraphs. Options considered by WGC for respective project components are summarized in a subsequent section of this summary.

Co-Production Facility

The proposed site for the Co-Production Facility is located in an area identified as the "E&R Property," which is positioned just within the southwestern municipal limits of Rainelle. The site includes approximately 23 acres (9 hectares) of land directly south of Sewell Creek. From its boundary with Sewell Creek, the site extends to the east and southeast astride the partially leveled northeastern end of a ridgeline connected with Sims Mountain. The proposed EcoPark site consists of approximately 26 acres (11 hectares) of land between Sewell Creek, Wolfpen Creek, and a CSX rail line that parallels highway WV 20. The potential ash byproduct manufacturing facilities (privately financed and independent of the

Co-Production Facility) would be located in the southern portion of the EcoPark property on a 6-acre (2-hectare) site immediately northwest of Sewell Creek and the power plant site.

The Co-Production Facility would include the following key processes and features:

- CFB boiler to burn the processed fuel incorporating an inverted cyclone (i.e., a separator that removes particulate matter from the combustion gas stream).
- Integrated Flash Dryer Absorber (FDA) and baghouse using limestone to reduce sulfur dioxide and particulate levels in the flue gas stream.
- Selective Non-Catalytic Reduction (SNCR) system to reduce the emissions of nitrogen oxides through the use of aqueous ammonia.
- Kiln facilities to convert waste ash materials produced by the CFB, plus limestone, alumina, and gypsum into sulfo-aluminate-belite (SAB) cement.

Fuel Sources and Beneficiation/Prep Plant

As a fuel supply, WGC plans to use coal refuse sites within approximately 30 miles (50 kilometers) of Rainelle that are reasonably accessible by existing roads and have acceptable coal refuse characteristics (e.g., British thermal unit (BTU) value, sulfur content, particle size, etc.) (***for more details on the fuel supply, see Sections 2.2.2 and 2.4.3***). WGC has identified two principal coal refuse sites (Anjean and Green Valley) and two supplemental coal refuse sites (Donegan and Joe Knob) that would serve as the initial fuel sources for the Co-Production Facility (see Figure S-1). WGC proposes to extract coal refuse from these four sources over a 20-year operating period at a rate of approximately 1.2 million tons (1.1 million metric tons) per year.

Anjean Mountain is an abandoned surface mine located approximately 14 miles (22 kilometers) northeast of the Co-Production Facility site. The entrance to Anjean Mountain is approximately 6 miles (10 kilometers) north of US 60 on Anjean Road (CR 1). The Green Valley coal refuse site is located approximately 12 miles (19 kilometers) north of Rainelle and 3 miles (5 kilometers) north of Quinwood on WV 20, just east of the community of Green Valley in southern Nicholas County. The Donegan site is located along CR 39/14 and adjacent to the community of Jetsville in southeastern Nicholas County, approximately 28 miles (45 kilometers) from Rainelle. Joe Knob is located approximately 2 miles (3 kilometers) east of the Anjean site on the same access road.

WGC intends to obtain the services for crushing, sizing, and beneficiation of coal refuse from a third party that would design and construct an innovative "Low Elevation Coal Processing Plant." The major advantage to the innovative prep plant design would be the reduction in height and structures and its modular design, which would allow for the relative ease of construction and disassembly in anticipation of relocation to the next coal refuse site.

To minimize transportation-related impacts, such as cost, traffic safety, and exhaust emissions, the prep plant would ideally be located at or near the coal refuse source. For the purposes of siting a prep plant, Anjean and Joe Knob were considered one source because of their close proximity (within 2 miles apart and on the same haul road). Therefore, a total of three sites would be needed for prep plant operations at different stages of the project. The suitability of a site for a prep plant would be based on several siting criteria, including: property availability, acreage, accessibility, proximity to coal refuse source, utilities availability, environmental impacts (e.g., potential for flooding) and required permits.

At any given time, only one prep plant would be operating and its location would mainly be dependent on the location of the coal refuse. WGC has identified five potential locations for the prep plant: AN1, AN2, and AN3 are candidate locations for processing coal refuse from the Anjean and Joe Knob sources;

DN1 and DN2 are candidate sites for the Donegan coal refuse source; and GV is the proposed location for the Green Valley source. The majority of the sites are located within a mile or two of the fuel source that they would be processing, with the exception of DN2, at Beech Knob, which is located approximately 7 miles (11 kilometers) south of Donegan. All of the sites, with the exception of DN2, are located away from homes, businesses and other sensitive receptors. DN2 is near the current property owner's residence. ***For further details on the beneficiation of coal refuse and the prep plant sites, see Sections 2.2.2, 2.4.3 and 2.4.4.***

Limestone Sources

The proposed ***power plant*** facility would require limestone for sulfur removal in the CFB boiler operations and for use in the cement kiln ***(for more details on the limestone supply, see Sections 2.2.4 and 2.4.5)***. Because the kiln would require a higher quality limestone than the boiler, WGC evaluated several commercial sources for limestone supply, including the Boxley ***Quarry in*** Alta and the Savannah Lane, Greystone, Fort Springs, and Mill Point quarries (see Figure S-1). WGC also considered the use of lime kiln dust to serve as the source of calcium oxide, versus limestone, for the kiln operations. Lime kiln dust could be obtained from sources located in Virginia or from shipments received via barge in Charleston, West Virginia.

Water Sources

The principal sources of water for the plant process would include treated effluent from the Rainelle Sewage Treatment Plant (RSTP) supplemented by water from local groundwater wells and/or the Meadow River. ***The potential water use options are described in greater detail in Section 2.4.6.*** A new pipeline would convey treated effluent to the WGC site from the RSTP, which is located at the confluence of Sewell Creek and the Meadow River. The proposed corridor for the water line would generally follow existing pipeline easements held by the Public Service District #2 to the site. Depending upon the availability of customers, steam lines may also be extended along the water line corridor and could potentially be routed to industrial users in the EcoPark or elsewhere in the immediate vicinity of the power plant.

Material Transportation

The largest incoming material sources would be fuel and limestone. Coal refuse would be transported in off-road trucks sequentially from Anjean/Joe Knob, Donegan, and finally Green Valley to the respective prep plant site servicing the active coal refuse pile. The resulting beneficiated fuel would be transported to the CFB plant site by on-road trucks. As these fuel sources would be depleted after an anticipated 20-year lifespan, other coal refuse sites would be used within the 30-mile radius of Rainelle and likely located along either WV 20 or US 60. Limestone sources are generally located in the vicinity of Lewisburg, and limestone would be conveyed to the facility by on-road trucks. Other materials delivered on a smaller scale by commercial suppliers would include aqueous ammonia for nitrogen oxide reduction at the power plant and sources of alumina and gypsum for the kiln. ***See Section 2.4.7 for a more detailed description on the material handling and transportation for the project.***

The largest waste streams requiring transport from the site would be fly ash and bottom ash generated by the boiler, along with smaller amounts of general solid wastes. Marketable byproducts could include cement and other ash byproducts from potential manufacturing facilities (privately financed and independent of the Co-Production Facility) at the EcoPark. A portion of the bottom ash would be transported to the kiln as raw material for the cement facility. The alkaline fly ash and excess bottom ash not required for the kiln would be transported to the prep plant sites by the trucks that delivered the fuel along the same transportation routes for mixing with reject material and return to the mine sites. WGC would contract for the collection and disposal of general solid wastes.

Trucks transporting materials to and from the site would travel during the daytime shift, 8 a.m. to 5 p.m., Monday through Friday. The fuel/ash ***would be delivered by*** 40-ton, 3-axle dump trailers, while the limestone would be delivered by 20-ton, 2-axle dump trailers. ***In the worst case, a total of 97 round trips per day would be made by delivery trucks (mainly on US 60, WV 20 and CR 1 – see Figure S-1).*** Commercial rail delivery of some process materials (e.g., alumina) to existing spurs may be considered; however, these deliveries would ***be in small quantities and occur on existing scheduled rail deliveries and would not result in an increase to existing rail frequency***.

Power Transmission Corridors

The WGC Co-Production Facility would produce electricity for distribution on the national power grid. An existing American Electric Power (AEP) transmission corridor right-of-way (ROW) is located approximately 4,000 feet (1,220 meters) west of the proposed WGC power plant site. Initial WGC plans included connecting at this point on the power network via a proposed transmission line that would cross WV 20, in a northwesterly direction. However, as project planning and coordination with the Pennsylvania Jersey Maryland (PJM) Regional Transmission Organization (RTO) progressed, it was determined that the electrical capacity of the existing AEP transmission lines was not sufficient to support the total plant generation capacity without substantial upgrades in both directions. Network reinforcements were considered too costly for this approach to be viable. Hence, current plans provide for the plant to be connected to the Grassy Falls 138kV substation (owned by Allegheny Power) approximately 18 miles (29 kilometers) north of Rainelle via a new 138kV line. WGC would procure a ***100-foot (30-meter) wide*** ROW ***for the new line***, clear the corridor, and construct and maintain the power transmission ***line***. ***See Sections 2.2.7 and 2.4.8 for more details on the power transmission corridors.***

Land Exchange

The proposed transmission corridor from the Co-Production Facility site to the existing AEP transmission line traverses approximately 17 acres (7 hectares) of land owned by the City of Rainelle's Board of Park and Recreation Commissioners. The property ranges from 300 to 500 feet (90 to 150 meters) in width and is approximately 2,000 feet (600 meters) in length from east to west. This land has been set aside for recreational and other public uses and includes a small picnic area that abuts WV 20 and the Greenbrier Hills Golf Club. Because public funds for open space recreation were used to reserve this property, the land cannot be used for a transmission corridor unless it is acquired and replaced with like property. As a result, WGC has worked with a local property owner, Plum Creek Timberlands, L.P., which has agreed to acquire the property and provide alternate property in exchange (i.e., the "exchange property"). The exchange property is located between the AEP transmission line and US 60, immediately west of the golf course.

Preferred Alternative

WGC has considered various options for implementing a proposed project to design, construct and demonstrate a Co-Production Facility based on an innovative atmospheric-pressure circulating fluidized-bed (ACFB) boiler with a compact inverted-cyclone design (as explained below under "WGC Options"). These options are for the power plant site, fuel supply, limestone supply, water supply, material handling and transportation, and power transmission corridor (these options are sometimes referred to in this EIS as "WGC Options"). WGC has identified a specific configuration of these options that WGC would prefer for implementing the project. DOE has conducted an independent analysis of each of WGC's options and has concluded that DOE's preferred alternative is to provide cost-shared funding for the WGC- proposed project implemented in the specific configuration that WGC prefers. That configuration comprises the following options (see below, "WGC Options"): Option A for the Power Plant Site; all four options for the Fuel Supply Sites; Option A for means of Limestone

Supply; Option B for Water Supply; Option A for Truck Transport and Option C for Power Transmission.

DOE Alternatives

Congress not only prescribed a narrow goal for the CCPI, but also directed DOE to use a process to accomplish that goal that would involve a more limited role for the federal government. Instead of requiring government ownership of the demonstration project, Congress provided for cost-sharing in a project sponsored by the private parties, with the provision for repayment of the public funds invested. Therefore, rather than being responsible for the siting, construction and operation of the projects, DOE has been placed in the more limited role of evaluating CCPI project applications to determine if they meet the CCPI's goal. It is well established that an agency should take into account the needs and goals of the applicant in determining the scope of the EIS for the applicant's project.

DOE has identified and analyzed two reasonable alternatives in this EIS:

(1) Provide cost-shared funding for the WGC Project as proposed, or subject to certain mitigation, for the design, construction, and demonstration of a Co-Production Facility based on an innovative atmospheric-pressure circulating fluidized-bed (ACFB) boiler with a compact inverted-cyclone design ("Proposed Action" – essential features of this alternative are described in Section 2.1, Chapter 2 of Volume 1).

(2) The second alternative is for DOE not to fund the applicant's proposed project ("No Action").

Although DOE here considered only two overall alternatives, it has examined numerous implementing alternatives for the power plant site, fuel supply, water supply, limestone supply, means of transportation, and transmission corridors (these options are described by component group below, under "WGC Options"). For example, DOE has examined three locations for the proposed power plant facility, each of which would change the size of the power plant footprint. Given that one of the advantages of the inverted cyclone technology is that it reduces the plant footprint in comparison to traditional cyclone technology, the size of the footprint is relevant to DOE's decision to fund or not fund. DOE has also examined four different coal refuse sites for fuel supply. These sites vary widely in size and distance from the plant site. DOE has examined secondary and tertiary water supply options that would involve varying degrees of surface (river) water and groundwater. DOE has further considered options for transportation.

These options, in some instances, have distinct environmental impacts. For example, one option for water supply would reduce streamflow in the Meadow River to a greater degree than the other option. This EIS analyzes in detail, the environmental and socioeconomic impacts of these different options. In Section 4.4.3.3 (Volume 1), DOE analyzes a number of impacts from the two options, including impacts on average daily flow, water balance and recreational uses. DOE similarly analyzes the environmental impacts from the options for other components of the project (such as power plant siting and transmission corridor siting) in detail.

After considering this range of reasonable implementation options, DOE concluded that providing cost-shared funding for WGC's configuration of options is the Preferred Alternative. Further, DOE gave full consideration to comments received during public scoping and the comment period for the Draft EIS when examining the range of options and related impacts. Other than comments recommending alternatives outside the scope of the purpose and need for agency action and alternatives that DOE has already considered, DOE received no comments from the public in the NEPA public process suggesting a specific alternative that DOE should consider with respect to the WGC Project.

WGC Options

WGC has considered various options for implementing the proposed project and is continuing to refine and evaluate options for project components. The WGC Project components and options are summarized below and presented in ***Sections 2.4.2 through 2.4.8 and Section 2.6.2*** of this EIS for comparative purposes. ***The options, as described in the EIS, are independent and discrete for each project component. For example, Option A under Facilities Siting is not related to Option A under Limestone Supply and are only labeled as such to identify the multiple options under a single project component.*** Unless otherwise indicated, the options were carried forward for evaluation in Chapter 4 of the EIS, in which the potential impacts of the proposed WGC Project components and options are described in comparison to the No Action Alternative.

Facilities Siting

WGC considered the following options for the location of the proposed facility as described in Section 2.4.1 of this EIS:

- Option A – E&R Property with a Reduced Power Island Footprint.
- Option B – E&R Property with an Expanded Power Island Footprint and Earthen Berm.
- Option C – E&R Property with an Expanded Power Island Footprint, Earthen Berm, and Rail Spur.

WGC identified Option A as the preferred configuration for the proposed power plant site. Although Options A and B have been carried forward for detailed evaluation in this EIS, DOE has eliminated Option C from further consideration, because the infrastructure improvements required to provide rail access to the plant site and to coal refuse sites would not be ***practicable from an operational standpoint***. ***The multiple locations of the coal refuse sites are a primary reason that rail transport of the fuel supply would be impractical.***

Fuel Supply

During the conceptual design process for the Co-Production Facility, WGC identified four coal refuse sites that would serve as the principal fuel sources expected to meet WGC's requirements for demonstrating a minimum 20-year fuel supply as described in Section 2.4.3 of this EIS:

- Anjean Mountain (Buck Lilly)
- Green Valley
- Donegan Mine
- Joe Knob

All four sites are components of the Proposed Action and they have been evaluated in this EIS in comparison to the No Action Alternative.

Additionally the prep plant would need to be sited at or near the coal refuse piles to provide economic feasibility, off-road vehicle access (where needed) and limited environmental impacts. WGC identified six candidate sites for the prep plant as described in Section 2.4.4 of this EIS:

- AN1, AN2, and AN3 – for the Anjean and Joe Knob sites.
- DN1 and DN2 – for the Donegan site.
- GV – for the Green Valley site.

One candidate site would be selected for each of the three coal refuse areas to process fuel obtained during the course of extraction from the respective area.

Limestone Supply

As described in Section 2.4.5 of this EIS, the options considered for sources of calcium carbonate or calcium oxide material include:

- Option A – Truck limestone from the Boxley ***Quarry in*** Alta (for the boiler) and Mill Point (for the kiln), with trucking the responsibility of the quarry or other third party.
- Option B – Truck limestone from Greystone quarry or other permitted quarry in the Lewisburg area (for the boiler) and Mill Point (for the kiln), with trucking the responsibility of the quarry or other third party.
- Option C – Truck limestone from an acceptable quarry in the Lewisburg area (for the boiler), with trucking the responsibility of the quarry or other third party, and barge material with high calcium oxide content (for the kiln) to Charleston and truck it under contract to the site.

Because of the higher limestone quality and shorter travel distances in Option A, WGC identified this option as the preferred means of limestone supply for the project. Although Options A and B have been carried forward for detailed evaluation in this EIS, DOE has eliminated Option C from further consideration, because the transport of calcium oxide material via barge and truck would not be ***practicable from an operational standpoint***.

Water Supply

As described in Section 2.4.6, WGC intends to use effluent from the RSTP as the primary source of process water for the power plant. To augment this source, WGC proposes to use the following options for supplemental sources of process water:

- Option A – Groundwater would provide the secondary source of process water supply for the power plant, and surface water would be the tertiary source. Potential groundwater sources would include Production Well Number 1 (PW-1), PW-3, and other potential wells located outside the drawdown area for PW-1, PW-3 and the Rainelle public water system wells. During periods when groundwater withdrawals would cause unacceptable drawdown of the local aquifer, surface water would be withdrawn from the Meadow River using a temporary intake structure as a supplemental source of process water supply.
- Option B – Surface water would provide the secondary source of process water supply for the power plant, and groundwater would be the tertiary source. Water from the Meadow River would be withdrawn at a permanent intake constructed in the vicinity of the RSTP and conveyed to the WGC plant using the same pipeline as the RSTP effluent. During periods when withdrawals would cause the flow in the Meadow River to decline below 60% of ***the average annual or seasonal flow*** (i.e., ***based on the Tennant Method,*** the river flow rate above which adverse water quality and aquatic habitat impacts would not be expected), groundwater would be withdrawn from PW-1, PW-3, and other potential wells as a supplemental source of process water supply. ***Since the Draft EIS was published, river withdrawal guidelines have been developed by WVDNR, including recommended flows to be maintained.***

WVDNR estimated flows in the Meadow River using the Watershed Characterization and Modeling System and determined that the average annual flow for the proposed withdrawal site is approximately 296 cubic feet per second. WVDNR also reviewed aquatic sampling results immediately downstream

from the proposed location of the intake structure on the Meadow River. WVDNR has prescribed the following guidelines which would be followed by WGC:

- ***A flow of 178 cubic feet per second must always be maintained in the Meadow River during the months of April – September (Spring/Summer);***
- ***A flow of 118 cubic feet per second must always be maintained in the Meadow River during the months of October – March (Fall/Winter);***
- ***Approximately 2.7 cubic feet per second is the maximum rate at which WGC would be allowed to withdraw water from the river; and***
- ***A flow monitoring gage via a calibrated staff (i.e., a rated staff that relates water levels to corresponding streamflows at a given location) must be implemented to alert operators or inspectors when the flows are at or approaching the thresholds.***

Details of WVDNR's stream studies and modeling, potential impacts, and specific monitoring requirements will be reviewed and made available by WVDEP during the 401 Certification permitting process.

Based on the amount of RSTP effluent generated on a seasonal basis, an additional 300 to 800 gallons per minute (0.45 to 1.15 million gallons per day or 1.70 to 4.35 million liters per day) would be required from the supplemental sources. Because existing studies indicate the aquifer could serve as an effective tertiary source while using the Meadow River as a secondary source, WGC has identified Option B as its preferred method of water supply. This preference is also based on the expectation that the Meadow River will not be adversely affected if withdrawal rates do not result in flow declining below 60% of the ***average*** annual or seasonal flow rate. Both options have been carried forward for detailed evaluation in the EIS. ***The ongoing groundwater study referenced in the Draft EIS has now been completed and reviewed by DOE and has been added to the Final EIS (see Appendix D2). See Sections 4.4 and 4.6 of Volume 1 for detailed discussions on the impacts to surface water and groundwater, respectively.***

Material Handling and Transportation

WGC considered the following options for transportation of fuel supplies as described in Section 2.4.7 of this EIS:

- Option A – Truck transport
- Option B – Rail transport

Based on the need for substantial rail upgrades, the rail alignment constraints at the plant site, and the cost implications related to excessive material handling requirements, rail transport was not considered economically feasible or practical from an operational standpoint and, therefore, Option B was eliminated from further consideration. ***As mentioned under Facilities Siting, the multiple locations of the coal refuse sites are a primary reason that rail transport of the fuel supply would be considered impractical.*** Truck transport, Option A, has been evaluated as the only feasible means of transportation for fuel supplies in this EIS.

Power Transmission Corridor

As described in Section 2.4.8 of this EIS, WGC considered the following options for distributing the generated electricity to the national grid:

- Option A –Widen existing ROW to Grassy Falls Substation to accommodate new poles and lines.
- Option B – Upgrade existing AEP poles to carry WGC lines up to Grassy Falls Substation.
- Option C – Construct new transmission corridor to Grassy Falls Substation.

Options A and B would affect more landowners. Option C would have least impact on private landowners, as it traverses large tracts of lands owned by timber companies, and would be more cost effective than the other options. Therefore, WGC has identified Option C as the preferred means of power transmission for the project. All three options have been evaluated in this EIS.

Alternatives Eliminated From Further Consideration

Alternative Coal Technologies

Alternative types of clean coal technologies (e.g., a conventional cyclone design collector rather than an inverted cyclone design collector) or coal type (e.g., high quality coal) are not reasonable alternatives. Such alternatives would not demonstrate a commercial application of the compact, inverted cyclone CFB design that converts waste ash into commercial building products while also integrating power generation with remediation of coal refuse piles. In particular, alternative fuel types such as high-grade coal, oil or gas are outside of the scope of the Proposed Action because they would displace refuse fuel. The use of refuse fuel is a key reason why the WGC Project advances the CCPI's objectives and influenced the selection of the project by DOE. Alternative plant designs that would result in plants larger than those analyzed in this EIS would undermine one of the key advantages of the inverted cyclone design, which is to reduce the footprint of the plant.

A note on design modifications to reduce the "carbon footprint" of the WGC Project: The alternative of incorporating technologies to reduce the "carbon footprint" of the WGC Project during the demonstration period was also considered. DOE recognizes that fossil fuel burning is the primary contributor to increasing carbon dioxide (CO_2) concentrations in the atmosphere (IPCC, 2007). CO_2 is a significant greenhouse gas, and increasing concentrations of greenhouse gases show correlation with global warming. Although CO_2 emissions are not currently regulated under the Clean Air Act, and a viable U.S. market currently does not exist for carbon credits as an incentive to reduce emissions, DOE is concerned about the implications of fossil fuel use on global climate change. Therefore, DOE oversees parallel research programs aimed at reducing the cost of electricity associated with power production and proving the viability of technologies for carbon capture and sequestration (CCS) to reduce CO_2 emissions from fossil fuel use. DOE expects that the combined efforts of these programs will enable large-scale plants to come on-line by 2020 that offer 90 percent carbon capture with99 percent storage permanence at less than a 10 percent increase in the cost of energy services (NETL, 2007).

However, the planned in-service date and CCPI demonstration for the WGC Project is well in advance of the timeline for achieving the DOE CCS goal. At present, mitigation of CO_2 emissions via geologic sequestration is not viable for CFB technology because the CO_2 is exhausted at low pressure (15-25 psi) and at dilute concentrations (3-15 percent by volume). For this reason, in part, CO_2 capture and sequestration is not a reasonable option for the WGC Project at this time. For further information on greenhouse gas impacts from the WGC Project, see "Greenhouse Gases" under Section 4.3.3.2 in Volume 1.

Alternative Energy Sources

Because the CCPI's purpose is to encourage the development of clean coal technologies, alternative energy sources (e.g., wind or solar) would not meet the principal objective of the CCPI for which the WGC Project was proposed. DOE deems that such alternatives are not reasonable because they are outside of the scope of the purpose and need for agency action.

Environmental Impacts

Chapter 3 of this EIS describes the baseline conditions for environmental resources that may be affected by the Proposed Action and No Action Alternative. Chapter 4 of the EIS analyzes the potential impacts or consequences that the Proposed Action and No Action Alternative may have on the respective environmental resources. In summary, both positive and adverse impacts could occur from implementation of the Proposed Action. Positive impacts of the Proposed Action would occur from both the direct and indirect economic effects of construction and operation of the power plant, and economic and environmental benefits related to the reclamation and potential reuse of several coal-refuse sites. Potential adverse impacts that could result from the Proposed Action would primarily be related to construction and operation of the power plant, transportation of the fuel and ash between the coal-refuse sites, and water supply. These potential impacts generally include air emissions, increased noise levels around the plant site and along the primary transportation corridors, visual impacts to properties nearby and adjacent to the power plant site, and potential drawdown of the local groundwater table (depending upon the water supply option selected by WGC). Table S-1 provides a summary comparison of the Proposed Action and No Action Alternative highlighting the principal impacts on respective environmental resources.

Table S-1. Summary Comparison of Alternatives and Potential Impacts

Resource	No Action	Proposed Action
Aesthetic Resources	No change in existing conditions; however, adverse impacts from degraded landscapes at coal refuse sites would remain.	**Power Plant Facilities:** • Option A – Most adverse impacts during construction and operation would occur for the nearest residential properties (located within 1,500 ft (460 m) east of the plant site), including approximately 12 single-family homes, a 52-unit apartment complex, a nursing and rehabilitation center, and approximately 12 mobile homes. The 300-ft (91-m) tall exhaust stack and portions of the 150-ft (46-m) tall boiler building would be visible from various locations in Rainelle. • Option B – The aesthetic impacts would be comparable to Option A. Although the site footprint would be larger, an earthen berm would be provided for noise mitigation and may limit the view of the power plant from adjacent properties. **Fuel Supply:** Extraction of coal refuse would occur at sites in remote areas that were used historically for mining purposes. ***With the exception of Anjean, all coal refuse sites have been reclaimed. Thus, use of fuel supply at Anjean would provide a beneficial impact at this location.*** Reclamation of the sites following completion of extraction would ***ensure continuation of*** long-term aesthetic benefits. The optional sites for the fuel prep plants would be located in remote areas in the vicinities of the coal refuse sites. **Limestone Supply:** Option A or B would obtain limestone from commercial quarries near Lewisburg, approximately 20 mi (32 km) and 40 mi (64 km), respectively, from Rainelle. Both options may also obtain a higher quality limestone from a commercial quarry in Mill Point, approximately 60 mi (97 km) from Rainelle. Aesthetic impacts would be comparable to existing conditions, because extraction would occur within permitted areas of active commercial quarries. **Water Supply:** Water supply structures, including the effluent pipeline from the Rainelle Sewage Treatment Plant (RSTP) to the power plant site, generally would be located within existing utility right-of-ways (ROWs) and would not affect viewsheds permanently. **Material Transportation:** The transport of fuel from the prep plant sites to the power plant would occur on existing heavy haul roadways used for coal and lumber transport regionally. The transport of limestone from the quarries to the power plant would also occur on existing heavy haul roadways. In the worst case, trucks would make a total of 97 round trips (mainly on US 60 and WV 20 or CR 1, depending on source of fuel – see Figure S-1) to the site daily. **Power Transmission:** All three transmission options would include the development of a 100-ft (30-m) wide power transmission line ROW from the plant site approximately 4,000 ft (1,220 m) northwest to an existing American Electric Power (AEP) ROW, which would affect the viewshed along a 9.2-ac (3.7-ha) corridor. • Option A – Widening of the existing AEP ROW by approximately 50 ft (15 m) for 17 mi (27 km) to the Grassy Falls substation would affect the viewshed along a 103-ac (42-ha) corridor. • Option B – Upgrading existing structures along the AEP ROW would not substantially alter the existing viewshed along the corridor after completion of construction. • Option C – The development of a new 17-mi (27-km), 100-ft (30-m) wide ROW to the Grassy Falls substation would affect the viewshed along a 206-ac (83-ha) corridor.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Atmospheric Conditions	No impact; no change in existing conditions.	**Power Plant Facilities:** Emissions would be identical regardless of the option selected for the plant site. Stationary emissions of priority pollutants would comply with National Ambient Air Quality Standards (NAAQS). Volatile organic compounds (VOCs) emissions would be below the prevention of significant deterioration (PSD) threshold***, while NO_x, CO, SO_2, H_2SO_4, PM, and Be would be above the thresholds. For the pollutants that would exceed the PSD thresholds, a BACT analysis was performed.*** The Class II PSD increment consumption by power plant emissions for sulfur dioxide (SO_2), nitrogen oxides (NO_x), and particulate matter (<10 microns [PM_{10}]) would range between 25% and 75% depending upon the pollutant and associated averaging time. The highest increment consumption would occur for PM_{10} emissions (24-hr averaging time) in the immediate vicinity of the site. ***See Table 4.3-6, Class II Prevention of Significant Deterioration (PSD) Increment Consumption, for modeling results.*** Visibility analysis in Class I areas predicted a total of 6 days over a 3-yr period in which the 5% change in light extinction threshold could be exceeded. However, meteorological records suggest that these occurrences may be attributable to natural obscuring conditions (such as fog, clouds, and rain). The plant is expected to meet the Clean Air Mercury Rule limitations and is not expected to discharge objectionable odors. The plant would emit up to 0.87 million tons (0.79 million metric tons) annually of carbon dioxide ([CO_2] a greenhouse gas). ***Although capture and geologic sequestration of CO_2 is not feasible for this project,*** potential plans to provide for the capture and use of waste heat from the power plant for potential commercial, industrial, and residential uses may offset the plant's CO_2 emissions in the range of 0.18 million tons per year (0.16 million metric tons) to 0.32 million tons per year (0.29 million metric tons). **Fuel Supply:** The extraction and processing of coal refuse would result in emissions of fugitive dust (total suspended particulates [TSP] and PM_{10}) that would be comparable for all coal refuse sites and prep plant locations. Emissions would be contained within site boundaries through the use of dust suppression activities in accordance with WV Rules 38 CSR 2. Most of the prep plant system would be enclosed and equipped with control devices such as fabric filters. **Limestone Supply:** Option A or B would obtain limestone from active commercial quarries. The increased production to supply the WGC plant would be accommodated within existing permits for these quarries. Depending upon the future demand for limestone and site-specific quarry operation plans, increases in PM_{10} and TSP air emissions could occur over existing conditions at the commercial quarry sites. It is expected that increased levels of these pollutants would generally be limited to the quarry sites, ***as the concentrations of these pollutants would rapidly dissipate with distance from the activity generating the emissions. The increase in production would be regulated under and bound by existing operating permits, which incorporate standard industry measures to prevent the degradation of atmospheric resources***. **Water Supply:** Construction of the water supply facilities would cause short-term impacts from fugitive dust and vehicle emissions. **Material Transportation:** Screening for mobile emissions sources based on guidelines established by U.S. Environmental Protection Agency (EPA) indicated that transportation activities would have *de minimis* impacts on air quality. **Power Transmission:** Operation of the power transmission lines would not affect air quality. Construction of the lines would result in short-term impacts from fugitive dust and vehicle emissions. • Option A – Widening the existing AEP ROW would require ground-disturbing activities along a 103-ac (42-ha) corridor. • Option B – Upgrading existing structures along the AEP ROW would disturb the least land area of the options. • Option C – The development of a new ROW would require ground-disturbing activities along a 206-ac (83-ha) corridor.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Surface Water Resources	No change in existing conditions; however, adverse impacts from acid mine drainage at coal refuse sites would remain.	**Power Plant Facilities:** Impacts on surface waters during plant construction would be minimized through the implementation of an erosion and sedimentation (E/S) control plan required for a National Pollutant Discharge Elimination System (NPDES) General Construction Permit. Potential impacts during operation would be minimized through the implementation of a storm water management pollution prevention (SWMPP) plan and a groundwater protection (GWP) plan based on the WV Department of Transportation (WVDOT) and the WV Department of Environmental Protection (WVDEP) requirements. • Option A would result in the least impact on surface waters. Post-development runoff was calculated as 55.7 ft^3/s (vs. 67.1 ft^3/s during pre-development). • Option B would result in slightly higher impact on surface waters. Post-development runoff was calculated as 57.6 ft^3/s (vs. 67.1 ft^3/s pre-development). **Fuel Supply:** Temporary impacts of coal extraction on water resources***, such as increased sedimentation resulting in a decrease in water quality,*** would be minimized through the implementation of planned E/S control features (***via best management practices [BMPs]***). Reclamation of the sites under agreements with WVDEP would provide long-term benefits to water quality. The impacts from discharge of storm water runoff from coal refuse piles at the prep plant sites would be minimized through the use of storm water retention ponds at the sites. • Anjean – Although the three candidate sites for the prep plant at Anjean would have similar impacts, AN3 would be within the same sub-watershed as the existing Anjean treatment ponds. • Donegan – Although the two candidate sites for the prep plant at Donegan would have similar impacts, DN1 would be within the same sub-watershed as the existing Donegan treatment ponds. **Limestone Supply:** ***Option A or B would obtain limestone from existing commercial quarries. Thus, potential impacts would be comparable to projected baseline conditions. The increase in production to supply the WGC plant would be regulated under the existing operating permits for these quarries, which incorporate measures to prevent the degradation of surface water resources***. **Water Supply:** The diversion of up to 100% of the RSTP effluent ***(up to approximately 1.5 cfs)*** to the WGC plant for primary water supply would have a long-term beneficial impact on Meadow River water quality because of the elimination of a biological oxygen demand (BOD) source. WGC would derive the balance of 350 to 800 gpm (1,300 to 3,000 L/min) from groundwater and/or surface water sources. To avoid adverse impacts to aquatic habitats, WGC would monitor flows in the Meadow River and limit withdrawals to avoid reductions in flow levels below a state-recommended threshold (see below). • Option A – As the tertiary source of process water supply, withdrawals from the Meadow River would occur only intermittently to make up a smaller proportion of the balance of process water required by the WGC plant during low aquifer conditions. ***The streamflow would be reduced by a maximum of approximately 1.6 to 2.0 cubic feet per second at the end of a 25-year period.*** • Option B – As the secondary source of process water supply, withdrawals from the Meadow River may reduce base flows to make up a larger proportion of the process water required by the WGC plant, but withdrawals would not be made when flows could fall below 60% of the annually or seasonally adjusted average ***flow*** (i.e., below the flow rate above which water quality and aquatic habitat impacts would not be expected), or another comparable withdrawal limitation measure determined in consultation with the state. ***Since publication of the Draft EIS, WVDNR has provided base flow thresholds to be maintained: 178 cfs April through September and 118 cfs October through March. The maximum water demand that the proposed power plant would require is approximately 2.7 cfs, which represents less than 1% of Meadow River's average annual flow. Furthermore, based on the thresholds, withdraw from the river would be limited to high flow conditions. Therefore, impacts to the river are expected to be minor. The streamflow would be reduced by a maximum of approximately 0.8 cubic feet per second at the end of a 25-year period.*** **Material Transportation:** The use of a truck or wheel wash at the power plant and prep plant to clean fuel delivery trucks prior to exiting the site would minimize potential impacts on surface water quality from runoff of contaminants released in transportation corridors. **Power Transmission:** Operation of the power transmission lines would not affect surface water quality. Short-term impacts on water quality during construction of the transmission lines would be minimized through the implementation of a SWMPP plan and a GWP plan based on WVDOT and WVDEP requirements. Power poles would not be erected within surface waters. • Option A – Widening the existing AEP ROW would require the clearing of a 103-ac (42-ha) corridor. • Option B – Upgrading existing structures along the AEP ROW would affect the least land area of the options.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Floodplains	No impact; no change in existing conditions.	**Power Plant Facilities:** Displacement of the floodplain for Sewell Creek would not increase the 100-year flood elevations over the Federal Emergency Management Agency (FEMA) designated height of 1 ft (0.3 m) above existing conditions in the local upstream area. • Option A would result in the least impact on the floodplain, requiring 16 ac (6.5 ha) to be filled. The greatest increase in water elevation for a 100-yr flood would be 0.48 ft (0.15 m). • Option B would result in slightly higher impact on the floodplain, requiring 20 acres to be filled. The greatest increase in water elevation for a 100-yr flood would be 0.67 ft (0.20 m). **Fuel Supply:** No impacts on floodplains would occur at any of the coal refuse sites. • Anjean – All 3 prep plant candidate sites appear to be outside of the 100-yr floodplain, but AN1 is situated in a topographic depression that could be subject to high water. Potential impacts would be avoided through effective site layout and design. • Donegan – Neither candidate prep plant site, DN1 or DN2, is within a floodplain. • Green Valley – Candidate prep plant site GV is not within the 100-yr floodplain, but it is situated near Hominy Creek and could be subject to high water. Potential impacts would be avoided through effective site layout and design. **Limestone Supply:** The increase in production to supply the WGC plant for Option A or B would occur in permitted areas within active commercial quarries and would not affect floodplains. **Water Supply:** The construction of the water supply pipeline would not alter the floodplain, and its location underground would protect it from flood impacts. • Option A – The use of a temporary intake structure on Meadow River would not affect flood flows. • Option B – The permanent intake structure and inlet pool on Meadow River would be designed to prevent an increase in the 100-yr flood elevations upstream by more than 1 foot (0.3 m). **Material Transportation:** The transport of fuel and limestone by trucks would not affect the floodplain. **Power Transmission:** The construction of power transmission facilities would not affect 100-yr floodplains in the respective corridors for Option A, B, or C. Power poles may be situated near stream banks where required but would not obstruct flood flows.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Geology and Groundwater Resources	No change in existing conditions; however, adverse impacts from acid mine drainage at coal refuse sites would remain.	**Power Plant Facilities:** Impacts from ground-disturbing activities would be minimized through the implementation of an E/S control plan as specified for a NPDES General Construction Permit and based on WVDOT and WVDEP requirements. Areas of competent rock encountered at the plant site may necessitate blasting, which would require a permit from the WV Fire Marshall that would outline measures to avoid or minimize short-term impacts. Fuel and material storage areas would be situated on slabs that would be drained to a lined collection pond to minimize release of pollutants to groundwater. Ammonia storage and handling would be located on top of a diked concrete area and comprise of control devices and safety procedures to minimize the potential release of aqueous ammonia to soil or groundwater. • Option A would require the least disturbance of land area for the plant footprint (17 ac [6.9 ha]). • Option B would require somewhat greater disturbance of land area for the plant footprint (20.3 ac [8.2 ha]). **Fuel Supply:** Extraction of coal refuse at all sites would cause potential impacts from accelerated erosion and acid mine drainage (AMD) generation. However, the recovery and reclamation processes would by carefully managed to minimize impacts in accordance with a NPDES General Permit and a remediation plan approved by WVDEP. Ultimately, the long-term reductions in AMD afforded by the remediation of the coal refuse sites are expected to outweigh the short-term increases in AMD generation during extraction. Although an analysis of ash samples indicated that both fly ash and bottom ash contain metals, the Toxic Characteristic Leaching Procedure (TCLP) analysis indicated that the leaching of metals from the ash in significant concentrations would not be expected ***(e.g., values for arsenic and mercury were less than 0.069 and 0.0078, respectively, for both fly ash and bottom ash; see Table 4.6-3 for TCLP results)***. The prep plant would use a closed loop system requiring 100 gpm (380 L/min) of water, which would be supplied by new wells to be constructed on respective sites. Prep plant operations would be the same regardless of site selected. **Limestone Supply:** Option A or B would obtain limestone from existing commercial quarries. The increase in production to supply the WGC plant would be regulated under the existing operating permits for these quarries, which incorporate measures to prevent the degradation of groundwater resources. **Water Supply:** Groundwater pumping tests have indicated that withdrawals from groundwater wells could potentially draw down the local aquifer. Therefore, WGC would ensure that the power plant maintains an adequate supply of process water without adversely affecting the Rainelle water supply and local private wells. ***Draw down levels are expected to be less than the depth of the city well pumps, and therefore, would not adversely impact the local water supply.*** WGC would obtain permits and meet specific requirements prior to initiating additional groundwater withdrawals for supplemental process water in either Option A or B. • Option A – As the secondary source of process water supply, withdrawals from groundwater wells would make up a larger proportion of the process water required by the WGC plant, which could potentially affect aquifer drawdown. ***The streamflow would be reduced by a maximum of approximately 1.6 to 2.0 cubic feet per second at the end of a 25-year period.*** • Option B – As the tertiary source of process water supply, withdrawals from groundwater wells would make up a smaller proportion of the process water required by the WGC plant, which would not be expected to affect aquifer drawdown. ***Since publication of the Draft EIS, WVDNR has provided base flow thresholds to be maintained for the Meadow River. Additionally, the ongoing groundwater study referenced in the Draft EIS has now been completed and reviewed by DOE and has been added to the Final EIS (Appendix D2); however, general impact conclusions remain unchanged. The streamflow would be reduced by a maximum of approximately 0.8 cubic feet per second at the end of a 25-year period.*** **Material Transportation:** The use of a truck or wheel wash at the power plant and prep plant sites to clean fuel delivery trucks prior to exiting the site would minimize potential impacts on groundwater from the infiltration of contaminants released in transportation corridors. **Power Transmission:** Operation of the power transmission lines would not affect geology, soils, or groundwater. Short-term impacts during construction of the transmission lines would be minimized through the implementation of a SWMPP plan and a GWP plan in accordance with WVDOT and WVDEP requirements. • Option A – Widening the existing AEP ROW would require the clearing of a 103-ac (42-ha) corridor. • Option B – Upgrading existing structures along the AEP ROW would affect the least land area of the options. • Option C – The development of a new ROW would require the clearing of a 206-ac (83-ha) corridor. ***Up to 2.5 acres of soils classified as prime farmland soils or farmland could be impacted as a result of construction and/or routine maintenance along the corridor***.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Biological Resources (Including Wetlands)	No change in existing conditions; however, adverse impacts from acid mine drainage at coal refuse sites would remain.	**Power Plant Facilities:** The power plant site has lost most of its original ecological resource value as a result of prior land-disturbing activity. Extensive adjacent acreage of undisturbed upland ***areas*** offer higher quality habitat. The project is not expected to impact any protected species. • Option A would result in the clearing of approximately 15 ac (6 ha) of mostly re-growth vegetation and the loss of ***0.26*** ac (***0.10*** ha) of wetlands. (***As the design phase finalizes, wetlands impacts as listed in this EIS may differ slightly from values listed in the final wetland permit due to refinements of the design. WGC is in the process of consulting with the USACE for the wetland permitting process to identify wetland impacts and methods for avoiding and minimizing impacts and developing suitable forms of wetland mitigation.)*** • Option B would result in greater loss of vegetation and wetland acreage than Option A, including the filling of an oxbow on Sewell Creek and the potential enclosure of an unnamed tributary on the east side of the site. **Fuel Supply:** Coal refuse sites offer habitat of limited value. Recovery and reclamation processes would be carefully managed to minimize impacts in accordance with a remediation plan approved by WVDEP. Ultimately, the coal refuse sites would be reclaimed to an extent that would surpass existing conditions and improve the quality of existing habitat and wetland areas in the vicinity. • Anjean – Of the candidate sites for a prep plant, AN1 has the greatest potential for involving a wetland; but impacts would be avoided through effective site planning and design. • Donegan – Neither candidate prep plant site, DN1 or DN2, contains wetlands. • Green Valley – Candidate prep plant site GV is located near an emergent wetland area that has been vegetated by an invasive plant species. Detailed site planning and design would avoid the emergent wetland area. **Limestone Supply:** Options for obtaining limestone supply from commercial quarries would not affect biological resources. **Water Supply:** The construction of the water supply pipeline would have a temporary impact on a small emergent wetland (***0.03*** ac [***120*** m^2]) along Sewell Creek that would be restored at the end of construction. To avoid potential adverse impacts on aquatic ecosystems, WGC would monitor flows in the Meadow River and limit withdrawals to avoid reductions in flow levels below a state-recommended threshold (see below). Therefore, adverse impacts to aquatic habitat are not expected to occur, so long as the threshold is maintained. • Option A – As the tertiary source of process water supply, withdrawals from the Meadow River would occur only intermittently to make up a smaller proportion of the balance of process water required by the WGC plant during low aquifer conditions. • Option B – As the secondary source of process water supply, withdrawals from the Meadow River may reduce base flows to make up a larger proportion of the process water required by the WGC plant, but withdrawals would not be made when base flows could fall below 60% of the annually or seasonally adjusted average ***flow*** (i.e., below the flow rate above which water quality and aquatic habitat impacts would not be expected), or another comparable withdrawal limitation measure determined in consultation with the state. ***Since publication of the Draft EIS, WVDNR has provided base flow thresholds to be maintained: 178 cfs April through September and 118 cfs October through March. The maximum water demand that the proposed power plant would require is approximately 2.7 cfs, which represents less than 1% of Meadow River's average annual flow. Furthermore, based on the thresholds, withdraw from the river would be limited to high flow conditions. Therefore, impacts to aquatic resources are expected to be minor.*** **Material Transportation:** The use of a truck or wheel wash at the power plant and prep plant sites to clean fuel delivery trucks prior to exiting the site would minimize potential impacts on aquatic ecosystems from runoff of contaminants released in transportation corridors. **Power Transmission:** The permanent loss of wildlife habitat in areas along the proposed power line corridor could displace some dependant species. However, displaced wildlife could continue to use the adjacent undisturbed areas or migrate to abundant comparable habitat nearby. The utility corridor may also create new habitat for edge-dependent species. Wetlands would be avoided during construction as practicable and wetland impacts would be temporary. • Option A – Widening the existing AEP ROW would require the clearing of a 103-ac (42-ha) corridor. • Option B – Upgrading existing structures along the AEP ROW would affect the least land area of the options. • Option C – The development of a new ROW would require the clearing of a 206-ac (83-ha) corridor and potentially affect approximately 5 ac (2 ha) of wetlands, although none would be lost.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Cultural Resources	No impact; no change in existing conditions.	***None of the project components associated with the Proposed Action would occur on, or otherwise affect, federally-recognized Native American tribal lands.*** **Power Plant Facilities:** The WV State Historic Preservation Office (WV SHPO) concurred with the conclusion of a Phase I survey that the proposed project would not have an effect on any potential archaeological resources at the plant site for Option A or B. An historic resources survey concluded that the undertaking would have no effect on National Register of Historic Places (NRHP)-eligible resources and would not alter the existing setting or character of the Rainelle Historic District. The WV SHPO stated that it would issue its findings about the potential for visual impacts on architectural resources after considering comments by the public and the Greenbrier County Historical Society on the Draft EIS. ***Since publication of the Draft EIS, the Greenbrier County Historical Society and the WV SHPO have sent comment letters on the Draft EIS (see Appendix B). The WV SHPO did not identify any specific concerns, but stated that they would complete their review upon receipt of public comments and the Phase I transmission survey, which was completed in October 2006 (see Appendix G). Due to refinements of the transmission corridor, additional Phase I surveys will be conducted and submitted to WV SHPO as an addendum to the October 2006 report; therefore, DOE and WGC will continue consultation with WV SHPO as required under the National Historic Preservation Act (NHPA) Section 106 review process with respect to public comments and ongoing refinements of the transmission line location (Segment C).*** **Fuel Supply:** All of the coal refuse sites have been extensively disturbed by previous mining operations, which would have destroyed any archaeological resources on the sites. None of the sites contain buildings or structures eligible for the NRHP. • Anjean – All three candidate sites for a prep plant (AN1, AN2, and AN3) have been disturbed extensively by prior mining operations and subsequent reclamation efforts, which would have destroyed existing archaeological resources. There are no buildings or structures located on any of the sites. • Donegan – Candidate prep plant site DN1 would be situated on previously developed land occupied by a building used during prior mining operations that is not eligible for the NRHP. DN2 contains no structures and occupies agricultural property that would be evaluated in consultation with the WV SHPO for the potential to affect unrecorded archaeological resources prior to construction. • Green Valley – The GV candidate prep plant site is located on the edge of the disturbed coal refuse site and contains no structures. **Limestone Supply:** The quarries that would supply limestone to WGC in Option A or B are ongoing commercial operations, and the increased production would not affect historic or archaeological resources. **Water Supply:** Most of the proposed pipeline corridor has served as a utility ROW for public service district (PSD) #2 or has otherwise been disturbed. In undisturbed segments, final adjustments in the pipeline alignment would be determined in consultation with the WV SHPO to avoid potential impacts on unrecorded archaeological resources. **Material Transportation:** The transport of fuel and limestone by trucks would occur on designated heavy haul routes and would not affect cultural resources. **Power Transmission:** The alignment common to all three options extending from the WGC plant site to the AEP ROW was determined not to contain any high-probability areas for archaeological resources. • Option A – The area to be widened along the AEP ROW would be surveyed and evaluated in consultation with the WV SHPO, and final adjustments in the alignment would be made to avoid potential resources. • Option B – Upgrading existing structures along the AEP ROW would occur in previously disturbed areas. • Option C – The proposed new corridor would be surveyed and evaluated in consultation with the WV SHPO and final adjustments in the alignment would be made to avoid potential archeological resources.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Socioeconomics	No change in existing conditions; however, the area would lose the potential for a needed stimulus to prevent further decline in the local economy and the working-aged population.	**Power Plant Facilities:** Construction and operation of the power plant would increase local employment opportunities and provide economic stimulus to area businesses without displacing existing residents or businesses or adversely affecting current trends in population growth and the demand for housing. During construction, the project is expected to employ an average of 185 individuals per month over a 29-month period. During the demonstration phase and subsequent commercial operation, the proposed project would employ approximately 126 full-time personnel and result in an additional 114 jobs from indirect economic activity. • Option A – Most adverse impacts on residential property values would affect the nearest residential properties (located within 1,500 ft (460 m) east of the plant site), including approximately 12 single-family homes, a U.S. Department of Agriculture (USDA) Rural Development property (a 52-unit apartment complex), a nursing and rehabilitation center, and approximately 12 mobile homes. • Option B – The power plant would affect the same residential properties as indicated for Option A; however, the site footprint would be larger and the eastern site boundary would be even closer to the properties. **Fuel Supply:** The reclamation of degraded coal refuse sites and remediation of AMD impacts would provide potential beneficial socioeconomic impacts to the local communities, county, and state. All six candidate prep plant sites are located in remote areas and would not affect nearby residential property values. **Limestone Supply:** The increased demand on regional quarries under Option A or B would have potential beneficial impacts on these commercial enterprises that would ultimately extend to the regional economy. **Water Supply:** The water supply pipeline would follow an existing ROW and cross other open lands. Pipeline construction would have limited, short-term adverse impacts on adjacent properties. **Material Transportation:** The transport of fuel and limestone by trucks would occur on designated heavy haul routes. Residential properties along the routes may be affected by increased truck traffic and noise. **Power Transmission:** The alignment common to all three options extending from the WGC plant site to the AEP ROW would not displace residents or businesses or affect property values. • Option A – The widening of the AEP ROW would not displace residents or businesses, and property owners would be compensated for granting an easement. • Option B – Upgrading structures along the AEP ROW would occur within an existing easement. • Option C – The proposed new power transmission corridor would not displace residents or businesses, and property owners would be compensated for granting an easement.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Environmental Justice	No change in existing conditions; however, the area would lose the potential for a needed stimulus to help reduce the high percentage of low-income residents.	**Power Plant Facilities:** The overall impacts of the Proposed Action on local residents generally would be favorable, although adverse impacts would affect the residents nearest the site of Option A or B as described for Socioeconomics (i.e., increased traffic and associated emissions, long-term adverse impacts on property values). As defined by the President's Council on Environmental Quality (CEQ) a "minority population" area is an area where the percentage of defined minorities exceeds 50 percent of the population. The proportion of minorities in the region of influence for the power plant site does not exceed 50%, and it is not meaningfully greater than the proportion of minorities in the larger local jurisdictions, county, and state. Therefore, the proposed power plant would not have a disproportionately high and adverse impact on minority populations. Because the general population of western Greenbrier County represents a "low-income population" compared to the county and state, the adverse impacts of the power plant would affect low-income populations regardless of where it would be sited in the region. However, the proportion of low-income residents nearest the site of Option A or B does not exceed 50%, and it is not meaningfully greater than the proportion in the general population of western Greenbrier County. Moreover, construction and operation of the power plant would increase local employment opportunities and provide economic stimulus to help reduce the high percentage of low-income residents locally. Therefore, the proposed power plant would not have a disproportionately high and adverse impact on low-income populations. **Fuel Supply:** The extraction and processing of fuel at any of the coal refuse sites and candidate prep plant sites would not have a disproportionately high and adverse impact on minority populations or low-income populations. **Limestone Supply:** Option A or B would obtain limestone from quarries that are ongoing commercial operations and would not have a disproportionately high and adverse impact on minority populations or low-income populations. **Water Supply:** The construction and operation of water supply features would not have a disproportionately high and adverse impact on minority populations or low-income populations. **Material Transportation:** The transport of fuel and limestone by trucks would occur on designated heavy haul routes and would not have a disproportionately high and adverse impact on minority populations or low-income populations. **Power Transmission:** None of the optional alignments for power transmission would have a disproportionately high and adverse impact on minority populations or low-income populations.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Land Use	No impact; no change in existing conditions.	**Power Plant Facilities:** Although the region of influence is not subject to a zoning ordinance or land use plan, the power plant would be located on disturbed land near areas used historically for industrial activities. Potential business opportunities arising from the proposed project could cause land uses surrounding the power plant to change. The three communities sponsoring the project envision the development of an industrial park (EcoPark) on adjoining vacant land that was previously designated for such use but has not been developed. • Option A – Most adverse impacts during construction and operation would occur for residential properties located within 1,500 ft (460 m) east of the plant site, including approximately 12 single-family homes, a 52-unit apartment complex, a nursing and rehabilitation center, and approximately 12 mobile homes. In addition, the Rainelle Elementary School and Rainelle Medical Center are located 2,000 ft (610 meters) north of the proposed power plant site, although no adverse impacts are anticipated for these facilities. • Option B – The power plant would affect the same residential properties as indicated for Option A; however, the site footprint would be larger and the eastern site boundary would be even closer to the properties. **Fuel Supply:** The reclamation of degraded coal refuse sites would render these sites potentially available for other uses beneficial to the local communities, county, and state. All six candidate prep plant sites are located in remote areas characterized by open lands. All sites would be subject to a property availability investigation and coordination with the property owners to ensure that impacts on land use would be avoided. **Limestone Supply:** Option A or B would obtain limestone from quarries that are ongoing, permitted commercial operations, and these existing land uses would not change. **Water Supply:** The water supply pipeline would follow an existing ROW and cross other open lands. Pipeline construction would have limited, short-term adverse impacts on adjacent land uses. **Material Transportation:** The transport of fuel and limestone by trucks would occur on designated heavy haul routes and would not alter adjacent land uses. The proposed truck storage area in Charmco is a vacant and disused former commercial property. **Power Transmission:** The alignment common to all three options extending from the WGC plant site to the AEP ROW crosses a 17-ac (7-ha) property west of WV 20 that is owned by Rainelle and reserved for recreational use. This property would be subject to a land exchange for comparable acreage along US 60 west of the AEP ROW. • Option A – The widening of the AEP ROW would affect a 103-ac (42-ha) corridor adjacent to an existing cleared power line ROW, and landowners would be compensated for granting an easement. • Option B – Upgrading structures along the AEP ROW would occur within an existing easement. • Option C – The development of a new ROW would require the clearing of a 206-ac (83-ha) corridor. The route would not traverse populated land areas and would not cross any parks, trails, or byways based on preliminary investigation. Landowners would be compensated for granting an easement.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Community Services and Utilities	No change in existing conditions that have resulted in the decline of the working-aged population and increased the demands on community services by an aging population.	**Power Plant Facilities:** The proposed power plant (Option A or B) would not impose excessive demands on community services and utility systems during construction and operation, nor is the project expected to induce unsupportable development locally. Impacts would be avoided by ensuring that waste products are characterized and disposed of properly. Construction activities and anticipated injuries may increase the short-term demand on medical services. **Fuel Supply:** The reclamation of degraded coal refuse sites would render these sites potentially available for other uses beneficial to the local communities, county, and state. During the processing of coal refuse at candidate prep plants, spoils would be separated into disposable aggregates and marketable (pyrite-containing) byproducts. Impacts would be avoided by ensuring that waste products are characterized, handled, and disposed of properly in accordance with a remediation plan approved by WVDEP. **Limestone Supply:** Option A or B would obtain limestone from quarries that are ongoing, permitted commercial operations and would not affect the demand for community services or utilities. **Water Supply:** The maximum water demand by the WGC power plant would be approximately 1,200 gpm (4,500 L/min), to which ***the Rainelle Sewage Treatment (RSTP) would supply 100% of its effluent (the RSTP's monthly discharge ranges from*** approximately ***400*** to ***600*** gpm [***1,500*** to ***2,300*** L/min]). The RSTP would require modifications to its National Pollutant Discharge Elimination System (NPDES) permit. The balance would be obtained from a combination of groundwater and/or surface water sources. Depending upon aquifer recharge conditions, project-related groundwater withdrawals could adversely impact the Rainelle water supply as indicated by groundwater pumping tests. Therefore, WGC would ensure that the power plant maintains an adequate supply of process water without adversely affecting the Rainelle water supply and local private wells. Final design for the power plant would require a closer evaluation of the maximum water demands and sources. WGC would obtain permits and meet specific requirements prior to initiating additional groundwater withdrawals for supplemental process water in either Option A or B. • Option A – As the secondary source of process water supply, withdrawals from groundwater wells would make up a larger proportion of the balance of process water required by the WGC plant. • Option B – As the tertiary source of process water supply, withdrawals from groundwater wells would make up a smaller proportion of the balance of process water required by the WGC plant. **Material Transportation:** The transport of fuel and limestone by trucks would occur on designated heavy haul routes and would not affect demands on community services. **Power Transmission:** WGC would provide new 138 kV transmission infrastructure from the power plant site to the Grassy Falls Substation. A feasibility study by the Pennsylvania-Jersey-Maryland Interconnection (PJM) concluded that the direct connection of the WGC facility to the Allegheny Power System (APS) grid at Grassy Falls could be accommodated with network reinforcements. • Option A would construct new power transmission infrastructure parallel to the AEP transmission lines in an expanded ROW. • Option B would upgrade the existing AEP transmission infrastructure to support the WGC load. • Option C would construct new power transmission infrastructure along a new ROW to Grassy Falls.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Traffic and Transportation	No impact; no change in existing conditions.	**Power Plant Facilities:** Existing roadway capacities are adequate to accommodate the additional traffic volumes during construction and operation of the proposed power plant (Option A or B) without causing adverse traffic delays at any of the intersections studied. See Material Transportation below for traffic related to fuel and limestone transport. **Fuel Supply:** Smaller county roads (CR 1 and CR 39/14) would be affected by traffic volumes generated during construction of the prep plants at respective optional sites. However, because the construction traffic volumes are expected to be fairly low, they are not expected to degrade intersection delays beyond level of service (LOS) "C" at any of the optional prep plant sites. For traffic related to fuel transport, see Material Transportation. **Limestone Supply:** Option A would include the pairing of the ***Boxley Quarry in Alta,*** a quarry near Lewisburg (***20*** mi [32 km] from Rainelle), with one in Mill Point (60 mi [97 km] from Rainelle). Option B would include Greystone quarry (approximately 40 mi [64 km] from Rainelle) and also Mill Point. For traffic related to limestone transport, see Material Transportation. **Water Supply:** Temporary traffic volumes generated by construction of water supply facilities would not cause adverse traffic delays. **Material Transportation:** The trucking of fuels, limestone, and other materials would occur on designated heavy haul routes and would not degrade intersection delays by more than LOS "***C***" at any of the intersections studied. However, slower-moving heavy-haul trucks would likely increase travel times on local roads, especially CR 1, CR 39/14, US 60, and WV 20 between the prep plant sites and the power plant site. • Anjean/***Joe Knob*** – ***The Anjean and Joe Knob coal refuse piles are approximately 18 mi (29 km) and 18.5 mi (30 km), respectively, from the power plant site.*** All three candidate prep plant sites are located along the same route. AN3 is the farthest distance (18 mi [29 km]) from the power plant site. AN1 and AN2 are both 14 mi (23 km) from the power plant site. • Donegan – ***The Donegan coal refuse pile is approximately 28 mi (45 km) from the power plant site.*** Candidate prep plant sites DN1 and DN2 are 28 mi (45 km) and 21 mi (34 km), respectively, from the power plant site along the same route. • Green Valley – The GV ***coal refuse pile and*** candidate prep plant site are located 13 mi (21 km) from the power plant site. **Power Transmission:** Temporary traffic volumes generated by construction of power transmission facilities would not cause adverse traffic delays for any of the three options. Operation of the power transmission lines would not affect local traffic.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Public Health and Safety	No impact; no change in existing conditions.	**Power Plant Facilities:** Worker safety impacts during construction of the proposed power plant (either Option A or B) would result in an estimated 23 recordable incidents, 12 lost workdays, and 0.04 fatalities per year based on national statistics. Worker safety impacts during operation of the power plant (either Option A or B) would result in an estimated 2 recordable incidents, 0.03 lost workdays, and 0.02 fatalities per year. The highest incremental carcinogenic risk from plant emissions for a sensitive receptor population would be ***0.0011*** x 10^{-4} for an adult subsistence fisher compared to an EPA acceptable risk criterion of 1.0 x 10^{-4}. The highest incremental non-cancer health risk for a sensitive receptor population would be ***0.02347*** for a resident child compared to an EPA acceptable risk criterion of 1.0. A few residential properties to the east fall near the 600-ft radius, the worst-case release impact area for aqueous ammonia. In the unlikely event of a release, people within this radius may be exposed to ammonia concentrations that are immediately dangerous to life or health. No population receptors, beyond on-site workers, fall within the 300-ft radius, the 'more likely' release impact area. Incremental increases in PM_{10} and particulate matter (<2.5 microns [$PM_{2.5}$]) concentrations would occur, but would not exceed the NAAQS. **Fuel Supply:** Worker safety impacts during operations at the coal refuse and prep plant sites would result in an estimated 2 recordable incidents, 2 lost workdays, and <0.001 fatalities per year based on national statistics. **Limestone Supply:** Option A or B would obtain limestone from commercial quarries that would not experience a change in worker safety conditions as a result of the Proposed Action. **Water Supply:** Worker safety impacts during construction of the proposed water supply facilities (Option A or B) would represent a small increment in the safety impacts indicated above for construction of the power plant. **Material Transportation:** Worker safety impacts during trucking operations for fuel and limestone would result in an estimated 3 recordable incidents and 1 lost workday per year based on national statistics. The anticipated annual accident rates for the transportation of fuel from coal refuse sites based on national statistics would be: • Anjean (and Joe Knob) – ***0.76*** injuries and ***0.04*** fatalities. • Donegan – ***4.20*** injuries and ***0.23*** fatalities. • Green Valley – ***0.89*** injuries and ***0.05*** fatalities. **Power Transmission:** Worker safety impacts during construction of the proposed power transmission facilities (Option A, B, or C) would represent a small increment in the safety impacts as indicated above for construction of the power plant.

Table S-1. Summary Comparison of Alternatives and Potential Impacts (continued)

Resource	No Action	Proposed Action
Noise	No impact; no change in existing conditions.	**Power Plant Facilities:** Most adverse impacts during plant construction (either Option A or B), including blasting noise and vibration, would occur for residential properties located within 1,500 ft (460 m) east of the plant site (see Aesthetic Resources). These impacts would be temporary and intermittent. Blasting, if required, would occur over a relatively short time period and be mitigated in accordance with a blasting plan required by the WV Fire Marshall. During operations, noise impacts from plant equipment lacking acoustic mitigation would exceed the impact criterion of a 60 dBA day-night equivalent sound level (L_{dn}) at all receptor sites modeled, including the residential properties located within 1,500 ft (460 m) east of the plant site (68.3 dBA L_{dn}). However, WGC is agreeing to incorporate noise attenuation and mitigation measures into the final design that would ensure operational noise levels would not exceed the impact criterion of 60 dBA L_{dn} at each identified receptor site. Acoustic mitigation requirements would range from 1.5 to 11.3 dBA L_{dn} depending upon receptor site location. WGC would voluntarily provide post-construction monitor noise levels to ensure minimal noise impacts to sensitive noise receptors. ***Steam blow-offs would occur that would result in a noise level of 125 dBA (95 dBA with mitigation) at the source; however, such events would be temporary and infrequent, occurring only during start-up and maintenance operations.*** **Fuel Supply:** Coal refuse sites and candidate prep plant sites are located in remote, sparsely populated areas where coal mining has occurred in recent times or is still occurring. Among the candidate prep plant sites, only DN2 is located in proximity to a residence (of the site owner) that could be affected by plant noise. **Limestone Supply:** Option A or B would obtain limestone from existing quarries that represent ongoing, regulated commercial operations that would not change appreciably from baseline conditions. **Water Supply:** Short-term, intermittent daytime noise impacts would occur during construction of water supply facilities. **Material Transportation:** Traffic-related noise during construction and operation is expected to fall below the impact criterion of a 10 dBA incremental increase above background conditions. The peak incremental increase in traffic noise in Rainelle caused by fuel transport from coal refuse sites would be 2.9 dBA during mid-day traffic at the WV State Police Barracks (WV 20 at Tom Raine Drive). The peak incremental increases in traffic noise associated with fuel transport from respective coal refuse sites would be: • Anjean (and Joe Knob) – 6.3 dBA increase during PM peak traffic on CR 1 at Anjean (same for fuel transport from Donegan). • Donegan – 5.7 dBA increase during PM peak traffic on CR 39 at Donegan. • Green Valley – 1.7 dBA increase during PM peak traffic on WV 20 at Quinwood. **Power Transmission:** Short-term, intermittent daytime noise impacts would occur during construction of power transmission infrastructure.

Abbreviations: *ac = acres; AEP = American Electric Power; AMD = acid mine drainage; APS = Allegheny Power System; BOD = biochemical oxygen demand; CEQ = President's Council on Environmental Quality; CO = carbon monoxide; CO_2 = carbon dioxide; CR = county road; dBA = decibels (A scale); E/S = erosion and sedimentation; EIS = Environmental Impact Statement; EPA = U.S. Environmental Protection Agency; FEMA = Federal Emergency Management Agency; ft = feet; ft^3/s = cubic feet per second; gpm = gallons per minute; GWP = groundwater protection; ha = hectares; km = kilometers; kV = kilovolt; L/min = liters per minute; L_{dn} = day-night equivalent sound level; LOS = level of service; m = meters; m^2 = square meters; mi = miles; NAAQS = National Ambient Air Quality Standards;* ***NHPA = National Historic Preservation Act****; NO_x = nitrogen oxides; NPDES = National Pollutant Discharge Elimination System; NRHP = National Register of Historic Places; PJM = Pennsylvania-Jersey-Maryland Interconnection; PM_{10} = particulate matter, <10 microns; $PM_{2.5}$ = particulate matter, <2.5 microns; PSD = prevention of significant deterioration; PSD = public service district; ROW = right-of-way; RSTP = Rainelle Sewage Treatment Plant; SO_2 = sulfur dioxide; SWMPP = storm water management pollution prevention; TCLP = Toxic Characteristic Leaching Procedure; TSP = total suspended particulates; USDA = U.S. Department of Agriculture; VOC = volatile organic compound;* ***WV SHPO = West Virginia State Historic Preservation Office****; WVDNR = WV Division of Natural Resources; WVDEP = WV Department of Environmental Protection; WVDOT = WV Department of Transportation; yr = year.*

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(***Note: Bold, italicized, and underlined text in this Table of Contents indicates sections that include changes from the Draft EIS. Volume 3, "Responses to Comments on the Draft EIS", is a new volume for the Final EIS.***)

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