1. PURPOSE OF AND NEED FOR THE AGENCY ACTION

1.1 INTRODUCTION

This environmental impact statement (EIS) has been prepared by the U.S. 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 operation of facilities proposed by WMPI PTY, LLC, for producing electricity, steam, and liquid fuels from coal waste. WMPI's team members include Nexant, Inc., Shell Global Solutions B.V., Uhde GmbH, Sasol Technology Ltd., and Chevron Lummus Global LLC. The EIS will be used by DOE in making a decision on whether or not to provide cost-shared funding to design, construct, and demonstrate the proposed facilities to be located adjacent to the existing Gilberton Power Plant near Gilberton, Pennsylvania. The project has been selected by DOE under the Clean Coal Power Initiative (CCPI) to demonstrate the integration of coal waste gasification and Fischer-Tropsch (F-T) synthesis of liquid hydrocarbon fuels at the commercial scale.

1.2 CLEAN COAL POWER INITIATIVE

"Clean coal technologies" refer to advanced coal utilization technologies that are environmentally cleaner, and in many cases, more efficient and less costly than conventional coal-utilization processes. These technologies contribute to a major objective of the national energy strategy for reducing U.S. dependence on potentially unreliable energy suppliers. Because the abundant domestic reserves of coal provide one of the nation's most important resources for sustaining a secure energy future, DOE has pursued a research and development (R&D) program to increase the use of coal while improving environmental quality. However, technologies displaying potential at the proof-of-concept scale in an R&D program must be operated at a larger scale to demonstrate readiness for commercialization. The CCPI Program moves promising technologies from R&D to the commercial marketplace through demonstration. Successful demonstrations also help position the United States to supply advanced coal-fired combustion and pollution control technologies to a rapidly expanding world market.

In Fiscal Year 2002, the U.S. Congress established the CCPI Program by providing $150 million in funding to accelerate commercial deployment of advanced coal-based technologies for generating clean, reliable, and affordable electricity in the United States. To implement the program, Congress also provided $150 million in funding in Fiscal Year 2003 and directed DOE to include certain previously appropriated funds so that DOE could offer over $300 million in cost-shared funding for a first round of commercial-scale demonstration projects. Congress indicated that projects in the program should be industry projects assisted by the government and not government-directed demonstrations. The projects are expected to showcase technologies in which coal-fired power plants can continue to generate low-cost electricity with improved efficiency and in compliance with more stringent environmental standards expected in the future.

In the CCPI Program, the project participant (i.e., the non-federal-government participant or participants) must finance at least 50% of the total cost of the project. The government assists the project participant by sharing in the project's cost, as detailed in a cooperative agreement negotiated between the participant and DOE. The government also shares in the rewards of successful projects. After a technology has been successfully demonstrated, the participant must repay the government's financial contribution to ensure that taxpayers benefit. Specifically, the government's investment is to be repaid within a 20-year period following completion of the demonstration based, for example, on revenue from the demonstration project itself and/or royalties from sales and licensing of the technology in the United States and abroad. At least 75% of the direct labor cost for the project, including subcontractor labor, must be incurred in the United States unless the participant can demonstrate that the U.S. economic interest would be better served through a greater percentage of the work being performed outside the United States. An example of the exception would be if the expertise to develop a proposed technology exists only outside the United States, but commercialization of the technology would result in substantial benefits to the United States, such as improved reliability of electricity, increased employment, and increased exports of U.S.-manufactured products.

The project participant has primary responsibility for designing, constructing, and demonstrating the project. During project execution, the government oversees project activities, provides technical advice, assesses progress by periodically reviewing project performance with the participant, and participates in decision making at major project junctures. In this manner, the government ensures that schedules are maintained, costs are controlled, project objectives are met, and the government's funds are repaid according to the terms in the cooperative agreement.

The CCPI Program is open to any technology advancement related to coal-based power generation that results in efficiency, environmental, and economic improvement compared to currently available state-of-the-art alternatives. The program is also open to technologies capable of producing any combination of heat, fuels, chemicals, or other useful byproducts in conjunction with power generation. Coal for the demonstration projects is required to provide at least 75% of the fuel energy input to the process. This provision ensures that multiple-fuel concepts such as co-firing are not excluded, but that a focus is maintained on coal-based power generation. Additionally, projects must show the potential for rapid market penetration upon successful demonstration of the technology or concept.

DOE issued the first-round CCPI solicitation in March 2002 and received 36 proposals in August 2002. Eight projects (including the proposed project) were selected in January 2003. Evaluation criteria used in the selection process included technical merit of the proposed technology, potential for a successful demonstration of the technology, and potential for the technology to be commercialized. DOE considered the participant's funding and financial proposal; DOE budget constraints; environmental, health, and safety implications; and program policy factors, such as selecting projects that represent a diversity of technologies, utilize a broad range of U.S. coals, and represent a broad geographical cross-section of the United States.

1.3 PROPOSED ACTION

The proposed action is for DOE to provide cost-shared funding for the design, construction, and demonstration of proposed facilities near Gilberton, Pennsylvania, for producing electricity, steam, and liquid fuels from anthracite coal waste by integrating technologies for coal gasification and Fischer-Tropsch (F-T) synthesis of liquid hydrocarbon fuels. The commercial-scale demonstration would allow industries and utilities to make decisions regarding commercialization of the integrated technologies.

DOE's share of the funding for the 3-year demonstration project is expected to be approximately $100 million (about 16% of the total cost of approximately $612 million), which would be subject to a repayment agreement between WMPI PTY, LLC and DOE. Private sector financing would provide about $465 million, while the remaining $47 million would be generated through transferable tax credits established in the "Coal Waste Removal and Ultraclean Fuels Tax Credit" that was signed into Pennsylvania law in 1999. DOE may also provide a loan guarantee, pursuant to the Energy Policy Act of 2005, to guarantee a portion of the private financing for the project. If a loan guarantee is provided, DOE's contribution of approximately $100 million to the project would likely be reduced.

WMPI PTY, LLC and the other project team members (Section 1.1) conceived and proposed the project in response to the DOE solicitation. Because DOE's role would be limited to providing cost-shared funding for the proposed project, DOE's decision is whether or not to fund the project. DOE's limited involvement constrains the range of alternatives considered in the EIS (Section 2), and DOE will make its decision based on those alternatives.

1.4 PURPOSE AND NEED

The purpose of the proposed project is to generate technical, environmental, and financial data from the design, construction, and operation of the integrated technologies at a sufficiently large scale to allow industries and utilities to assess the project's potential for commercial application. The project would demonstrate that coal waste can be used to produce steam, electricity, and liquid hydrocarbon fuels that may ultimately help to reduce U.S. dependence on imported oil. While the individual technologies have been independently operated, this project would demonstrate the integration of the technologies. A successful demonstration would indicate that the performance and cost targets for the integrated technologies are achievable at the commercial scale.

The need for the proposed project is twofold. First, DOE's need is to address the Congressional mandate to demonstrate advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the United States (Section 1.2). Second, WMPI's need is to provide steam, electricity, and liquid hydrocarbon fuels that would promote economic development in the region, while consuming coal waste that has degraded the quality of regional watersheds. Although DOE recognizes that the need for the project may be justified on either basis, its reason for selecting the

proposed project is to support the demonstration of innovative, coal-based technology, not for regional economic development or reduction in legacy waste.

The cost-shared contribution by DOE for the demonstration would help reduce the risk to the WMPI team in developing the integrated technologies to the level of maturity needed for decisions on commercialization.

1.4.1 DOE's Need

Since the early 1970s, DOE and its predecessor agencies have pursued a broadly based coal R&D program to ensure available and affordable energy supplies while improving environmental quality. This R&D program includes long-term activities supporting the development of innovative, unproven concepts for a wide variety of coal technologies through the proof-of-concept stage. However, the availability of a viable technology at the proof-of-concept stage is not sufficient to ensure its continued development and subsequent commercialization. Before any technology can be seriously considered for commercialization, it must be demonstrated at a sufficiently large scale. Utilities and industries are generally reluctant to demonstrate technologies at an unproven scale in the absence of strong economic incentives or firm legal requirements. Implementation of the CCPI Program, with cost-shared funding from the federal government, has been endorsed by Congress and industry as a mechanism to accelerate the commercialization of innovative technologies to meet near-term environmental goals in the power industry and to reduce risk to an acceptable level through cost-shared funding. The proposed project was selected for demonstration in the CCPI Program as one of the projects that would best further these goals.

Nearly 50% of current electrical generating capacity in the United States is over 30 years old. Thus, much replacement or refurbishment of aging facilities is anticipated over the next several decades to continue to meet current electricity demand, and new capacity will be needed to keep pace with rising demand for electricity. Currently, about 55% of U.S. electricity requirements are met by power plants fired with pulverized coal. As the most abundant domestic energy source, coal continues to represent an attractive option for future power plants, particularly through advanced technologies that have the potential to dramatically improve environmental performance and efficiency. The abundance of U.S. coal reserves makes coal one of the nation's most important strategic resources for minimizing dependence on imported oil and sustaining a secure energy future. Based on existing mining technology, recoverable reserves of coal in the United States could supply coal consumption at current levels for nearly 300 years. However, advanced coal utilization technologies must be successfully demonstrated if coal is to provide an environmentally acceptable and economically competitive source of energy in the 21st century.

DOE's need is to demonstrate that advanced coal-based technologies, such as the integrated technologies offered by the proposed project as part of the CCPI Program, can generate clean, reliable, and affordable electricity. The ability to show prospective domestic and overseas customers an operating facility rather than a conceptual or engineering prototype would provide a persuasive inducement to replicate the technology. Data obtained on operational characteristics would allow

prospective customers to assess the potential of the integrated technologies for commercial application. Successful demonstration would enhance prospects of exporting the integrated technologies to other nations and could provide the United States with an important advantage in the global competition for new markets. DOE would work closely with the project participants to develop plans for technology transfer and commercialization.

1.4.2 WMPI's Need

The proposed facilities would meet WMPI's need to provide steam, electricity, and liquid hydrocarbon fuels that would promote economic development in the region, while consuming coal waste that has degraded the quality of regional watersheds. The level of unemployment in Schuylkill County was 7% in 2001, well above the Pennsylvania statewide average of 4.7%. In addition, the median household income in the county was only 81.5% of the statewide level in 2001. The project's construction and operational jobs would improve the regional economy, as would the indirect jobs created by other industries that could benefit from the steam and electricity supplied by the proposed facilities.

About 1 billion tons of coal waste exist in Pennsylvania. The proposed facilities would consume anthracite coal waste that for decades has polluted regional watersheds. The project would reduce piles of coal waste from the landscape, increasing the scenic beauty of the land and eliminating a major source of metals, acidic discharge, and sedimentation to the area's rivers and watersheds. Some of the solid residues produced by the proposed facilities would be returned to coal waste sites, aiding in the restoration of lands adversely impacted by past mining.

The WMPI team members, as well as DOE, are interested in demonstrating the commercial viability of the integrated technologies. The potential exists for application of the technologies across the United States to accommodate a wide range of feedstocks, environmental conditions, and market needs. Successful demonstration, which is necessary prior to widespread market penetration, would provide an appreciable advantage in the global competition for new markets. The cost-shared funding from the federal government would reduce the project's risk to an acceptable level for the WMPI team members.

1.5 NATIONAL ENVIRONMENTAL POLICY ACT STRATEGY

This EIS has been prepared in compliance with NEPA for use by DOE decision makers in determining whether or not to provide cost-shared funding for the design, construction, and demonstration of the proposed project under the CCPI Program. DOE's policy is to comply fully with the letter and spirit of NEPA, which ensures that early consideration is given to environmental impacts in federal planning and decision making. The EIS provides a means for the public to participate in the decision making process. Actions taken by DOE with regard to any proposal, including project selection or award, are not considered final decisions prior to completion of the NEPA process.

An overall strategy for compliance with NEPA has been developed for the CCPI Program, consistent with the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500-1508) and DOE regulations for compliance with NEPA (10 CFR Part 1021). The DOE strategy has two principal elements. The first element involved proposers completing a DOE environmental questionnaire, along with submission of a technical proposal to the CCPI solicitation. The responses to the questionnaire contained discussions of the site-specific environmental, health, safety, and socioeconomic issues associated with each project.

The second element consists of preparing site-specific NEPA documents for each selected project. For this project, DOE has determined that providing cost-shared funding for the proposed project would constitute a major federal action that may significantly affect the quality of the human environment. Therefore, DOE has prepared this EIS to assess the potential impacts on the human and natural environment of the proposed action and reasonable alternatives. The EIS has been prepared in accordance with Section 102(2)(C) of NEPA, as implemented under regulations promulgated by the CEQ (40 CFR Parts 1500-1508) and as provided in DOE regulations for compliance with NEPA (10 CFR Part 1021). The EIS is organized according to CEQ recommendations (40 CFR Part 1502.10).

A Notice of Intent to prepare the EIS and hold a public scoping meeting was published by DOE in the *Federal Register* on April 10, 2003 (68 *FR* 17608–11). The Notice of Intent invited comments and suggestions on the proposed scope of the EIS, including environmental issues and alternatives, and invited participation in the NEPA process. An advertisement publicizing the public scoping meeting was printed in the *Pottsville Republican & Evening Herald* newspaper in Pottsville, Pennsylvania, on April 17, 18, and 19, and May 1, 2, and 3, 2003. A flyer announcing the public scoping meeting was posted at the Frackville Free Public Library in Frackville, Pennsylvania. On April 22, 2003, the Notice of Intent and the newspaper notice were sent to 12 stakeholders including federal, state, and local agencies for their information and comments on the proposed project.

Publication of the Notice of Intent initiated the EIS process with a public scoping period for soliciting public input to ensure that (1) significant issues are identified early and appropriately addressed, (2) issues of little significance do not consume time and effort, (3) the EIS is thorough and balanced, and (4) delays occasioned by an inadequate EIS are avoided (40 CFR Part 1501.7). DOE held the scoping meeting in Pottsville, Pennsylvania, on May 5, 2003. The public was encouraged to provide oral comments at the scoping meeting and to submit additional comments in writing to DOE by the close of the EIS scoping period on May 19, 2003.

DOE received 15 oral responses at the public scoping meeting and 90 responses by comment card, mail, e-mail, fax, and telephone from members of the public, interested groups, and federal, state, and local officials. The responses assisted in establishing additional issues to be analyzed in the EIS and in determining the level of analysis required for each of the issues. Issues raised during public scoping are identified in Section 1.6.

1.6 SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT

This section summarizes the issues and alternatives identified and considered during the preparation of this EIS for the proposed project. The following issues were initially identified as requiring analysis and assessment in the EIS and were included in the Notice of Intent:

1. Atmospheric Resources: potential air quality impacts resulting from emissions during construction and operation of the proposed facilities, including odor impacts;
2. Water Usage: potential effects on surface and groundwater resources, including impacts from withdrawals of groundwater and mine pool water from the Susquehanna River and Delaware River watersheds;
3. Water Quality: potential impacts resulting from wastewater treatment and discharge, from water usage, and from reclaiming abandoned anthracite coal waste (culm);
4. Infrastructure and Land Use, including Potential Environmental and Socioeconomic Effects Resulting from: plant construction; delivery of feed materials; recovery of coal waste and mine pool water; steam and heat distribution; electric power generation and transmission; product hydrocarbon liquids transportation, distribution, and use; measures to prevent soil erosion and degradation; and site restoration;
5. Solid Waste: pollution prevention and waste management, including ash, slag, and wastewater treatment facility sludge;
6. Noise: potential impacts resulting from construction and operation of the proposed plant and from transportation of feed materials and plant products;
7. Construction: potential impacts associated with traffic patterns, construction-related emissions, and involvement of floodplains and wetlands;
8. Safety and health impacts, including construction-related safety, process safety, and management of chemicals and catalysts;
9. Ecological: potential onsite and offsite impacts to vegetation, terrestrial wildlife, aquatic wildlife, threatened and endangered species, and ecologically sensitive habitats;
10. Community impacts, including potential impacts from local traffic patterns, socioeconomic impacts on public services and infrastructure, and environmental justice;
11. Visual impacts associated with plant structures and plant operations;
12. Reclamation Impacts: potential impacts resulting from recovery of coal waste from disposal and reclamation sites;
13. Cumulative effects that result from the incremental impacts of the proposed project when added to the other past, present, and reasonably foreseeable future projects, including the existing 80-MW Gilberton Power Plant;
14. Connected actions, including processing of gasifier slag into aggregate for use in construction applications, use of heat and energy from the plant, and both processing and use of liquid hydrocarbon products;
15. Compliance with regulatory requirements and environmental permitting; and
16. Environmental monitoring.

During the scoping process (Section 1.5), local residents expressed concerns about potential effects that could result from the proposed project. The issues of most concern were: (1) potential impact to air quality from emissions, including hazardous air pollutants, from the proposed facilities; (2) potential effect on surface and groundwater resources by the withdrawal and discharge of water associated with process use; and (3) potential impact of solid waste generated by the proposed facilities. Most of these concerns related to effects on human health, such as potential deterioration in respiratory function and potential increases in occurrences of cancer. Other concerns that were expressed during the scoping process were the potential for odorous emissions; the possibility of emissions reducing atmospheric visibility and creating safety issues such as fog affecting Interstate 81; airborne emissions resulting from vehicles traveling over red anti-skid material (bottom ash from the Gilberton Power Plant) applied to roads; increased traffic and emissions from trucks; potential noise impacts; potential effects on ecological resources including endangered species; potential depreciation of property values; potential effects on historic properties; effect of the proposed project on local taxes; potential impacts to inmates at two nearby state prisons; environmental justice; regulatory requirements; the possibility of accidents and spills; cumulative impacts from the proposed facilities in conjunction with existing cogeneration facilities; global warming impacts; the use of alternative feedstocks by the proposed facilities; alternative sites; alternative technologies; and comparisons of technologies and impacts with those of the operating coal-to-oil facilities in South Africa.

DOE used public input obtained during the scoping process to add to the list of issues requiring analysis and assessment and to provide additional focus to analysis of initially identified issues. Table 1.6.1 lists the composite set of issues identified for consideration in the EIS (i.e., issues identified in the Notice of Intent, and additional issues identified during public scoping that expanded the scope of the assessment). Issues are analyzed and discussed in this EIS in accordance with their level of importance. The most detailed analyses focus on issues associated with air quality, surface water, groundwater, and solid waste impacts.

Table 1.6.1. Issues identified for consideration in the environmental impact statement

Issues identified in the Notice of Intent		
Atmospheric resources	Construction	Reclamation impacts
Water usage	Safety and health impacts	Cumulative effects
Water quality	Ecological impacts	Connected actions
Infrastructure and land use	Community impacts	Compliance
Solid waste	Visual impacts	Environmental monitoring
Noise		
Additional issues identified during public scoping that expanded the scope of the assessment		
Property values	Inmates at prisons	Alternative feedstocks
Historic properties	Accidents and spills	Technology and impact comparisons

CEQ requires an EIS to include a discussion of alternatives to the proposed action. The purpose of and need for the proposed action determine the range of reasonable alternatives. Alternatives to the proposed project that were considered initially as candidates for analysis in this EIS (i.e., approaches that are practical or feasible both technically and economically) are identified and briefly described in the following bullets:

- ***No-action alternative***. DOE would not provide cost-shared funding for the proposed facilities near Gilberton, Pennsylvania, to produce electricity, steam, and liquid fuels from coal waste by integrating coal gasification and F-T synthesis of liquid hydrocarbon fuels. Consequently, it is reasonably foreseeable that the proposed facilities for demonstrating the technologies would not be built.
- ***Alternative site***. The proposed project would be demonstrated at another site. However, site selection was governed primarily by benefits that could be realized by the companies participating in the project. The site selected for the project had to provide the maximum benefit to the companies by closely meeting the project's technical needs and integrating with existing infrastructure. The WMPI team members selected the site adjacent to the existing Gilberton Power Plant in part because the cost associated with construction of the proposed facilities at an undeveloped site would be much higher and the environmental impacts likely would be much greater than adjacent to the existing plant. Site selection was also based on the proximity of feed materials (i.e., anthracite coal waste) to the site. No additional sites were seriously considered by the WMPI team members during their site selection process.
- ***Alternative size***. The proposed project would be demonstrated using a smaller-sized plant. This alternative would not meet DOE's purpose (Section 1.4). A smaller-sized plant would not be sufficiently large to demonstrate the commercial viability of the integrated technologies.
- ***Alternative technologies***. DOE would demonstrate other technologies. This alternative would not demonstrate the production of electricity, steam, and liquid fuels from coal waste by integrating coal gasification and F-T synthesis of liquid hydrocarbon fuels and may not meet DOE's need to demonstrate advanced coal utilization technologies with potential to address domestic energy needs (Section 1.4.1).

In addition to the proposed project, the no-action alternative was determined to require consideration in the EIS. Three alternatives were dismissed from further consideration: alternative site, alternative size, and alternative technologies. Alternatives and the basis for their consideration or dismissal are discussed in detail in Section 2.

1.7 APPROACHES AND ASSUMPTIONS

The following approaches are used and assumptions are made in this EIS:

- Except as specifically noted in the text, potential environmental effects of the proposed facilities are based on the operating characteristics discussed in Section 2.

- One major exception to the above is that air quality impacts predicted by air dispersion modeling are based on the conservative assumption that the proposed facilities operate at a 100% capacity factor rather than the expected 85% capacity factor.
- Potential environmental impacts are assessed for the surrounding environment (beyond the boundary of the facilities), as described in Section 3.
- Potential environmental impacts resulting from construction and operation of the proposed facilities during the demonstration period are assessed in Section 4. Section 5 addresses potential impacts of commercial operation following completion of the demonstration.