2.3 ALTERNATIVE SITES

Considerable additional expense would be required if the proposed research were conducted at an alternative site. The unique expertise of the METC researchers was a key factor in determining that the proposed work should be performed at METC. METC is equipped to perform the proposed work, and the project would be integrated with existing support systems (e.g., utilities and analytical facilities) already at METC. As a result, environmental impacts of alternative sites was not analyzed in this EA.

2.4 ALTERNATIVE TECHNOLOGIES

Alternative technologies to circulating PFBC reactors include fixed-bed, bubbling-bed, and entrained-bed reactors. Each of the alternative technologies is already undergoing development at METC and/or its contractors. Data collected from the circulating PFBC process being developed under the proposed action would be made available for comparison with data from alternate technologies relative to economic and environmental performance. The environmental impacts of alternative technologies will not be analyzed in the EA.

3.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND THE NO-ACTION ALTERNATIVE

3.1 THE PROPOSED ACTION

3.1.1 Air Quality

During operation, the 2-foot diameter, 50-foot high pressurized fluidized bed system would generate new sources of air emissions. During operation, process air would be heated to approximately 750°F using two indirect, natural gas-fired heaters. Each natural gas-fired heater would have an input heating value of 4.02 million Btu per hour. Each natural gas-fired heater would emit approximately 36,000 scfh of nitrogen, 12 scfh of oxygen, 8,500 scfh of water vapor, and 8,400 scfh of carbon dioxide. A total of 15.6 million standard cubic feet of carbon dioxide per year would contribute to the global carbon dioxide emissions during one year (36 hrs/week x 52 week/year = 1872 hrs/year) of operation. No release of sulfur dioxide or sulfuric acid mist would be expected.

The particle loading in the gas exiting the cyclones would range from a minimum of 0.4 grains per cubic foot (or 0.057×10^{-3} pounds per cubic foot) to a maximum of 4.0 grains per cubic foot (or 0.57×10^{-3} pound per cubic foot of air). With a baghouse efficiency of 99.9 percent, the total maximum particle emission to the atmosphere would be 1,030 pounds per year (or 0.55 pph).

3.1.2 Water Quantity/Quality Impacts

The proposed action would be located within the existing METC facility. Operation of the 2-foot diameter, 50-foot high pressurized fluidized-bed unit would require a total of 4.4 million gallons of water from the municipal water supply system. A water spray cooler would consume 20 gallons per minute which would be turned into steam and discharged to the atmosphere. The closed-loop spray cooling tower would evaporate approximately 18 gallons per minute of water for discharge to the atmosphere as steam. About 0.7 gallons per minute of water would be removed from the circuit to limit the concentration of scale in the recirculated water. This water would be discharged to the city sewer system. Water removed from the action of compressing the air would flow to a floor drain, be captured, be collected in waste containers, and be disposed by approved waste water disposal methods. No change in water quantity or quality would be anticipated.

3.1.3 Solid Waste Disposal

During each test, the 2-foot diameter, 50-foot high pressurized fluidized-bed unit would use a maximum of 940 pounds of material (for example, sand, limestone, or nylon sphere). Most of the particles would be collected by cyclones and recirculated back to the fluidized bed in order to maintain the bed inventory. A small amount of particles would escape collection in the cyclones and enter the baghouse. The particles collected in the baghouse would be non-hazardous, and would be stored on the METC site in 55-gallon drums for possible use in future test programs. The inert particles used in the test program would be limestone, sand, or plastic.

3.1.4 Noise

Operations of the 2-foot diameter, 50-foot high pressurized fluidized-bed unit would be within an enclosed structure, therefore, no increase in noise at the structure boundaries would be anticipated from the project. The noise level of the air compressor would be no more than 85 decibels at a distance of one meter from the equipment. Personnel entering the Building-22 during operation would be required to wear ear protection.

3.1.5 Floodplains or Wetlands

The proposed project would be located at an elevation of approximately 962 feet above sea level (ASL). The normal pool elevation of the Monongahela River is 797 feet ASL. The highest rise in the river, since construction of the Tygart Dam, occurred in November 1985, and caused the river to rise to an elevation of 814 feet ASL. The Corps of Engineers, Pittsburgh District, calculates the elevation of a 500-year flood to be 816 feet.

West Run Creek runs around the METC property starting at an elevation of 920 feet and drops to the river elevation. No wetland areas are located near the project site. The U.S Army Corps of Engineers, Pittsburgh District, has verified that no impact to wetlands or floodplains would result from this project.

3.1.6 Historic Areas

The proposed action would be conducted within an existing building at an existing research facility, and no earthmoving would be necessary. Therefore, no impact to historic landmarks, archeological sites, or cultural sites is expected.

3.1.7 Ecological Impacts

The proposed action would not affect federally-listed threatened or endangered species. No impact to terrestrial or aquatic ecology would be expected, since the operation would be within an existing facility.

3.1.8 Socioeconomic Impacts

The proposed action would not require additional labor, nor would it require public services in Morgantown, West Virginia.

3.1.9 Summary of Impacts

The environmental effects associated with the design, construction, and operation of a 2-foot diameter, 50-foot high pressurized fluidized bed unit at METC have been reviewed. This project would have little or no impact on air quality, water quality/quantity, solid waste management, noise levels, floodplains, wetlands, historic areas, ecological resources, or socioeconomic factors.

3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, DOE would not fund the proposed project at METC, and the proposal is not expected to be implemented in the absence of Federal funds. Therefore, the impacts described in this EA as a consequence of the proposed action would not occur.

4.0 LIST OF AGENCIES AND PERSONS CONSULTED

Carl Hackett
Army Corps of Engineers, Pittsburgh District
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Finding of No Significant Impact

MORGANTOWN ENERGY TECHNOLOGY CENTER

FUNDAMENTAL FLUIDIZATION RESEARCH PROJECT

AGENCY: U.S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: The DOE has prepared an Environmental Assessment (DOE/EA-0575) that analyzes the potential environmental impacts for the design, construction, and operation of a 2-foot diameter, 50-foot high, pressurized fluidized-bed unit in an existing research building at the DOE's Morgantown Energy Technology Center (METC) in Morgantown, West Virginia. Based on the analysis in the EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an Environmental Impact Statement is not required and the Department is issuing this FONSI.

COPIES OF THE EA ARE AVAILABLE FROM:

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BACKGROUND: METC proposes to conduct fundamental research on fluidization technology by designing, constructing, and operating a 2-foot diameter, 50-foot high, pressurized fluidized-bed unit. The anticipated result of the proposed project would be a better understanding of fluidization phenomena under pressurized and high velocity conditions. This improved understanding would provide a sound basis for design and scale-up of pressurized circulating fluidized-bed combustion (PCFBC) processes for fossil energy applications.

DESCRIPTION OF PROPOSED ACTION: The 2-foot diameter, 50-foot high, pressurized fluidized-bed unit would be an open-loop system, designed to suspend inert particles using warm air. The unit would operate under ambient or elevated temperature and pressure. Atmospheric air would be compressed to 75 pounds-per-square inch gauge (psig) and heated to 750 degrees Fahrenheit. The maximum air flow rate would be 16,000 actual cubic feet-per-minute. The air would be fed to the bottom of the fluidization vessel, where it would contact and suspend inert particles injected pneumatically by a separate air stream into the vessel. Limestone, sand, or plastic chips would be used as the inert particles. At the top of the vessel, four cyclone separators would collect and return carry-over particles to the bottom of the vessel. The warm air exiting the vessel would flow through a spray water cooler before entering a baghouse where fine particles would be removed. The air heaters would be fired with

natural gas, and the exhaust flue gas would be discharged to the atmosphere. The 2-foot diameter, 50-foot high, pressurized fluidized-bed unit would be constructed in an existing research building at METC. The test program would investigate the effects of bed temperature (i.e., ambient to 750 degrees Fahrenheit), bed pressure (i.e., 20 to 75 psig), static bed height (i.e., 1 to 12 feet), and various physical properties of the solid materials, such as particle shape, size, density, and size distribution. The unit would operate approximately 36 hours-per-week (1,872 hours-per-year) for the first year and proposed plans are for similar operations during the following several years.

ENVIRONMENTAL IMPACTS: The environmental effects associated with the design, construction, and operation of a 2-foot diameter, 50-foot high, pressurized fluidized bed unit at METC, have been reviewed and found to be insignificant. This project would have little or no impact on air quality, water quality/quantity, solid waste management, noise levels, floodplains, wetlands, historic areas, ecological resources, or socioeconomic factors. About 2 million pounds-per-year of carbon dioxide would be emitted from natural gas-fired heaters with no release of sulfur dioxide or sulfuric acid mist expected from the project. The total particle emission would be about 1,030 pounds-per-year. All required permits would be obtained prior to operation of the project. No solid waste would be generated by the project, as the solid bed materials (i.e., limestone, plastic, or sand) would be

recirculated back to the unit in order to maintain the constant bed inventory. About 4.4 million gallons-per-year of water would be used for indirect cooling, and would be discharged to the atmosphere as steam. No increase in noise at the METC site boundaries would be anticipated from the project. Sound level measurements would be performed during operations, and proper signs and personal protection equipment (PPE) would be used in accordance with approved procedures. Because the project would be conducted within an existing research building, there would be no significant impact to floodplains, wetlands, historic areas, and ecological resources.

ALTERNATIVES CONSIDERED: Alternatives to the proposed action were considered in the EA. Under the No Action Alternative, DOE would not proceed with the proposed project, and the proposal is not otherwise expected to be implemented. Therefore, the impacts described in the EA as a consequence of the proposed action would not occur. However, a no-action alternative would fail to provide necessary data for design and scaleup of PCFBC processes. A no-action alternative would delay or abort any technology transfer to industry, and any subsequent industrial plans to demonstrate PCFBC technology. Alternative sites for conducting the proposed research were considered and dismissed because implementation would be cost prohibitive. The unique expertise of the METC researchers and the availability of METC facilities were key factors in determining that the proposed Fundamental

Fluidization Research Project should be sited at METC. Alternative technologies to PCFBC include fixed-bed, bubbling-bed, and entrained-bed processes. Each of the alternative technologies is already undergoing development by METC and/or its contractors.

PUBLIC AVAILABILITY: Copies of the EA and the FONSI will be distributed to all persons and agencies known to be interested in or affected by the proposed action or alternatives, including appropriate agencies within the State of West Virginia. Additional copies of the EA and FONSI are available on request from the DOE directly and from the Morgantown Energy Technology Center at the address given above.

DETERMINATION: Based on the analysis provided in the EA, DOE determines that this proposed action, Fundamental Fluidization Research Project, is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act, 42 U.S.C. 4321 et seq. Therefore, an Environmental Impact Statement is not required and DOE is issuing this FONSI.

ISSUED IN WASHINGTON, D.C. ON February 10, 1994

for Tara O'Toole, M.D., M.P.H.
Assistant Secretary
Environment, Safety and Health

DISTRIBUTION LIST
FOR
FINAL ENVIRONMENTAL ASSESSMENT AND
FINDING OF NO SIGNIFICANT IMPACT

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