

**Finding of No Significant Impact
for
Large Pilot Testing – Advanced Post- Combustion
CO₂ Capture Technology Project**

Springfield, Illinois

LEAD AGENCY: U.S. Department of Energy; National Energy Technology Laboratory

ACTION: Finding of No Significant Impact

SUMMARY:

Pursuant to the Council on Environmental Quality (CEQ) Regulations (40 *Code of Federal Regulations* [CFR] Parts 1500-1508) for implementing the procedural provisions of the National Environmental Policy Act (NEPA) (42 *United States Code* [U.S.C.] 4321 *et seq.*) and Department of Energy (DOE) National Environmental Policy Act (NEPA) implementing regulations (10 CFR 1021), DOE prepared an Environmental Assessment (EA) (DOE/EA-2128) to analyze the potential environmental, cultural, and socioeconomic impacts of partially funding a proposed project to design, construct, and operate a 10-megawatt-electric (MWe) carbon capture system based on the Linde-BASF advanced amine-based post-combustion carbon dioxide (CO₂) capture technology at a coal-fired power plant. This EA identifies, documents, and evaluates the potential environmental effects of implementing the proposed project to be located at the City Water, Light and Power (CWLP) Facility in Springfield, Illinois, and operated by Linde-BASF and University of Illinois at Urbana–Champaign (UIUC). All discussions and findings related to the Proposed Action and the No-Action Alternative are presented in the attached Final EA and Appendices. The Final EA is hereby incorporated by reference.

DOE proposes to provide cost-shared funding to a project team led by the University of Illinois at Urbana–Champaign (UIUC) and Linde-BASF for the proposed carbon capture facility at CWLP, an existing power plant in Springfield, Illinois. The proposed project would involve the construction and two-year operation of a Large Pilot Testing Facility to assess the scalability and commercial potential of the Linde-BASF post-combustion CO₂ capture technology using U.S. domestic coal, resulting in mitigation of the risks associated with adopting the technology at full scale and creating a pathway for commercial deployment in the U.S. Under the Proposed Action, DOE proposes to provide the Trustees of the University of Illinois (UIUC) with up to \$3 million of cost-shared financial assistance under the Fossil Fuel Large-Scale Pilot program initiative. The mission of the Fossil Fuel Large-Scale Pilot program is to develop large-pilot scale projects for potentially transformational coal technologies aimed at enabling step change improvements in coal powered system performance, efficiency, and cost of electricity. DOE’s contribution would constitute approximately 80 percent of the estimated \$3.7 million total cost.

Based on the analysis in the EA, DOE finds that implementing the Proposed Action at CWLP would not constitute a major federal action that would significantly affect the quality of the physical, biological, or human environment, within the meaning of NEPA. Therefore, the preparation of an Environmental Impact Statement is not required, and DOE is issuing this Finding of No Significant Impact (FONSI).

ALTERNATIVES CONSIDERED:

PROPOSED ACTION

DOE proposes to provide cost-shared funding to a project team led by the University of Illinois at Urbana–Champaign (UIUC) and Linde-BASF at CWLP, an existing power plant, in Springfield, Illinois to design, construct, and operate a large-scale pilot of a post-combustion CO₂ capture system that could significantly reduce the greenhouse gas emissions of a coal-fueled system. Large-scale pilots are necessary to reduce the technical and financial risk associated with the adoption of a new technology in the marketplace. This is the final stage of research and development prior to commercial demonstration; thereby demonstrating technical success of the

integrated components at the large pilot-scale.

The proposed large-scale carbon capture pilot would take a slipstream from the host site and capture post-combustion carbon dioxide (CO₂) from the coal-fired power plant flue gases using Linde-BASF patented solvent-based technology. The proposed Large Pilot Testing facility would demonstrate the scalability and commercial potential of the Linde-BASF post-combustion CO₂ capture technology using U.S. domestic coal, resulting in mitigation of the risks associated with adopting this technology at full scale and creating a pathway for commercial deployment in the U.S.

Under the Proposed Action, DOE proposes to provide the Trustees of the University of Illinois (UIUC) with up to \$3 million of cost-shared financial assistance under the Fossil Fuel Large-Scale Pilot program initiative, an estimated 80 percent of the estimated \$3.7 million total project cost.

The Large Pilot Testing Facility would consist of fabricated and assembled process modules and fabricated or field-erected columns. The components would be shipped to the CWLP site for installation on a concrete foundation. The process modules would include a flue gas pre-treatment (direct contact cooling) process, CO₂ absorption process, and amine solvent regeneration. Ancillary equipment would include storage tanks and truck loading/unloading stations, flue-gas ductwork connections from the Unit No. 4 stack to the capture process and utility (including electricity, cooling water, potable water, steam) connections to CWLP.

The capture process would take a slipstream from Dallman Unit No. 4 flue gas stream and would capture post-combustion carbon dioxide (CO₂) from the coal-fired power plant flue gases using the Linde-BASF patented amine solvent-based technology. The slipstream would be removed upstream of the Continuous Emission Monitoring System (CEMS) installed in the Dallman Unit No. 4 stack and the captured CO₂ stream and treated exhaust gases from the capture process would be returned to the Dallman Unit No. 4 stack upstream of the CEMS. The captured CO₂ and treated exhaust gas from the capture process would be mixed with the Dallman Unit No. 4 flue gas and would be emitted to the atmosphere through the Dallman Unit No. 4 stack.

NO-ACTION ALTERNATIVE

Under the No-Action Alternative, DOE would not provide cost-shared funding to the proposed project; resulting in potential delays if the University opts to search for other funding sources. More likely, the Large Pilot Testing Facility would not be constructed. DOE assumes, for the purposes of NEPA, that under the No-Action Alternative the recipient would not pursue the project. Consequently, the Linde/BASF technology would not be tested at large-pilot scale using domestic U.S. coal, and the level of commercial readiness for this technology would not be advanced.

ENVIRONMENTAL CONSEQUENCES:

The Final EA examined the potential effects of the Proposed Action and No-Action alternatives on the following 13 resource areas of environmental and socioeconomic concern: air quality and climate, water resources, biological resources, health and safety, solid and hazardous waste, infrastructure and utilities, visual resources, socioeconomic conditions, geology and soils, land use, cultural and paleontological resources, environmental justice and noise. Five of the resource areas were screened from further analysis since DOE determined they would either not be affected or would sustain negligible impacts from the proposed project and not require further evaluation. The following eight resource areas were analyzed in more detail: air quality and climate, water resources, biological resources, health and safety, solid and hazardous waste, infrastructure and utilities, visual resources, and socioeconomic conditions. The EA also considered cumulative impacts, including climate change, that might reasonably occur as a result of the Proposed Action.

Based on the analysis contained in the Final EA, DOE determined that the construction and operation of the proposed Large Pilot Testing Facility would not have significant adverse impacts, either individually or cumulatively, on the physical, biological, or human environments. Implementation of the proposed project would result in short-term and long-term negligible to minor adverse impacts, which are described in the following paragraphs. Under the No-Action Alternative, the Large Pilot Testing Facility project would not be constructed at CWLP, and existing conditions would remain unchanged. As such, implementation of the No-Action Alternative would not result in impacts to considered resource areas.

Air Quality and Climate. Minor adverse impacts to air quality would be anticipated during construction and operation of the project. Construction of the proposed project would result in direct criteria air pollutant emissions from fuel combustion for operation of construction equipment and indirect criteria air pollutant emissions from consumption of electricity during the construction period. Construction of the proposed project also would result in fugitive particulate emissions (PM₁₀, PM_{2.5}) from site clearing and excavation, installation of pilings and concrete, and other construction activities. The project will use best practices for dust suppression and vehicle emissions to minimize impacts to air quality during construction. Proposed project construction activities are not expected to exceed air quality monitoring thresholds or ambient air quality standards in offsite areas.

Operation of the Large Pilot Testing Facility would result in a minor impact to air quality due to direct and fugitive air emissions from the proposed project components. Direct emissions would be returned to CWLP stack and would constitute a minor increase in volatile organic material (VOM), and a minor decrease in sulfur oxides for the 2-year duration of the pilot project. These emissions would be within authorized limits and would not exceed any permit limits or federal or state regulations.

Water Resources. The proposed project is adjacent to Lake Springfield which serves as the drinking water source for the City of Springfield, nearby communities, and rural customers among other uses. Lake Springfield is listed as a Category 5 impaired water for aquatic life and aesthetic quality uses. The project is not located within any Federal Emergency Management Agency (FEMA)-mapped floodplains and the nearest mapped floodplain is a 100-year floodplain associated with Lake Springfield, located approximately 47 feet southwest of the project. Per the most current National Wetland Inventory, the project is not located within any wetlands, and the nearest wetland is approximately 800 feet west of the project. Project construction would require the development of a Stormwater Pollution Prevention Plan (SWPPP) and a Clean Water Act (CWA) Section 404 National Pollutant Discharge Elimination System (NPDES) permit containing site-specific measures for avoiding erosion and sediment transport to surface waters and containment and cleanup of accidental petrochemical spills. With the implementation of the SWPPP and site-specific design strategies, spills associated with the handling or use of hazardous materials (e.g., vehicle fuel, oils and lubricants, etc.) would potentially be avoided, or minimized and quickly contained. Construction and operation of the proposed Large Pilot Testing Facility Project would result in negligible adverse impacts to floodplains and minor adverse impacts to surface water and surface water quality, including potential localized water quality degradation of Lake Springfield. The use of construction best practices and site-specific design strategies and plans would limit the potential for impact to Lake Springfield.

The impermeable nature of the surface geology in the watershed and the disturbed and compacted nature of the project site would limit groundwater contamination during construction and operations and no impacts to groundwater are anticipated to occur. Wetlands do not occur in the project's construction footprint, and therefore, no filling, excavating, or clearing would occur in this resource. Therefore, there would be no impacts to wetlands.

Biological Resources. The proposed project site would be located within the existing CWLP facility in an area currently developed and used for equipment and materials storage. Impacts to aquatic species could occur as a result of water quality impacts described previously. The potential for accidental impacts to water quality and, consequently, to aquatic species would be minimized with the implementation of the SWPPP and site-specific design strategies, and adherence to the constraints imposed by the CWA Section 404 permitting process.

No sensitive habitats or ecologically sensitive terrain is present at the proposed project site, and no new surface disturbance would be required for construction or operation of the project. Given the lack of suitable roosting and

foraging habitat for migratory birds and bats within the proposed project site, and the temporary nature of the proposed project, impacts to migratory birds and special status bat species would likely be minor and short term in duration and would not result in population-level impacts to their populations.

Due to the active power plant and the major roadways adjacent to the proposed project site, species likely to occur in the proposed project area would be those acclimated to urban environments. DOE has contacted U.S. Fish and Wildlife Service and the Illinois Department of Natural Resources to confirm the proposed project would be unlikely to contribute impacts to protected species and those agencies have identified no issues associated with the proposed project. Given the lack of impacts identified by the Federal and state wildlife agencies as well as the temporary nature of the proposed project, impacts to special status species are expected to be negligible.

Health and Safety. Construction and operation of the proposed project would result in minor potential for health and safety impacts to proposed project construction, operations, and decommissioning personnel, CWLP employees, and members of the public. Potential health and safety impacts to project construction and operations personnel would include occupational injuries during construction, operation, and decommissioning, and potential occupational exposure to hazardous materials from transport, storage, and use of process chemicals including amine solvent, sodium hydroxide, and other corrosive, flammable, or toxic chemicals. Safety elements of the design of the project would minimize hazards to the extent possible. Safety elements would include corrosion resistant, fail-close design gas valves, limits on the cooling water system to prevent amine solvent entry, a manually operated pump system to allow sampling of contaminated liquid before transfer to the wastewater line, components designed for acceptable surface temperatures, and all equipment would be designed and installed to maintain the maximum feasible distance from power lines.

All project-related construction personnel and operations personnel would receive training in areas relevant to construction and operational safety and their job requirements and all personnel would use personal protective equipment appropriate for their work activities in accordance with CWLP safety plan and applicable requirements. A Linde-BASF comprehensive Hazard and Operability study of the proposed project design and proposed operation would identify potential hazards to which mitigation measures could be applied. Adherence to Occupational Safety and Health Administration (OSHA) requirements, project-specific and CWLP-specific safety plans, and standard safety practices would minimize these potential risks to health and safety.

Solid and Hazardous Waste. Construction of the proposed project would generate solid and hazardous wastes including construction and demolition debris from site clearing, excavation, and construction, and potentially waste oils, spent solvents, and other solid waste (e.g., scrap metal) from construction activities. Solid and hazardous wastes generated from construction activities would be managed by the construction contractor and transported off site for disposal at licensed facilities.

Operation of the proposed project would generate solid and hazardous wastes. Off-site disposal locations and vendors for offsite transport and disposal of solid and hazardous wastes generated from proposed project operations would be coordinated with direct oversight from CWLP and in accordance with CWLP's site-specific waste management processes and procedures. Therefore, no impacts are expected from solid and hazardous wastes.

Infrastructure and Utilities. Construction and operation of the proposed project is not anticipated to result in adverse impacts to infrastructure and utilities. Negligible adverse impacts to water and wastewater are expected during construction. High-pressure steam, low-pressure steam, cooling water, and potable water would be provided to the project by CWLP through direct connections to CWLP electrical, steam, process water, and potable water systems. Wastewater/stormwater streams resulting from operation of the pilot facility would include a continuous flow of process condensate from the direct contact cooler flue gas treatment process and an intermittent flow of process condensate from the stripper condenser, liquid waste from process, liquids from cleaning/flushing process equipment during maintenance activities, and stormwater runoff from the site. Liquids would be monitored, and liquids that are not acceptable for treatment in CWLP's wastewater treatment plant would be either treated on site or disposed of offsite in licensed treatment and disposal facilities.

Captured and diverted uncontaminated stormwater from the testing facility site would be handled, treated and discharged by CWLP under its existing NPDES permit. Stormwater from the testing facility site that is not found to be uncontaminated would be either treated on site or disposed of offsite in licensed facilities. Captured and diverted uncontaminated stormwater from the testing facility site would be handled, treated, and discharged by CWLP under its existing NPDES permit.

Visual Resources. The testing facility would be an addition to existing power plant along an interstate highway and therefore would be in character with the existing viewshed. The only identified visual resource at the proposed project site is the graphic on the side of Dallman Unit No. 4, indicating that Springfield is the hometown of President Lincoln. The main viewpoint of the Lincoln graphic on Dallman Unit No. 4 for residents and visitors to Springfield occurs while traveling on Routes 36/72/55. Visual modeling indicates the proposed project's columnar structures intersect, but do not block this graphic as viewed on the direct approach to the power plant on Routes 36/72/55 and do not interfere with the view of the graphic from highway angles of view other than the direct approach. Therefore, the impacts to visual resources are minimal and temporary and do not affect the purpose of the graphic installation.

Socioeconomic Conditions. Construction workers from within and outside the immediate area would spend money in the local area however, expenditures would be short-term and localized, and would be unlikely to have measurable impact to Springfield's economy.

Operations positions for the proposed project would first be offered to current employees impacted by the retirement of existing power plant units. As no additional employment positions are planned for operation activities, the impact of the proposed project to the community employment would be negligible on the city's population of over 116,000 people. The budget for the proposed project is \$3.7 million. While the proposed project proponents would attempt to utilize local contractors for the proposed project, it is not anticipated that all expenditures would be local. Therefore, the proposed project would be expected to have a minor, short-term, and beneficial impact on the economy.

PUBLIC AVAILABILITY:

DOE encourages public participation in the NEPA process. This EA was released for public review and comment after publication of the Notice of Availability in the Springfield Illinois State Review-Journal. The public was invited to provide written comments on the Draft EA to DOE by e-mail or ground delivery during the comment period, which occurred from April 6, 2020 through May 5, 2020. Copies of the Draft EA also were distributed to cognizant agencies, Native American Tribes, and interested parties. Copies of the Draft EA were made available for review at the Lincoln Library, 326 S. 7th Street, Springfield, IL 62701, and the Illinois State Library, Gwendolyn Brooks Building, 300 S. Second Street, Springfield, IL 62701. Since much of the country was experiencing office shut-downs due to the COVID-19 pandemic, all copies of the document were disseminated electronically, with the exception of hardcopies mailed to the libraries and Native American Tribes. Additionally, DOE waited two weeks after the close of the comment period to ensure that any letters mailed had been received and to allow for any late comments to arrive.

Responses were received from the Environmental Protection Agency and from the Illinois Department of Natural Resources, State Historic Preservation Office. Those letters are included in the Final EA, and appropriate changes were made in the corresponding sections of the document. Other changes include minor edits to correct typos or improve clarity. All changes are shown in bold text to allow readers to quickly identify altered material.

No comments were provided by other agencies, Native American Tribes, non-governmental organizations, or the public.

The Draft and Final EA are available on the National Energy Technology Laboratory website at <https://www.netl.doe.gov/library/environmental-assessments> and DOE's NEPA website at <https://energy.gov/node/4436510>

FOR FURTHER INFORMATION ON THE DOE NEPA PROCESS CONTACT:

Ms. Pierina Fayish
U.S. Department of Energy
National Energy Technology Laboratory M/S 922-1W13
P.O. Box 10940
Pittsburgh, Pennsylvania 15236
Pierina.Fayish@NETL.DOE.GOV
(412) 386-5428

DETERMINATION:

Based on the information presented in the Final EA (DOE/EA-2128), DOE finds that providing cost-shared funding to UIUC for the proposed pilot project at CWLP would not constitute a major federal action that would significantly affect the quality of the physical, biological, or human environment, within the meaning of NEPA. Therefore, the preparation of an Environmental Impact Statement is not required, and DOE is issuing this FONSI.

Issued in Pittsburgh, Pennsylvania on this ____ day of ____, 2020.

Brian J. Anderson, Ph.D.
Director, National Energy Technology Laboratory