

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION



RECIPIENT: Lehigh University

STATE: PA

PROJECT TITLE: Decarbonizing Concrete: Low-Temperature Calcined Clays as an Alternative Concrete Binder, Achieving Durability with Clay Beneficiation

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002997	DE-EE0011220	GFO-0011220-001	GO11220

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

A9 Information gathering, analysis, and dissemination	Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
B1.31 Installation or relocation of machinery and equipment	Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.
B3.6 Small-scale research and development, laboratory operations, and pilot projects	Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Lehigh University (Lehigh) for the characterization, beneficiation and calcination of clays for use in cement and concrete. The project would purify and modify clay resources that are otherwise not targeted for kaolin extraction. The project would also assess small batches of cement and concrete prepared with low-CO₂ calcined clay supplementary cementitious materials for concrete mechanical strength properties, aspects of durability, environmental impact and economic viability.

Characterization, beneficiation, calcination, and concrete sample production and sample testing would occur at Lehigh University in Bethlehem, Pennsylvania. The mining, processing, packaging and shipping of pertinent material would occur at Buzzi Unicem's facilities in Stockertown, Pennsylvania and Chattanooga, Tennessee.

Hazardous materials that would be utilized as part of this project include dry fine particulate powders, including Portland cement, silica sand, calcined clays, and supplemental cementitious materials for cement and concrete sample fabrication. All such handling would occur at a small-scale, which would limit exposure concerns to the research team and pose no risk to the public. All handling of particulate powders would occur using appropriate controls in a laboratory setting and/or be performed outdoors. High temperatures would be utilized during the calcination of clay materials. Lehigh requires all research participants to complete comprehensive laboratory safety training on the hazards of particulate exposure and proper safety procedures. Research participants would be required to use appropriate personal protective equipment and existing health and safety policies and procedures would be followed. Additional policies and procedures would be implemented as necessary as new health and safety risks are identified.

The electric kiln would calcine clay and predominately release water vapor from the dehydroxylation of the clays.

Other trace contaminants of the clays, such as carbonates, would be released as negligible emissions, such as carbon dioxide in the case of carbonates. All emissions are expected to be negligible, and the project facility occurs within a USEPA Attainment Area.

Physical modification of Lehigh facilities would include the indoor installation of an electric rotary kiln for the calcination of clays. The electric rotary kiln would require a new dedicated electric service panel for the 240 Volt operation. The electrical service panel would only be operated by trained technical staff. No ground disturbing activities, change in the mission of the existing facilities or outdoor equipment installations would occur as part of this award.

A local electrical permit may be required for the proposed electrical wiring modifications. Any and all permits required for the execution of the project at the above-referenced locations would be the responsibility of the recipient.

DOE has considered the scale, duration, and nature of proposed activities to determine potential impacts on resources, including those of an ecological, historical, cultural, and socioeconomic nature. DOE does not anticipate impacts on these resources which would be considered significant or require DOE to consult with other agencies or stakeholders.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Industrial Efficiency & Decarbonization Office
NEPA review completed by Chris Akios, 06/28/2024

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____



Andrew Montano

NEPA Compliance Officer

Date: 6/28/2024

FIELD OFFICE MANAGER DETERMINATION

- Field Office Manager review not required
- Field Office Manager review required