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

RECIPIENT: North Carolina State University **STATE:** NC

PROJECT TITLE: Next Generation Miscanthus: Hybrid Performance Evaluation and Enhanced, Sustainable Feedstock Production and Supply in the Southeast U.S. for Biofuels and Bioproducts

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001917	DE-EE0008523	GFO-0008523-001	GO8523

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.)
B3.1 Site characterization and environmental monitoring	Site characterization and environmental monitoring (including, but not limited to, siting, construction, modification, operation, and dismantlement and removal or otherwise proper closure (such as of a well) of characterization and monitoring devices, and siting, construction, and associated operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis). Such activities would be designed in conformance with applicable requirements and use best management practices to limit the potential effects of any resultant ground disturbance. Covered activities include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA. (This class of actions excludes activities in aquatic environments. See B3.16 of this appendix for such activities.) Specific activities include, but are not limited to: (a) Geological, geophysical (such as gravity, magnetic, electrical, seismic, radar, and temperature gradient), geochemical, and engineering surveys and mapping, and the establishment of survey marks. Seismic techniques would not include large-scale reflection or refraction testing; (b) Installation and operation of field instruments (such as stream-gauging stations or flow-measuring devices, telemetry systems, geochemical monitoring tools, and geophysical exploration tools); (c) Drilling of wells for sampling or monitoring of groundwater or the vadose (unsaturated) zone, well logging, and installation of water-level recording devices in wells; (d) Aquifer and underground reservoir response testing; (e) Installation and operation of ambient air monitoring equipment; (f) Sampling and characterization of water, soil, rock, or contaminants (such as drilling using truck- or mobile-scale equipment, and modification, use, and plugging of boreholes); (g) Sampling and characterization of water effluents, air emissions, or solid waste streams; (h) Installation and operation of meteorological towers and associated activities (such as assessment of potential wind energy resources); (i) Sampling of flora or fauna; and (j) Archeological, historic, and cultural resource identification in compliance with 36 CFR part 800 and 43 CFR part 7.
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 North Carolina State University (NCSU) to evaluate the performance of new varieties of miscanthus, a perennial grass, and identify the best-performing varieties for growth in areas that are typically less suitable for commodity crop production. Plant rhizomes of new

miscanthus varieties would be sown in locations across North Carolina, representative of three different geo-climatic regions, and would be characterized for growth potential, yield, water use efficiency (WUE), environmental impact and other relevant factors. The plants would be managed and analyzed over a five-year period. The project would be completed over three Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP.

Proposed project activities would focus on developing a comparative analysis of soil and plant varieties at each project site. Field activities would include microbiome profiling, water consumption/WUE assessments, genetic diversity analysis, and productivity assessments (including yield efficiency, reproductive fertility, carbon exchange and nutrient translocation). Laboratory testing and computer modeling would also be performed. These activities would include meta-transcriptome analysis of microbial communities, near infrared (NIR) modeling, and supply chain modeling. Oak Ridge National Laboratory (ORNL) would assist with supply chain modeling. All other laboratory research activities would be overseen by NCSU and performed at its campus in Raleigh, NC.

Three different locations would be used for crop establishment and field testing: Williamsdale Biofuels Field Laboratory (Wallace, NC), Oxford Tobacco Research Station (Oxford, NC), and Mountain Horticultural Research and Extension Center (Mills River, NC). Crop establishment would be performed with miscanthus rhizomes from existing plots at Mills River, NC. Once established the crops would then be assessed over a five year period. At the outset, 15 varieties of miscanthus would be evaluated. Upon completion of BP1, the 5 most productive varieties would be down-selected for continuation into BP2 and BP3, to undergo further agronomic trials to improve observed yields.

All locations where field testing would be performed are research and/or university extension facilities operated by NCSU or the North Carolina State Government. Each facility owns and manages land dedicated to agricultural research, which would be used by the project for field testing. All field testing locations have recently (e.g. 2018) been in use as farmland and would not require any clearing of land to complete the project.

Field testing would be performed primarily in plots designated as ‘Standard Sites.’ Miscanthus varieties would be arranged in a block design in plots measuring 5.5 m wide x 10 m long. Approximately 4,900 rhizomes would be planted at each Standard Site, with an estimated production of 4,320 dry lbs. of miscanthus biomass per site per year. A ‘Watershed Site’ and ‘Harvest Site’ would also be established at the Williamsdale Laboratory to support hydrologic model development and harvest strategy development, respectively. Miscanthus plots were previously established at this location and would be used for analysis. Together, these plots would produce approximately 84,100 dry lbs. of biomass per year.

Field lysimeters would be installed at each of the Standard Sites in 60 cm diameter x 75 cm deep holes that would be dug using a tractor-mounted auger. Soil moisture sensors would be installed and would require 25 cm diameter x 25 cm deep holes that would be dug manually to facilitate the insertions of soil moisture probes at 10, 15, and 25 cm depth. At the watershed site (Williamsdale Biofuels Field Laboratory), fiber optic (FO) soil moisture sensing cables would be installed at 10, 15 and 25 cm depths along a 1000 m transect within the established miscanthus field. A plowing system would be used to simultaneously deploy the FO sensing cables at the three targeted depths with minimal soil disturbance. At the end of the project all monitoring systems would be removed and the holes would be refilled with original soil.

Nitrogen fertilizer would be used at approximately 100 lbs./acre for a total of 8-10 acres per year. All spraying of pesticides would be completed by licensed applicators and in accordance with established labeling, storage, and disposal guidelines. Miscanthus harvest operation scenarios would be completed using existing industrial foraging equipment/machinery under NCSU supervision. Laboratory activities would involve the use and handling of industrial chemicals, reagents, and gases. Both field testing and laboratory activities would be performed adhering to established health and safety policies and procedures. Both NCSU and ORNL would adhere to all applicable Federal, State and local health, safety and environmental regulations.

There is a bird species and alligator species listed by the U.S. Fish and Wildlife Service as species of concern in the area in which the Williamsdale Biofuels Field Laboratory is located. At the Oxford Tobacco Research Station there are two clam species and two plant species listed. At the Mountain Horticultural Research and Extension Center there are three mammal species, one clam species and five plant species. However, none of the listed species have any significant probability of being within the field testing sites. All the listed mammal and bird species are either forest or cave dwelling species. Likewise, the clam and alligator species both inhabit freshwater environments. The plant species would not be expected to be found in the area, as all three project sites are established agricultural testing facilities and project activities would only be performed on previously disturbed plots of land currently used by each facility for field testing. Accordingly, DOE has determined that field activities associated with the project would

cause no effects to any of the listed species.

All land in which field testing would be performed is designated by the U.S. Department of Agriculture as prime farmland or as farmland of statewide importance. However, as noted above, all three sites are actively used for agricultural testing. Additionally, the project activities would not affect the land in such a way as to alter its current designation.

DOE also conducted a review of potential issues relating to other resources of concern and found that no effects would be expected to result from the project.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assisstance agreement:

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

Notes:

Bioenergy Technologies Office
This NEPA determination requires a tailored NEPA Provision.
NEPA review completed by Jonathan Hartman, 02/20/2019

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: Electronically Signed By: Casey Strickland Date: 2/20/2019

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☑ Field Office Manager review not required

☐ Field Office Manager review required

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____

Field Office Manager