U.S. Department of Energy
Categorical Exclusion Determination Form

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Proposed Action Title: Rhizosphere Observations Optimizing Terrestrial Sequestration (ROOTS) Program (FOA No. DE-FOA-0001565)

Program or Field Office: Advanced Research Projects Agency - Energy (ARPA-E)

Location(s) (City/County/State): AZ, CA, CO, FL, GA, IA, IL, KY, MA, MI, MO, NE, NM, OK, PA, TX, WA, WI, Nottingham, UK,

Proposed Action Description:

The ROOTS Program seeks to fund the development of novel, non-destructive, field-deployable technologies to: (1) measure root functional properties; (2) measure soil functional properties; and (3) advance models that accelerate selection and development of plant varieties. The ROOTS Program is composed of 10 small-scale research and development projects that will be conducted by universities, for-profit entities, and federal laboratories. If successful, ROOTS technologies will accelerate selection and development of crops that will greatly increase carbon uptake in soil and remove CO2 from the atmosphere, decrease N2O emissions, and decrease the energy intensity of agricultural production.

All of the 10 ROOTS projects (listed in Attachment A) are covered by this Determination and fit within the class of actions identified under the DOE Categorical Exclusions identified below and do not involve any extraordinary circumstances that may affect the significance of the environmental effects of the projects. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. Project tasks for all 10 projects under the ROOTS Program will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and Local regulatory requirements. For one project, Prime Recipient Pennsylvania State University, must obtain and maintain all required authorizations for all work involving recombinant DNA molecules and GM plants prior to beginning work with these materials. Penn State must also secure an interstate movement permit from USDA APHIS prior to transferring the transgenic materials between facilities in Wisconsin and Pennsylvania.

Categorical Exclusion(s) Applied:

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

B3.8 - Outdoor terrestrial ecological and environmental research

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

☑ The proposal 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 proposal that may affect the significance of the environmental effects of the proposal.

☑ The proposal 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.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer: [signature] Date Determined: 03/22/2017

(This form will be locked for editing upon signature)

Attachment A: Projects in the ROOTS Program (FOA No. DE-FOA-0001565)

Prime Recipient	Project Title
Colorado State University	Root Genetics In The Field To Understand Drought Adaptation And Carbon Sequestration
Iowa State University	High-throughput, High-resolution Phenotyping of Nitrogen Use Efficiency Using Coupled In-plant and In-soil Sensors
Lawrence Berkeley National Laboratory (1565-1540)	An Integrated Imaging and Modeling Toolbox for Accelerated Development of Root-focused Crops at Field Scales
Lawrence Berkeley National Laboratory (1565-1553)	Associated Particle Imaging (API) for Non-Invasive Determination of Carbon Distribution in Soil
Pennsylvania State University	DEEPER: An Integrated Phenotyping Platform for Deeper Rooting
Sandia National Laboratories	Multi-Modal Monitoring of Plant Roots for Drought and Heat Tolerance in the US Southwest
Stanford University	Thermoacoustic Root Imaging, Biomass Analysis, and Characterization
Texas A&M AgriLife Research	A Field-Deployable Magnetic Resonance Imaging Rhizotron for Modeling and Enhancing Root Growth and Biogeochemical Function
UHV Technologies, Inc.	Low Cost X-Ray CT System for In-Situ Imaging of Roots
University of Florida	Rays for Roots - Integrating Backscatter X-ray Phenotyping, Modeling, and Genetics to Increase Carbon Sequestration and Switchgrass Resource Use Efficiency