



U.S. Department of Energy

Categorical Exclusion Determination Form

Proposed Action Title:

Program or Field Office:

Location(s) (City/County/State):

Proposed Action Description:

Categorical Exclusion(s) Applied:

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:

Date Determined:

Attachment A: Projects in the Exploratory Topic L - Phytomines (FOA No. DE-FOA-0002784 and DE-FOA-0002785)

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
University of Florida (2784-1844)	Nickel Farming: Improving a U.S.-native Hyperaccumulator Plant for Commercial Cultivation	A9, A3.6, B3.1
University of Wisconsin – Madison (2784-1833)	Design and Application of a Genetic Toolbox to Domesticate <i>Odontarrhena corsica</i> and <i>Odontarrhena chalcidica</i> for Nickel Phytomining in the United States	A9, A3.6, B3.1
Michigan Technological University (2784-1840)	Chemically and Biologically Catalyzed Phytomining of Nickel from Serpentine Barren Soils	A9, B3.6
Advanced Environmental Technologies, LLC. (2785-1635)	Development of an Alfalfa/Biodigested Lignite/Fungal Bioleaching-Based System to Enhance Phytomining of Nickel from Soil	A9, B3.6
University of Arizona (2784-1827)	Systematic Elemental Screening of Herbarium and Field Plants to Create a Comprehensive U.S. Plant Inventory for Metal Hyperaccumulators	A9, A3.6, B3.1
Verinomics LLC (2785-1636)	Developing a Sterile, High-Yield Phytomining Platform to Bring Low-Carbon Nickel Production to the United States	A9, A3.6
University of Massachusetts Amherst (2784-1834)	<i>Camelina sativa</i> for Hyperaccumulator of Nickel (CaSH-Ni)	A9, A3.6

Bold text indicates the one project included in the Third Amended CX.



U.S. Department of Energy

Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: Exploratory Topic L: Plant HYperaccumulators TO MIne Nickel-Enriched Soils (PHYTOMINES) and PHYTOMINES SBIR/STTR (FOA Nos. DE-FOA-0002784 and DE-FOA-0002785)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): AZ, CA, CO, CT, DC, IL, MA, MD, MI, MO, NE, NJ, NM, NV, NY, PA, WI

Proposed Action Description:

SECOND AMENDED PROGRAMMATIC NEPA DETERMINATION (See attached original and First Amended Determination dated September 18, 2024 and October 7, 2024, respectively). Exploratory Topic L: PHYTOMINES seeks to research the feasibility of extracting nickel and other critical minerals through the natural accumulation of these minerals in plants. Specifically, the projects aim to improve phytomining systems technologies for nickel and other critical materials, optimize nickel accumulation rates in plants that grow in nickel-rich soils, and improve awareness of phytomining's potential application in underutilized and nonagricultural lands. If successful, PHYTOMINES projects will establish a competitive domestic supply chain to supplement conventional mining methods and reduce nickel imports for use in clean energy technologies, thereby reducing fossil fuel combustion and greenhouse gas emissions.

The PHYTOMINES Program is composed of 7 small-scale research and development projects that will be conducted by universities and small businesses. This Second Amended Determination covers 1 of the 7 projects (listed in Attachment A). All 6 projects covered by this and the prior Determinations fit within the class of actions identified under the DOE Categorical Exclusions identified below. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. All project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and Local regulatory requirements.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

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

B3.1 - Site characterization and environmental monitoring

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: **GEOFFREY GOODE** Digitally signed by GEOFFREY GOODE
Date: 2024.11.21 17:03:06 -05'00'

Date Determined:

Attachment A: Projects in the Exploratory Topic L - Phytomines (FOA No. DE-FOA-0002784 and DE-FOA-0002785)

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
University of Wisconsin – Madison (2784-1833)	Design and Application of a Genetic Toolbox to Domesticate <i>Odontarrhena corsica</i> and <i>Odontarrhena chalcidica</i> for Nickel Phytomining in the United States	A9, A3.6, B3.1
Michigan Technological University (2784-1840)	Chemically and Biologically Catalyzed Phytomining of Nickel from Serpentine Barren Soils	A9, B3.6
Advanced Environmental Technologies, LLC. (2785-1635)	Development of an Alfalfa/Biodigested Lignite/Fungal Bioleaching-Based System to Enhance Phytomining of Nickel from Soil	A9, B3.6
University of Arizona (2784-1827)	Systematic Elemental Screening of Herbarium and Field Plants to Create a Comprehensive U.S. Plant Inventory for Metal Hyperaccumulators	A9, A3.6, B3.1
Verinomics LLC (2785-1636)	Developing a Sterile, High-Yield Phytomining Platform to Bring Low-Carbon Nickel Production to the United States	A9, A3.6
University of Massachusetts Amherst (2784-1834)	<i>Camelina sativa</i> for Hyperaccumulator of Nickel (CaSH-Ni)	A9, A3.6

Bold text indicates the one project included in the Second Amended CX.



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Categorical Exclusion Determination Form

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Proposed Action Title: Exploratory Topic L: Plant HYperaccumulators TO MIne Nickel-Enriched Soils (PHYTOMINES) and PHYTOMINES SBIR/STTR (FOA Nos. DE-FOA-0002784 and DE-FOA-0002785)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): AZ, CA, CO, CT, DC, MA, MD, MI, MO, NE, NJ, NM, NV, NY, PA

Proposed Action Description:

FIRST AMENDED PROGRAMMATIC NEPA DETERMINATION (See attached original Determination dated September 18, 2024.) Exploratory Topic L: PHYTOMINES seeks to research the feasibility of extracting nickel and other critical minerals through the natural accumulation of these minerals in plants. Specifically, the projects aim to improve of phytomining systems technologies for nickel and other critical materials, optimize nickel accumulation rates in plants that grow in nickel-rich soils, and improve awareness of phytomining's potential application in underutilized and nonagricultural lands. If successful, PHYTOMINES projects will establish a competitive domestic supply chain to supplement conventional mining methods and reduce nickel imports for use in clean energy technologies, thereby reducing fossil fuel combustion and greenhouse gas emissions. The PHYTOMINES Program is composed of 7 small-scale research and development projects that will be conducted by universities and small businesses. This Amended Determination covers 2 of the 7 projects (listed in Attachment A). All 5 projects covered by this Determination and the original Determination fit within the class of actions identified under the DOE Categorical Exclusions identified below. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. All project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and Local regulatory requirements. Advanced Environmental Technologies, LLC. and Michigan Technical University have not identified all field site locations and are prohibited from commencing project work until such locations are identified. Per the terms of the award, identification of the field sites, and if necessary, an amended NEPA Determination, are required prior to the conduct of applicable project work.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

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

B3.1 - Site characterization and environmental monitoring

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: **GEOFFREY GOODE**

Digitally signed by GEOFFREY GOODE
Date: 2024.10.07 12:16:12 -04'00'

Date Determined:

Attachment A: Projects in the Exploratory Topic L - Phytomines (FOA No. DE-FOA-0002784 and DE-FOA-0002785)

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
Michigan Technological University (2784-1840)	Chemically and Biologically Catalyzed Phytomining of Nickel from Serpentine Barren Soils	A9, B3.6, B3.1
Advanced Environmental Technologies, LLC. (2785-1635)	Development of an Alfalfa/Biodigested Lignite/Fungal Bioleaching-Based System to Enhance Phytomining of Nickel from Soil	A9, B3.6, B3.1
University of Arizona (2784-1827)	Systematic Elemental Screening of Herbarium and Field Plants to Create a Comprehensive U.S. Plant Inventory for Metal Hyperaccumulators	A9, A3.6, B3.1
Verinomics LLC (2785-1636)	Developing a Sterile, High-Yield Phytomining Platform to Bring Low-Carbon Nickel Production to the United States	A9, A3.6
University of Massachusetts Amherst (2784-1834)	Camelina sativa for Hyperaccumulator of Nickel (CaSH-Ni)	A9, A3.6

Bold text indicates the two projects included in the First Amended CX.



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Categorical Exclusion Determination Form

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Proposed Action Title: Exploratory Topic L: Plant HYperaccumulators TO MIne Nickel-Enriched Soils (PHYTOMINES) and PHYTOMINES SBIR/STTR (FOA Nos. DE-FOA-0002784 and DE-FOA-0002785)

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): AZ, CA, CT, DC, MA, MD, MO, NE, NM, NV, NY

Proposed Action Description:

Exploratory Topic L: PHYTOMINES seeks to research the feasibility of extracting nickel and other critical minerals through the natural accumulation of these minerals in plants. Specifically, the projects aim to improve of phytomining systems technologies for nickel and other critical materials, optimize nickel accumulation rates in plants that grow in nickel-rich soils, and improve awareness of phytomining's potential application in underutilized and nonagricultural lands. If successful, PHYTOMINES projects will establish a competitive domestic supply chain to supplement conventional mining methods and reduce nickel imports for use in clean energy technologies, thereby reducing fossil fuel combustion and greenhouse gas emissions.

The PHYTOMINES Program is composed of 7 small-scale research and development projects that will be conducted by universities and small businesses. This Determination covers 3 of the 7 projects (listed in Attachment A). All 3 projects fit within the class of actions identified under the DOE Categorical Exclusions identified below. This assessment was based on a review of the proposed scope of work and the potential environmental impacts of each project. All project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and Local regulatory requirements. University of Arizona's sample collection and project work locations are tentative and subject to change; ARPA-E must be notified of any location changes prior to conducting work at any new locations, and University of Arizona must provide confirmation to ARPA-E that they will follow required protocols to conduct relevant project work in all locations, including obtaining all necessary permits and authorizations.

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

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

B3.1 - Site characterization and environmental monitoring

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: **GEOFFREY GOODE** Digitally signed by GEOFFREY GOODE
Date: 2024.09.18 17:20:54 -04'00'

Date Determined:

Attachment A: Projects in the Exploratory Topic L - Phytomines (FOA No. DE-FOA-0002784 and DE-FOA-0002785)

Prime Recipient (Control No.)	Project Title	Categorical Exclusion
University of Arizona (2784-1827)	Systematic Elemental Screening of Herbarium and Field Plants to Create a Comprehensive U.S. Plant Inventory for Metal Hyperaccumulators	A9, B3.6, B3.1
Verinomics LLC (2785-1636)	Developing a Sterile, High-Yield Phytomining Platform to Bring Low-Carbon Nickel Production to the United States	A9, B3.6
University of Massachusetts Amherst (2784-1834)	Camelina sativa for Hyperaccumulator of Nickel (CaSH-Ni)	A9, B3.6