

**U. S. DEPARTMENT OF ENERGY, OFFICE OF SCIENCE**  
**NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)**  
**ENVIRONMENTAL EVALUATION NOTIFICATION**

**To be completed by "Applicant," i.e., organization with responsibilities for a "Federal action" involving application to DOE for a permit, license, exemption or allocation, or other similar actions. For assistance, refer to "Instructions for Preparing Environmental Evaluation Notification."**

Solicitation/Award No. (if applicable): DE-SC0026257

Organization Name: University of Michigan (Ann Arbor, Michigan); University of California, Berkeley (Berkeley, California)

Proposed Action Title: Structure-Function Relationships in O<sub>2</sub>-dependent and O<sub>2</sub>-independent Enzymes that Build and Derivatize Photosynthetic Pigments

Total DOE Funding/Total Funding: \$678,000

**I. Project Description: (Use explanation pages if additional space is required)**

**A. Proposed Project/Action (if applicable, delineate Federally funded/Non-Federally funded portions)**

The proposed project involves immunodetection of Rubrivivax gelatinosus AcsF (RgAcsF) and Chloracidobacterium thermophilum AcsF (CtAcsF) polypeptides. This undertaking is important to assess synthesis levels of the introduced AcsF homologs in Auxenochlorella. If a previously established Arabidopsis antibody is not sufficient for this purpose, we will produce and screen custom antibodies raised against purified RgAcsF and CtAcsF proteins using an as yet undetermined commercial vendor.

The proposed action involves the use of vertebrate animals (rabbits) for the generation of polyclonal antibodies produced by immunizing rabbits with purified RgAcsF and CtAcsF antigens, and collecting serum samples at designated intervals (see attached Vertebrate Animals section document and proposals).

The proposed action will be carried out with DOE being the sole funding agency.

B. Would the project proceed without Federal funding? Yes  No

***If "yes," use explanation page.***

**II. Description of Affected Environment: (Use explanation pages if additional space is required)**

Testing will be performed indoors in biochemistry lab spaces in Stanley Hall (rooms 443 and 427) at the University of California, Berkeley. The tests will be carried out by one or two researchers, in environments with 8-16 occupants. Rabbits will be housed and procedures to generate the antibodies will be carried out at Labcorp Early Development Laboratories, Inc. facilities at 465 Swamp Bridge Road, Denver, PA 17517.

III. Preliminary Questions:

- |   | Yes                      | No                                  |
|---|--------------------------|-------------------------------------|
| A. <u>Is the DOE-funded work routinely administrative or <i>entirely</i> advisory or a “paper study?”</u> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

***If “Yes”, ensure that the description in Section I reflects this and go directly to Section V.***

- B. Is there any potential whatsoever for: (*Provide an explanation for each “Yes” response*)

- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| 1. Work to be performed outdoors?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 2. Major modification of a building facade or interior?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 3. Threat of violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health?        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 4. Siting, construction or major expansion of waste treatment, storage, or disposal facilities?                                | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Disturbance to hazardous substances, pollutants, or contaminants preexisting in the environment?                            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 6. The presence of any environmentally-sensitive resources?  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 7. Any potential whatsoever for high consequence impacts to human health or the environment?                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. The work being connected to another existing/proposed activity that could potentially create a significant impact?          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9. Nearby past, present, and/or reasonably foreseeable future actions such that collectively significant impacts could result? | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 10. Scientific or public controversy, uncertainty over potential impacts, or conflicts regarding resource usage?               | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

***If “No” to ALL Section III.B. questions, go directly to Section V.***

IV. Potential Environmental Effects: (*Provide an explanation for each “Yes” response*)

- A. Environmentally Sensitive Resources: Could the proposed action potentially result in changes and/or disturbances to any of the following resources?

- |  | Yes                      | No                                  |
|--|--------------------------|-------------------------------------|
| 1. Threatened/Endangered Species and/or Critical Habitats                          | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Other Protected Species (e.g., Burros, Migratory Birds, Pollinators)            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. Tundra, Coral Reefs, or Rain Forests  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4. Cultural or Historic Resources  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Important Farmland  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 6. Non-Attainment Areas for Ambient Air Quality Standards                          | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7. Class I Air Quality Control Region  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8. Special Sources of Groundwater (e.g., Sole Source Aquifer)                      | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 9. Navigable Air Space   | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 10. Coastal Zones  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11. Areas with Special National Designation (e.g. National Forests, Parks, Trails) | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 12. Floodplains and/or Wetlands  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

- B. Regulated Substances/Activities: Would the proposed action involve any of the following regulated Items or activities?

- |  |                          |                                     |
|--|--------------------------|-------------------------------------|
| 13. Natural Resource Damage Assessments  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 14. Invasive Species or Exotic Organisms   | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 15. Noxious Weeds  | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 16. Clearing or Excavation greater than one acre or Removal of Trees Governed by Local Requirement | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 17. Dredge or Fill (under Clean Water Act, Section 404, greater than one acre)                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

B. Regulated Substances/Activities: Would the proposed action involve any of the following regulated Items or activities? (continued)

	Yes	No
18. Noise (in excess of regulations)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
19. Asbestos Removal	<input type="checkbox"/>	<input checked="" type="checkbox"/>
20. Polychlorinated biphenyls (PCBs)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
21. Import, Manufacture, or Processing of Toxic Substances	<input type="checkbox"/>	<input checked="" type="checkbox"/>
22. Chemical Storage/Use Including Emerging Chemicals (e.g., PFAS)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
23. Pesticide Use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
24. Hazardous, Toxic, or Criteria Pollutant Air Emissions	<input type="checkbox"/>	<input checked="" type="checkbox"/>
25. Liquid Effluents	<input type="checkbox"/>	<input checked="" type="checkbox"/>
26. Spill Prevention/Surface Water Protection	<input type="checkbox"/>	<input checked="" type="checkbox"/>
27. Underground Injection	<input type="checkbox"/>	<input checked="" type="checkbox"/>
28. Hazardous Waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>
29. Underground Storage Tanks	<input type="checkbox"/>	<input checked="" type="checkbox"/>
30. Radioactive or Radioactive Mixed Waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>
31. Radiation Exposure	<input type="checkbox"/>	<input checked="" type="checkbox"/>
32. Nanoscale Materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>
33. Genetically Engineered Microorganisms/Plants or Synthetic Biology	<input checked="" type="checkbox"/>	<input type="checkbox"/>
34. Ozone Depleting Substances	<input type="checkbox"/>	<input checked="" type="checkbox"/>
35. Greenhouse Gas Generation/Sustainability	<input type="checkbox"/>	<input checked="" type="checkbox"/>
36. Off-Road Vehicles	<input type="checkbox"/>	<input checked="" type="checkbox"/>
37. Biosafety Level 3-4 Laboratory	<input type="checkbox"/>	<input checked="" type="checkbox"/>
38. Research on Human Subjects or other Vertebrate Animals	<input checked="" type="checkbox"/>	<input type="checkbox"/>
39. Facility footprint exceeds 5,000 Square Feet	<input type="checkbox"/>	<input checked="" type="checkbox"/>

C. Other Relevant Information: Would the proposed action involve the following?

	Yes	No
40. Disproportionate Nearby Presence of Minority and/or Low Income Populations	<input type="checkbox"/>	<input checked="" type="checkbox"/>
41. Existing, Modified, or New Federal/State Permits	<input type="checkbox"/>	<input checked="" type="checkbox"/>
42. Involvement of Another Federal Agency (e.g. license/permit, funding, approval)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
43. Action in a State with NEPA-type law	<input type="checkbox"/>	<input checked="" type="checkbox"/>
44. Action Would Require Expansion of Public Utilities/Services	<input type="checkbox"/>	<input checked="" type="checkbox"/>
45. Depletion of a Non-Renewable Resources	<input type="checkbox"/>	<input checked="" type="checkbox"/>
46. Subject to an Existing Institutional Work Planning and Control Process	<input type="checkbox"/>	<input checked="" type="checkbox"/>
47. Other Pertinent Information Which Could Impact Human Health or the Environment	<input type="checkbox"/>	<input checked="" type="checkbox"/>

V. Applicant certification that to the best of their knowledge all information provided on this Notification is accurate:

Does this disclosure contain: classified, sensitive business, or other exempt information that DOE would not be obligated to disclose pursuant to the Freedom of Information Act. Yes  No

A. Organization Official (Name and Title): Dave Beza, Contract & Grant Officer  
 Signature: Dave Beza Digitally signed by Dave Beza  
Date: 2025.09.29 10:34:06 -07'00' Date: 9/29/2025  
 e-mail: dbeza@berkeley.edu Phone: 510-664-9278

B. Optional Secondary Approval (Name and Title): Janet Follo, Associate Director EH&S University of Michigan  
 Signature: Janet Follo Date: 9/29/2025  
 e-mail: follo@umich.edu Phone: 734 647-3133

Remainder to be completed by DOE

VI. DOE Concurrence/Recommendation/Determination:

A. DOE Project Director/Program Manager or Contract/Grant Management Specialist:

Has the Applicant completed this Notification correctly?

Yes

No

Does an existing generic categorical exclusion apply?

If yes, indicate: \_\_\_\_\_

Name and Title: Haley Engle, Grants Management Specialist

Signature: Haley Engle Date: 09/30/2025

B. DOE NEPA Team Review (if requested):

Is the class of action identified in the DOE NEPA Regulations (Appendices A-D to Subpart D (10 CFR § 1021))?

Yes

No

If yes, specify the class(es) of action: B3.6

Name and Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

C. DOE Counsel (if requested):

Name and Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

D. DOE NEPA Compliance Officer:

The preceding pages are a record of documentation required under DOE Final NEPA Regulation, 10 CFR § 1021.410.

Action may be categorically excluded from further NEPA review. I have determined that the proposed action meets the requirements for Categorical Exclusion referenced above.

Action requires approval by Head of the Field Organization. Recommend preparation of an Environmental Assessment.

Action requires approval by Head of the Field Organization or the SC Director of Field Operations. Recommend preparation of an Environmental Impact Statement.

Comments/limitations if any:

No work on the project subject to approval by Animal Care and Use Committee (ACUC) from the UC Berkeley Office for Animal Care and Use may occur until approval is received.

NEPA Compliance Officer:

Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Optional Additional Narrative: (add additional detail to description to Sections I and II or explanations to responses in Sections 3 and 4.

Explanations to 'Yes'

III.B.7

There is potential for biological hazards exposure during work and waste handling during the antibody generation due to needlestick hazards and potential for exposure to pathogens during blood collection. However, LabCorp Early Development Laboratories, formerly Covance Inc. has performed these procedures for more than 30 years and is very experienced with proper procedures for minimizing biological hazards exposure. The Labcorp Early Development Laboratories Inc., OLAW Assurance Number is # D16-00488 (A3850-01), the USDA Research Registration Number is # 35-R-0030, and they have had full AAALAC accreditation since March 1993.

IV.B.33:

The green alga *Auxenochlorella protothecoides* x *symbiontica* UTEX 250-A will be genetically modified by introduction of transgenes to express selectable markers and chlorophyll aerobic cyclase genes from *Rubrivivax gelatinosus* and *Chloracidobacterium thermophilum*. *Auxenochlorella* species are non-harmful (BSL level 1), and all genetically modified strains will be disposed of in accordance with UC Berkeley Environmental Health and Safety regulations for BSL1 recombinant DNA.

IV.B.38:

Antibodies will be generated in rabbits to recognize antigens from chlorophyll aerobic cyclase enzymes as described in the attached Vertebrate Animals section and proposals by Labcorp Drug Development Inc. The proposals will be submitted for UC Berkeley Animal Care and Use review on receiving pending approval from the Labcorp Early Development Laboratories, Denver Site Institutional Animal Care and Use Committee.

