



U.S. Department of Energy Categorical Exclusion Determination Form

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Proposed Action Title: Integral Consulting Inc. - Cost-Effective Real Time Wave Assessment Tool

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

Location(s) (City/County/State): Santa Cruz, CA; Santa Barbara, CA; Albuquerque, NM; Kaneohe, HI

Proposed Action Description:

Funding will support efforts to continue the development of Wave Assessment Tool, a wave buoy technology that can measure its own movements and relay real-time wave properties at a fraction of the cost of current technologies, enabling cost-efficient assessment of the best locations to place wave energy converter (WEC) arrays, optimized design for WEC systems, and active tuning of WEC systems. Analytical and development-based project tasks and controlled laboratory testing activities will be conducted on a small-scale, pilot basis at Integral Consulting Inc.'s (Integral) laboratory and office facilities (Santa Cruz, CA and Santa Barbara, CA) and at Sandia National Laboratories (Albuquerque, NM). In addition, nearshore field testing will be conducted at previously approved test sites, including in Santa Cruz Harbor and in authorized boating zones of the Monterey Bay National Marine Sanctuary (MBNMS). Integral has also expanded field testing to the Wave Energy Test Site (WETS), a dedicated wave energy testing facility operated by the U.S. Navy off the coast of Kaneohe, HI.

Nearshore field testing covered under this determination will involve small-vessel deployments of the wave buoy and commercial off-the-shelf wave measurement devices for validation and performance evaluation. The proposed testing sites are not in close proximity to areas of high biological sensitivity and are not within areas of hazardous natural bottom conditions. Moreover, the proposed field testing activities do not have potential to cause impacts in the MBNMS. Field testing in the MBNMS will be conducted in accordance with Federal regulations governing the MBNMS (15 C.F.R. Part 922).

Categorical Exclusion(s) Applied:

A9 - Information gathering, analysis, and dissemination

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

B5.25 - Small-scale renewable energy research and development and pilot projects in aquatic environments

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: 08/26/2014



**PROJECT ENVIRONMENTAL REVIEW
MEMORANDUM TO THE RECORD**

Lead Organization: Integral Consulting Inc.

Project Title: Cost-Effective Real Time Wave
Assessment Tool (DE-AR0000514)

Date: August 26, 2014

Approved:

William J. Bierbower
ARPA-E NEPA Compliance Officer

Concurred:

Dr. Bryan Willson
ARPA-E Program Director

INSTRUCTIONS: Please complete Sections I - V of this memorandum form. Please complete all relevant fields. Where a particular field is irrelevant to the project under review, please indicate "N/A" in the field.

SECTION I. PROJECT INFORMATION

Funding Opportunity Announcement (if any): DE-FOA-0000670 (Open 2012)

Lead Organization: Integral Consulting Inc.

Other Participants (Subrecipients, Contractors, etc.): Sandia National Laboratories; Sea Engineering Inc.

Locations of Work (City, State): Santa Cruz, CA; Santa Barbara, CA; Albuquerque, NM; Kaneohe, HI

SECTION II. NEPA ANALYSIS

A. CATEGORICAL EXCLUSION(S) APPLIED

The activities to be conducted under this project fit within the class(es) of actions listed in Categorical Exclusion(s) A9, B3.6, and B5.25. Categorical Exclusion(s) cover(s):

A9: 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.

B3.6: Siting, construction, modification, operation, and decommissioning of facilities for small-scale 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.

B5.25: Small-scale renewable energy research and development projects and small-scale pilot projects located in aquatic environments. Activities would be in accordance with, where applicable, an approved spill prevention, control, and response plan, and would incorporate appropriate control technologies and best management practices. Covered actions would not occur (1) Within areas of hazardous natural bottom conditions or (2) within the boundary of an established marine sanctuary or wildlife refuge, a governmentally proposed marine sanctuary or wildlife refuge, or a governmentally recognized area of high biological sensitivity, unless authorized by the agency responsible for such refuge, sanctuary, or area (or after consultation with the responsible agency, if no authorization is required). If the proposed activities would occur outside such refuge, sanctuary, or area and if the activities would have the potential to cause impacts within such refuge, sanctuary, or area, then the responsible agency shall be consulted in order to determine whether authorization is required and whether such activities would have the potential to cause significant impacts on such refuge, sanctuary, or area. Areas of high biological sensitivity include, but are not limited to, areas of known ecological importance, whale and marine mammal mating and calving/pupping areas, and fish and invertebrate spawning and nursery areas recognized as being limited or unique and vulnerable to perturbation; these areas can occur in bays, estuaries, near shore, and far offshore, and may vary seasonally. No permanent facilities or devices would be constructed or installed. Covered

actions do not include drilling of resource exploration or extraction wells, use of large-scale vibratory coring techniques, or seismic activities other than passive techniques.

The proposed activities satisfy the elements and requirements of Categorical Exclusion(s).

This project was originally performed by Sea Engineering Inc. (SEI), in conjunction with Sandia National Laboratories (SNL), under ARPA-E's Open 2012 Funding Opportunity Announcement (DE-FOA-0000670). Under the original teaming arrangement, SEI served as the Project Team lead under Cooperative Agreement DE-AR0000305. SNL served as a teaming partner to SEI under Work Authorization 11/CJ000/10/03/0. ARPA-E issued an initial categorical exclusion determination (B3.6 and B5.25) for this project on January 17, 2013 and a second categorical exclusion determination (A9, B3.6, and B5.25) for additional project tasks on April 16, 2014.

On September 1, 2014, the Principal Investigator will transfer his full-time employment from SEI to Integral Consulting Inc. (Integral). Accordingly, ARPA-E will issue a new award (DE-AR0000514) to Integral for the additional work SEI had been authorized to perform. SEI will remain on the Project Team as a subrecipient to Integral, and SNL will continue to perform project tasks under Work Authorization 11/CJ000/10/03/0.

Pursuant to its new award, Integral proposes to continue conducting laboratory-based, small-scale research and development activities originally performed under SEI's award. Specifically, the Project Team will: (1) develop Wave Assessment Tool specifications and hardware, firmware, and software, including sensing and communications systems; (2) develop algorithms to find the optimal equation for real-time measurements; (3) conduct controlled environment laboratory testing and system validation; (4) conduct nearshore field testing and validation; and (5) perform technoeconomic analysis and technology-to-market activities in conjunction with SNL. All project tasks will be performed on a small-scale, pilot basis for a period of up to 24 months.

Analytical and development-based project tasks and controlled laboratory testing of the Wave Assessment Tool will be carried out at SEI's dedicated laboratory and office facilities in Santa Barbara, CA and at SNL's facilities in Albuquerque, NM.

Initial nearshore field testing will involve small-vessel deployments of the wave buoy and commercial off-the-shelf wave measurement devices for validation and performance evaluation. Field testing will be conducted at previously approved test sites, including in Santa Cruz Harbor, near the Santa Cruz municipal wharf, and in Zone 2 of the Monterey Bay National Marine Sanctuary (MBNMS). Pursuant to Federal regulations governing the MPNMS (15 C.F.R. Part 922), Zone 2 of the MBNMS is open for unrestricted motorized watercraft operation (see attached map for reference). Any vessel movement beyond Santa Cruz Harbor will be restricted to Zone 2 and the access route that connects Zone 2 and the Harbor. The proposed testing sites are not in close proximity to areas of high biological sensitivity and are not within areas of hazardous natural bottom conditions. Moreover, the proposed field testing activities do not have potential to cause impacts in the MBNMS.

Field testing will be conducted in accordance with federal regulations governing the MBNMS. All testing activities will be conducted during daylight hours, and the wave buoy and associated equipment will be accompanied by Integral field staff at all times. No equipment or vessels will be mounted or left unattended in MBNMS waters, and no materials will be removed from the MBNMS. Field testing will not result in obstruction or alteration of navigable waters. Once field testing activities are completed, Integral will remove the wave buoy and associated equipment from the water. No special permits or authorizations are required to conduct the proposed testing activities at the selected field sites.

Integral has also expanded field testing to the Wave Energy Test Site (WETS), a dedicated wave energy testing facility operated by the U.S. Navy off the coast of Kaneohe, HI. The U.S. Navy conducted a NEPA review for this test site earlier this year and issued a Finding of No Significant Impact.

B. EXTRAORDINARY CIRCUMSTANCES ANALYSIS (All Categorical Exclusions)

The proposed project will involve the following:

- a. Use, handling, storage, transport, or disposal of radioactive, toxic, or hazardous chemicals or materials Yes No
- b. Use, handling, storage, transport, or disposal of genetically engineered organisms recombinant DNA. Yes No
- c. Use, handling, storage, transport, or disposal of nanoscale materials Yes No
- d. Use, handling, storage, transport, or disposal of solid wastes Yes No
- e. Emissions into the ambient air Yes No
- f. Release of pollutants/contaminants into water resources Yes No
- g. Substantial noise pollution Yes No
- h. Adverse community-based environmental impacts Yes No

Comments: Project tasks will result in the generation of spent alkaline batteries as well as other consumables (e.g., electrical tape, packaging materials, paper towels, rope, and cotter pins). Spent batteries will be recycled at a designated battery recycling center in Santa Cruz.

No hazardous or toxic chemicals or materials will be used in this project. No emissions to the ambient air are anticipated as a result of prototype development or field testing. No pollutants or contaminants will be discharged or deposited in MBNMS waters.

C. INTEGRAL ELEMENTS ANALYSIS (Appendix B Categorical Exclusions Only)

The proposed project will:

- a. Threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health or similar requirements of DOE or Executive Orders.

Yes No

- b. Require siting/construction or major expansion of waste storage, disposal, recovery, or treatment facilities.

Yes No

- c. Disturb hazardous substances, pollutants, contaminants, or petroleum/natural gas products that preexisted in the environment, resulting in an uncontrolled/unpermitted release.

Yes No

- d. Have potential to cause significant impacts on environmentally sensitive resources.

Yes No

- e. For projects involving genetically engineered (GE) organisms, synthetic biology, governmentally designated noxious weeds, or invasive species:

- i. Such organisms will be contained and confined in a manner designed and operated to prevent unauthorized release into the environment.

N/A Yes No

- ii. Activities involving recombinant DNA will be conducted in accordance with NIH Guidelines for Research Involving Recombinant DNA Molecules

N/A Yes No

- iii. Activities involving GE organisms with pesticidal qualities will be conducted in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

(7 U.S.C. § 136 et seq.) and EPA's FIFRA Implementing Regulations (40 C.F.R. Parts 150-189).

N/A Yes No

iv. Activities involving GE organisms that may pose a risk to plant/animal health will be conducted in accordance with the APHIS Regulations (7 C.F.R. Part 340).

N/A Yes No

v. Activities involving new GE organisms will be conducted in accordance with the Toxic Substances Control Act (TSCA) (15 U.S.C. § 2601 et seq.) and EPA's TSCA Implementing Regulations (7 C.F.R. Parts 700-790).

N/A Yes No

Comments: N/A

SECTION III. ADDITIONAL COMMENTS/ANALYSIS

The proposed project fits squarely within Categorical Exclusions A9, B3.6, and B5.25, presents no extraordinary circumstances, and satisfies the integral elements for projects categorically excluded under Appendix B of 10 C.F.R. part 1040.

SECTION IV. RECOMMENDATION FOR CONDITION ON AWARD

It is recommended that the following condition be included in the award:

No NEPA-related condition need be included in the award.

SECTION V. RECOMMENDATION FOR CATEGORICAL EXCLUSION

The activities to be conducted under this project fit within the class of activities identified under the Department of Energy Categorical Exclusion(s) identified above.

The review has not identified any extraordinary circumstances related to the specific project that may affect the significance of the environmental effects of the project.

It is recommended that no further review under NEPA is required; however, any changes to the project may require further review.

Please find attached the selectee's completed and signed NEPA Questionnaire.

