

SECTION A. Project Title: Testing and Demonstration of Overhead Superconducting Power Line with VEIR, Rev. 1

SECTION B. Project Description and Purpose:

Revision 1:

This Idaho National Laboratory (INL) project is a collaboration to test an innovative overhead superconducting power line. The project will be conducted over 3 years and will culminate in the deployment, operation, and testing of a 0.25- to 1-mile, 3-phase AC suspended superconducting power line. The superconducting line utilizes liquid nitrogen (LN2) cooling technology. The Pilot system, including the LN2 supply, will be installed in the INL's Obsidian Test Pad/Substation (OTP) where it will interconnect to commercial power via the INL's 138kV East Loop transmission line. The East Loop Transmission Line, a 138 kV transmission line that spans approximately 13 miles between INL's Critical Infrastructure Test Range Complex (CITRC), the OTP, and Materials and Fuels Complex (MFC) substations. A section of the East Loop line and its associated easement from OTP out toward MFC will be modified to support the superconducting line over the specified test distance. The superconducting line will then connect from the East Loop line back to OTP via new transmission poles. This pilot will evaluate the performance of the superconducting line at high current and voltage in a pilot-scale transmission setting, the endurance of equipment such as lashings and clamps, and other considerations that will be defined as the test plan is created.

The Project is divided into the following Project Phases and Tasks (Phases 1 through 3 were covered in the Original ECP below):

Project Phase 1: Kick-Off, Advisory (months 1-9)

- Task 1.1: Recruit and establish Advisory Committee (months 1-9).

Project Phase 2: Siting, Permitting, Interconnection (months 3-8)

- Task 2.1: Conceptual design & initial cost estimate (months 1-4).
- Task 2.2: Site identification and route selection (months 3-5).
- Task 2.3: Permitting (months 5-7).
- Task 2.4: Site survey / geotechnical (months 5-7).
- Task 2.5: Interconnection (months 6-8).

Project Phase 3: Operation & Test Plan; Detailed Design; Cost Estimation (months 6-14)

- Task 3.1: Operation and Test Plan (months 6-8). With the support of the Contractor and the Advisory Committee, Participant shall develop operation and test plans for the site.
- Task 3.2: Detailed design (months 10-14). With the support of the Contractor and the Advisory Committee, Participant shall finalize the detailed design for the site.
- Task 3.3: Cost estimation (months 13-14). With the support of the Contractor and an EPC, Participant shall develop an estimate of the cost of the site.
- Task 3.4: Go/No Go: Final Design and Cost Estimate Report (months ?). Participant shall decide whether or not to continue the project through the remaining phases.

Project Phase 4: Procurement & Fabrication (months 14-25)

- Task 4.1: Liquid nitrogen delivery system (months 14-23). With the support of the Contractor, Participant shall procure the liquid nitrogen delivery system and deliver it to the site.
- Task 4.2: Transmission line poles / towers (months 14-23). With the support of the Contractor, Participant shall procure the transmission line poles / towers and deliver them to the site.
- Task 4.3: Pole-top units (months 14-23). Participant shall fabricate the pole-top heat exchange and termination units and deliver them to the site.

- Task 4.4: AC cable & conductor assembly (months 14-25). Participant shall fabricate the AC cable and conductor assembly and deliver them to the site.
- Task 4.5: Control building panels & equipment (months 14-25). With the support of the Contractor, participant shall procure the control building panels and equipment and deliver them to the site.

Project Phase 5: Construction (months 14-28)

- Task 5.1: EPC indicative pricing (month 14). With the support of the Contractor, Participant shall gather from EPCs indicative pricing for the procurement of materials for and construction of the site.
- Task 5.2: EPC RFP/package (months 15-17). With the support of the Contractor, Participant shall submit an RFP/package to EPCs and collect bids from EPCs.
- Task 5.3: EPC contract signing (months 17-20). With the support of the Contractor, Participant shall execute a contract with an EPC for the procurement of materials for and construction of the site.
- Task 5.4: EPC execution (transmission line) (months 20-28). With the support of the Contractor and EPC, Participant shall construct the transmission line portion of the site.
- Task 5.5: EPC execution (substation retrofits) (months 24-28). With the support of the Contractor and EPC, Participant shall perform substation retrofits necessary for the operation of the site.

Project Phase 6: Energization & Testing; Decommissioning Plan (months 29-36)

- Task 6.1: Commissioning and energization (month 29). Parties shall commission and energize the Pilot according to a pre-established commissioning and energization plan.
- Task 6.2: Operation and testing (months 30-36). Parties shall operate and test the Pilot according to the operation and test plans established in Task 3.1. Parties shall generate a CRADA final report.
- Task 6.3: Decommissioning plan (months 34-36). Parties shall establish a decommissioning plan and timeline for the Pilot.

Original ECP:

This Idaho National Laboratory (INL) project will include the planning and background studies for the potential deployment, operation, and testing of a 0.25- to 1-mile-long, 3-phase AC suspended superconducting power line (Demo). The Demo will be constructed adjacent to the INL's Raghorn Transmission Line, a 138 kV transmission line that spans 13 miles between the Contractor's Critical Infrastructure Test Range Complex (CITRC) and Materials and Fuels Complex (MFC) substations. The Demo will connect to the Raghorn Transmission Line via the INL's CITRC substation, Obsidian substation, and/or MFC substation.

VEIR, Inc. has developed a new generation of alternating current (AC) overhead superconducting power lines, capable of carrying 5-times the electrical current of conventional conductors at a given voltage class. The purpose of this work is to establish an external advisory committee, fund, demonstrate, and test the innovative overhead superconducting power line, then establish a decommissioning plan. This project will demonstrate the technical and commercial viability of VEIR's new line.

This ECP only covers the first three phases and will not include soil disturbance or geotechnical surveys. A new environmental review and a revision of the ECP will be required:

- If the project is determined to go forward based on Task 3.4 Go/No Go listed below
- Once the site location has been identified (Task 2.2)

The milestones and deliverables for this project include up to the 35% design phase and includes the following tasks:

Project Phase 1: Kick-Off, Advisory (months 1-9)

- Task 1.1: Recruit and establish Advisory Committee (months 1-9).

Project Phase 2: Siting, Permitting, Interconnection (months 3-8)

- Task 2.1: Conceptual Demo design & initial cost estimate (months 1-4).
- Task 2.2: Site Demo identification and route selection (months 3-5).
- Task 2.3: Permitting (months 5-7).
- Task 2.4: Site survey / geotechnical (months 5-7).
- Task 2.5: Interconnection with relevant utilities for power to the Demo (months 6-8).

Project Phase 3: Operation & Test Plan; Detailed Design; Cost Estimation (months 6-14)

- Task 3.1: Operation and Test Plan (months 6-8). With the support of the Contractor and the Advisory Committee, Participant shall develop operation and test plans for the Demo.
- Task 3.2: Detailed design (months 10-14). With the support of the Contractor and the Advisory Committee, Participant shall finalize the detailed design for the Demo.
- Task 3.3: Cost estimation (months 13-14). With the support of the Contractor and an EPC, Participant shall develop an estimate of the cost of the Demo.
- Task 3.4: Go/No Go: Final Design and Cost Estimate Report (months ?). Participant shall decide whether or not to continue the project through the remaining phases.

SECTION C. Environmental Aspects or Potential Sources of Impact:

Air Emissions

NA

Discharging to Surface-, Storm-, or Ground Water

NA

Disturbing Cultural or Biological Resources

There is the potential for this work to impact vegetation and for project personnel to interact with various wildlife species. A Biological Resource Review will be arranged within two weeks prior to the initiation of any activities that might disturb soil or vegetation and again following completion of project activities. A nesting bird survey is included with the Biological Resource Review for actions occurring between April 1 - October 1 per compliance with the Migratory Bird Treaty Act. Bat surveys are also included with the Biological Resource Review in accordance with the INL Bat Protection Plan.

Cultural: A Section 106 review was completed under CRMO project number (BEA-24-082) and resulted in No Historic Properties Affected. Please refer to the Hold Points and Project Specific Instructions of the ECP.

Generating and Managing Waste

When wastes are generated, how they are disposed can adversely affect the environment. Managing wastes appropriately and responsibly and implementing recycling or reuse practices, where feasible, during project activities can reduce the potential impact on the environment.

Original ECP: No waste will be generated by Phases 1-3 which are covered in this ECP.

Releasing Contaminants

When chemicals are used during the project there is the potential for spills that could impact the environment (air, water, soil).

Using, Reusing, and Conserving Natural Resources

Project description indicates materials will need to be purchased or used that require sourcing materials from the environment. Being conscientious about the types of materials used could reduce the impact to our natural resources.

Environmental Justice

According to the CEQ Climate and Economic Justice Screening Tool, the INL site as well as the Research and Education Campus in Idaho Falls, ID are located in U.S. Census tracts that are identified as disadvantaged communities. Census tracts identified as disadvantaged meet or exceed

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socioeconomic, environmental, health, or demographic thresholds identified by CEQ. Given that activities analyzed in this document will happen within the boundaries of existing DOE/INL land and/or facilities where there are no permanent residents, any impacts to Environmental Justice in surrounding communities are anticipated to be negligible.

SECTION D. Determine Recommended Level of Environmental Review, Identify Reference(s), and State Justification: Identify the applicable categorical exclusion from 10 Code of Federal Regulation (CFR) 1021, Appendix B, give the appropriate justification, and the approval date.

For Categorical Exclusions (CXs), the proposed action must not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, or similar requirements of Department of Energy (DOE) or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment or facilities; (3) disturb hazardous substances, pollutants, contaminants, or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources (see 10 CFR 1021). In addition, no extraordinary circumstances related to the proposal exist that would affect the significance of the action. In addition, the action is not "connected" to other action actions (40 CFR 1508.25(a)(1) and is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1608.27(b)(7)).

References: B1.2 "Training exercises and simulations", B3.6 "Small-scale research and development, laboratory operations, and pilot projects", B4.6 "Additions and modifications to transmission facilities", B4.11 "Electric power substations and interconnection facilities", B4.12 "Construction of powerlines"

Justification: Based on the purpose and need and description of the proposed action and potential environmental impacts, the proposed action fits within the class of actions that is listed in Appendix B CX B1.2, B3.6, B4.11, B4.12 and B4.6. 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.

Authorizing the proposed action will not (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including DOE and/or Executive orders; (2) require siting of new facilities or expansion of existing facilities; (3) disturb hazardous substances, pollutants, or contaminants; (4) adversely affect environmentally sensitive resources; or (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Robert Douglas Herzog, DOE-ID NEPA Compliance Officer on: 10/25/2024