PMC-ND

(1.08.09.13)

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION

RECIPIENT: Katz Water Technologies, Inc. **STATE:** TX

PROJECT TITLE : Solar Thermal Desalination System at a New Mexico Oil Site

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
		GFO-SolarDesalPrize-002	

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

A9 Information gathering, analysis, and dissemination	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. (See also B3.1 of appendix B to this subpart.)
B3.6 Small-scale research and development, laboratory operations, and pilot projects	Siting, construction, modification, operation, and decommissioning of facilities for smallscale 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.
B5.1 Actions to conserve energy or water	(a) Actions to conserve energy or water, demonstrate potential energy or water conservation, and promote energy efficiency that would not have the potential to cause significant changes in the indoor or outdoor concentrations of potentially harmful substances. These actions may involve financial and technical assistance to individuals (such as builders, owners, consultants, manufacturers, and designers), organizations (such as utilities), and governments (such as state, local, and tribal). Covered actions include, but are not limited to weatherization (such as insulation and replacing windows and doors); programmed lowering of thermostat settings; placement of timers on hot water heaters; installation or replacement of energy efficient lighting, low-flow plumbing fixtures (such as faucets, toilets, and showerheads), heating, ventilation, and air conditioning systems, and appliances; installation of drip-irrigation systems; improvements in generator efficiency and appliance efficiency ratings; efficiency improvements for vehicles and transportation (such as fleet changeout); power storage (such as flywheels and batteries, generally less than 10 megawatt equivalent); transportation management systems (such as traffic signal control systems, car navigation, speed cameras, and automatic plate number recognition); development of energy-efficient manufacturing, industrial, or building practices; and small-scale energy efficiency and conservation research and development and small-scale pilot projects. Covered actions include building renovations or new structures, provided that they occur in a previously disturbed or developed area. Covered actions could involve commercial, residential, agricultural, academic, institutional, or industrial sectors. Covered actions do not include rulemakings, standard-settings, or proposed DOE legislation, except for those actions listed in B5.1(b) of this appendix. (b) Covered actions include rulemakings that establish energy conservation standards for consumer products and industrial equipment, provided that the actions would not: (1) have the potential to cause a significant change in manufacturing infrastructure (such as construction of new manufacturing plants with considerable associated ground disturbance); (2) involve significant unresolved conflicts concerning alternative uses of available resources (such as rare or limited raw materials); (3) have the potential to result in a significant increase in the disposal of materials posing significant risks to human health and the environment (such as RCRA hazardous wastes); or (4) have the potential to cause a significant increase in energy consumption in a state or region.
B5.15 Small-scale renewable energy research and development and pilot projects	Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to authorize the administration of the fourth and final phase (Test Contest) of Round 1 of a prize competition (The American-Made Challenge: Solar Desalination, or "Prize") to accelerate technology innovation through the design, development, and demonstration of desalination systems that use solar thermal energy to produce clean water from very high-salinity water. The prize would be administered by the Solar Energy Technologies Office (SETO) in partnership with the National Renewable Energy Laboratory (NREL).

The Prize is a four-contest program designed to accelerate the commercial development of thermal desalination systems powered by low-cost thermal energy. The contests provide innovators a pathway from initial concept to technical design to prototype to field-tested systems. Each successive phase of the competition will be more challenging than the last, with larger prizes and fewer competitors advancing.

Round 1 of the Solar Desal Prize was launched in April of 2020. Katz Water Technologies (KWT) (Houston, TX) has been selected as a finalist to compete in the fourth phase (Test Contest). During the Test Contest, KTW will build their prototype and bring their design from the Design Contest to fruition. This NEPA Determination (ND) is applicable only to KTW, and none of the other Design Contest competitors reviewed in the previous NEPA Determination for this Prize (GFO-SolarDesalPrize-001; CXs A9, B3.6; 10/13/2021).

Test Contest activities undertaken by KTW would include the development, design, and fabrication of the solar thermal desalination prototype, as well as water testing, bench-top laboratory research, and administration activities. These activities would occur at KWT's purpose-built office/warehouse space in Houston, TX. Caza Petroleum would provide an existing oil and gas wellsite (API No. 30-025-42972), located on federal land near Hobbs, NM, for the temporary installation and field testing of the prototype system. All permits necessary for the Team's work have already been procured by Caza Petroleum. The existing federal permit for the oil and gas well site would be valid for the proposed work, including all water management activities.

Award activities would include the fabrication of a 100 cubic meter thermal desalination system operating on concentrated solar power (CSP). KTW's X-VAP thermal distillation system would be used to separate water vapor from contaminated water. The X-VAPs would be housed in a shipping container for ease of transport and installation. CSP equipment would be delivered separately, including a CSP collector array consisting of adjustable dishes with the ability to be hooked up to the existing system. Roughly ten CSP dishes would be needed for each 30 X-VAPs. 60 X-VAPs would be housed in one shipping container, with the first system deployed after roughly month eight of the proposed work when initial testing at KWT has ended, and another storage container with 60 X-VAPs would be created and sent a few months later. Once the design, development, and fabrication activities at KWT are finished, the system would be transported to Caza's site. The system would then be connected to a treatment system at the well site to purify contaminated produced water to create freshwater for onsite reuse. Installation activities would include attaching the solar desalination system to the existing water infrastructure by flexible fluid lines. Produced water input lines would be connected to the gun barrel tanks. The output clean water would go to an existing lined water pond. The heavy brine would go to an existing gun barrel storage tank for reuse or disposal.

The system would initially generate between 30-120 cubic meters of produced water per day during solar peak hours. It is estimated that 50 percent of the feed would be purified into fresh water. The rest of the water would be concentrated into a heavy brine for reuse or disposal. If pretreatment is necessary to sell the brine, the team intends to use a hydrogen peroxide system (utilizing up to several gallons of hydrogen peroxide per day). There would be no water discharge into any water resources. Any water that cannot be reused onsite would be disposed of by the current, approved third-party operator servicing the site. No siting, construction, or major expansion of existing onsite waste storage, disposal, recovery, or treatment actions would be required.

No permanent change in the use, mission, or operation of the facility would arise out of the Prize-related actions. Proposed activities would be confined to previously developed, cleared well pads. The equipment would be installed temporarily and would be secured to the sandy soil using hand drilled auger anchors, resulting in shallow and impermanent disturbance to ground that has already been extensively disturbed. Based on the types of activities proposed within the context of past development and current oil and gas operations, DOE does not anticipate any impacts to resources of concern due to the proposed activities of the project.

At the conclusion of the Test Contest, the team's pilot installation would be decommissioned by removing the anchors and placing the solar arrays in storage containers for shipment; the water desalination equipment housed in shipping containers will be removed as an entire unit within the shipping container. All flexible coiled fluid lines connecting the equipment will be removed, and the site would be returned to the cleared condition prior to the team's work.

Potential workplace hazards would include the installation and operation of high temperature thermal systems. The system surfaces would be insulated for thermal protection. Existing corporate health and safety policies and procedures would be followed, including employee training and the use of personal protective equipment.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office (SETO)
NEPA review completed by Alex Colling on 03/15/2023.

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) 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 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.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Andrew Montano Date: 3/20/2023

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☑ Field Office Manager review not required
☐ Field Office Manager review required

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____

Field Office Manager