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**on Clean Hydrogen Program**

*Additional submitted attachment is included below.*

Written Comments submitted to Docket No. 22-ERDD-03

By James H. Shnell

Address: 1371 Smokewood Drive

Santa Ana, California 92705

Phone: (714) 669-5435

E-mail: [jim.shnell819@gmail.com](mailto:jim.shnell819@gmail.com)

Subject: CLEAN HYDROGEN PROGRAM; CLEAN WATER AND CLEAN OXYGEN FROM  
GEOTHERMAL ENERGY, THE PACIFIC OCEAN AND CALIFORNIA WATERS

People around the world need reliable supplies of potable water. People around the world also need continuing access to energy. California is in critical need of both clean water and energy, but California is in a favorable position to access both of them because of its proximity to the Pacific Ocean and because of its resources of geothermal energy. My proposal will direct California to advance both goals. Many Californians have, for more than a century, been seeking to raise additional sources of potable water, by repeated attempts at desalinating water from the Pacific Ocean, not always fully successful. California is in a position to seek a much easier approach to geothermal energy because while the earth's crust on land is often 50,000 meters or thicker, much of the earth's crust under the ocean is just 5,000 meters thick, in some places even thinner.

I hope to meet and work with experts and others who are seeking to advance and support the applied research and development of clean hydrogen production and use these developments in connection with advancing developments in geothermal energy. I would like to join the members of the staffs in the relevant offices of the California Energy Commission and the California Air Resources Board and related entities such as Empower Innovation that can assist in recruiting a team of experts to apply existing technology to drill into the Pacific Ocean floor (within U.S. legal boundaries) and anchor at a depth close to (but not as deep as) the ocean floor, a desalination plant (the "Plant"). Such a Plant will be designed and constructed to minimize attrition to wildlife and to collect and exclude from passing through the Plant all life-forms, pieces of plastic and other waste that must be eliminated to protect the ocean and its denizens (collectively, the "Eliminations") and will then split the remaining ocean water into: (1) desalinated and purified water, and (2) concentrated seawater (which may include chemicals and other elements that were present in the intake). The Plant will convey the pure water to the electrolyzer where the geothermal heat and the electricity generated by the Plant (if any - see below) are used to electrolyze the clean water into hydrogen, (to be sent down one pipe), or into oxygen, (to be sent down a separate pipe). The Plant will combine some of the oxygen produced by the electrolysis process with the concentrated seawater and convey this oxygenated concentrated seawater up to areas near the ocean surface that contains insufficient oxygen and then distribute it to ocean currents that will spread the ocean concentrate broadly across the ocean. If it is not pragmatic to protect the ocean

appropriately with respect to Eliminations, the Eliminations must be removed from the ocean to the port designated for that purpose and disposed of in the local sewer or landfill.

The Plant will send the purified water into a well down through the ocean floor and to a depth such that the geothermal temperature reaches approximately 900 to 1000 degrees Celsius, which should be hot enough to cause the purified water molecules to split into atoms of hydrogen and oxygen. If the geothermal temperature does not provide enough heat to split the water as needed without additional heat, the plant can drill for and obtain some additional geothermal energy to run a generator to provide electric power as needed to complete the splitting of the water. It is expected that hydrogen will be transported to and marketed on land as a transportation fuel or for other approved purposes, and oxygen will be transported and used in or on the ocean or on land.

In a recent article, *Los Angeles Times* staff writer Hayley Smith compared and contrasted analyses by a number of experts with varying positions on the potential solutions to the problems arising with respect to water shortages and desalination. The article reports that some environmentalists in California argue that desalination could become an ecological disaster, and some experts argue that desalination is too expensive. Some experts feel, on the other hand, that ecological disasters can be averted if adequate precautions are provided in the research and development stage. ("Can the Ocean Solve the Water Crisis", *Los Angeles Times*, November 7, 2022, pages A1 and A8).

In my proposal the expenses of desalination will be more than balanced by revenues from the other products produced, such as hydrogen, oxygen and clean water, and by the savings that could be created by advancing hydrogen to complete the final termination of greenhouse gas emissions and the numerous health problems that they inflict on many people around the world.