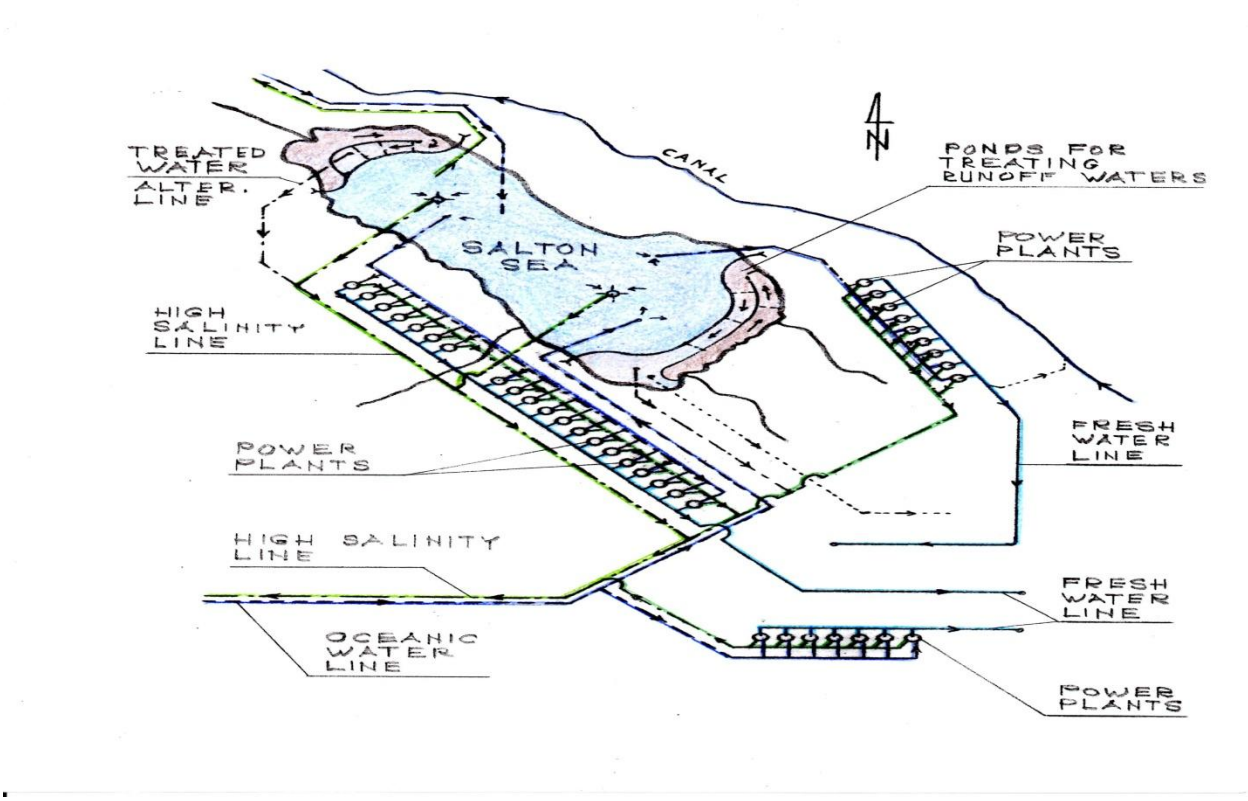
# Proposal for the Restoration of the Salton Sea

## "Scientific Geothermal Technology"

**– Handout Summary – at Power Point Presentation**

**Long Range Plan Committee, CVWD, Palm Desert, CA - February 25, 2016**





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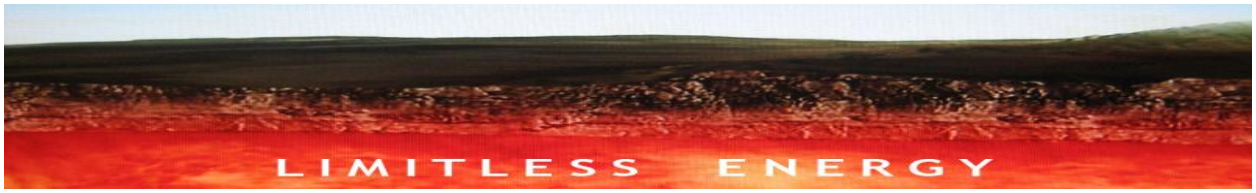


# EXECUTIVE SUMMARY:

## Overview of the Salton Sea Situation

- The Salton Sea is California's largest lake and is presently 50 % saltier than the Ocean. The Salton Sea is a "terminal lake," meaning that it has no outlets. Water flows into it from several limited sources but the only way water leaves the sea is by evaporation.

- The lake is shrinking exposing the lake bed and precipitating higher salinity levels and environmental issues as well as a serious threat to its multi- billion-dollar tourist trade.

- Under the terms of the Quantification Settlement Agreement (QSA) the lakes decline is set to accelerate starting in 2018. About the 1/3 of inflow water from the canal will be diverted to San Diego and Coachella Valley.

- Runoff water from nearby agricultural fields which contains fertilizers, pesticides and other pollutants from Mexicali contaminate Salton Sea and make it an undesirable tourist destination especially for beach goers.

- The lake is 35 miles long, 10 miles wide, and is located south of Palm Springs in a basin 230 feet below sea level.

- The Earth's crust at the south end of the Salton Sea is relatively thin. Temperature in the Salton Sea Geothermal Field can reach 680 ºF (360 ºC) less than a mile below the surface.

- There have been many complains and studies about consequences for our community if we don't find a solution for the Salton Sea.

- There have been several proposals involving importing ocean water, but they failed to address the salt balance and pollution.

- This proposal is quite different - it incorporates in final comprehensive design, several patented technologies – that have not been accessible to the authors of previous proposals.

- This proposal has architectural element which harmoniously incorporates several patented technologies in a functional self-sustaining organism.

## The Objectives of the Enclosed Proposal for Restoration of the Salton Sea

1. Raising and stabilizing the lake's waterline level;
2. Preventing further pollution of the lake and treating farmland runoff waters with natural and plant-based filtration systems – Similarly to successfully implemented sewer treatment in Arcata, CA;
3. Providing wildlife sanctuary;
4. The equalizing salinity of the salty terminal lake (Salton Sea) water with salinity of the Ocean and in process generate electricity (about 11.5 MWh) depending on selected corridor;
5. Providing conditions for tourism and making Salton Sea a renewed recreational destination;

6. Harnessing prevalent geothermal source of the Salton Sea Geothermal Field (SSGF) for generation of electricity; and
7. Production of fresh water with no additional expenses for it;

## The Proposal for the Restoration of the Salton Sea Consist of Five Phases:

- **Phase I** - **Connecting the Salton Sea with the Ocean** (preferably San Diego / Carlsbad / Oceanside area) with several pipelines (preferably 4 inflows and 1 outflows pipelines) and in process generate electricity (about 11.5 MWh);

- **Phase II** - **Building two main dikes** - One in northern and one in southern part of the Salton Sea and several secondary dikes for forming ponds (wetland) for treatment of farmland runoff waters.

- **Phase III** - **Building one power plant** using (SCI-GHE) system at one of selected sector;

- **Phase IV** - **Building several more power plants** using (SCI-GHE) system - one in each selected sector; and

- **Phase V** - **Continued buildup** of additional power plants using (SCI-GHE) system at each selected sector;

## SPECIFIC BENEFIT TO THE SALTON SEA

- It is a long-term solution for the Salton Sea and our community and it can be considered as a **"Project of the Century"** in California;

- It would employ many people during construction and after construction;

- It would cost **less than $10 billion** (preferably $7 billion), with the final result of "really" saving the Salton Sea and maintaining its water level of 50s and 60s.

- Preventing further pollution of the lake by dividing lake in three sections;

- Bringing ocean's water, and providing conditions for tourism - Beaches, Resorts, Hotels, Motels, Front water properties, etc. - and in process of filling it with ocean's water, generate electricity 24/7 (about 11 MWh);

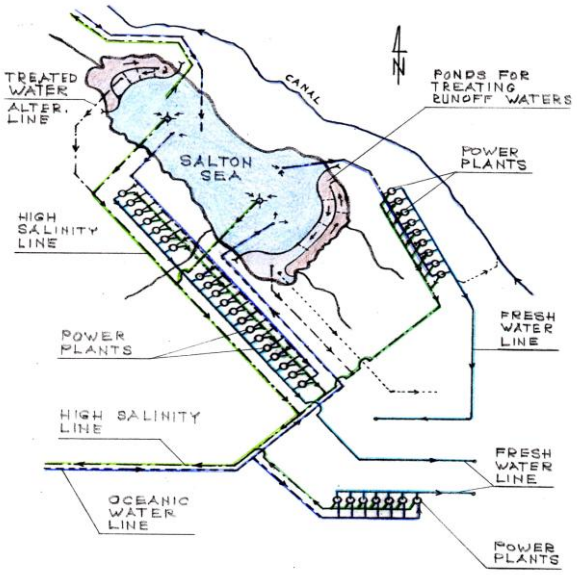
- Providing wildlife sanctuary. Birds can chose which section to inhabit;

- Harnessing prevalent geothermal energy with a "Scientific Geothermal Technology" using a complete closed loop system (not conventional geothermal technologies);

- Producing potable water as a byproduct with no additional expenses for it;

- Generating hundred billion dollars in a few decades for our economy and it will continue so in the future.

# Summary of the Proposal for Restoration of the Salton Sea




- **Phase I**: **Connecting the Salton Sea with Pacific Ocean** with pipelines for controlling waterline level of the lake; exchanging waters and in process **generating electricity;** and **providing conditions for tourism.**
- **Phase II: Production of two sets of dikes –** one in northern and one in southern part of the Salton Sea forming ponds for **treatment of farmland runoff water and providing wildlife sanctuary, and separating (now) oceanic water in the central part of the lake.**
- **Phase III: Production of the first Power Plant with SCI-GHE system using geothermal sources for production of electricity and fresh water.**
- **Phase IV: Production of two additional power plants on two additional sectors.**
- **Phase V: Continued buildup of subsequent Power Plants at each sector.**

**EXHIBIT " A "**

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## Power Plant

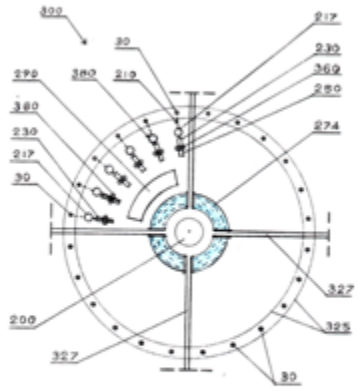


FIG. 41

- 300 – Power Plant.
- 30 – Wells.
- 380 – Power Units.
- 200 – Control Center.
- 290 – Processing Building.
- 274 – Fresh water pond.
- 210 – Heat Exchange system.
- 325 – Railroad track for maintenance derrick.

**EXHIBIT " G "**

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## Cross-Sectional view of one Power Unit – SCI-GHE System

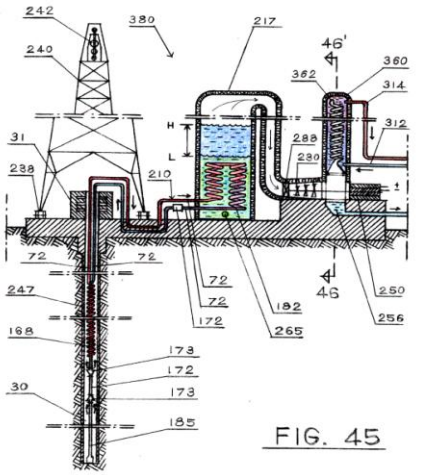


FIG. 45

- **30 - Well.**
- **240 - Derrick.**
- **380 - Power Units.**
- **210 - Heat Exchange system.**
- **217 - Boiler / Distiller.**
- **230 - Turbine.**
- **360 - Condenser.**
- **250 - Generator.**
- **312 - Inflow cooling line – water from canal.**
- **314 - Outflow cooling line.**
- **256 - Condensed fresh water line.**

**EXHIBIT " K "**

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## Cross-sectional view of the "In-Line-Pump" taken along line 22-22' of FIG. 23

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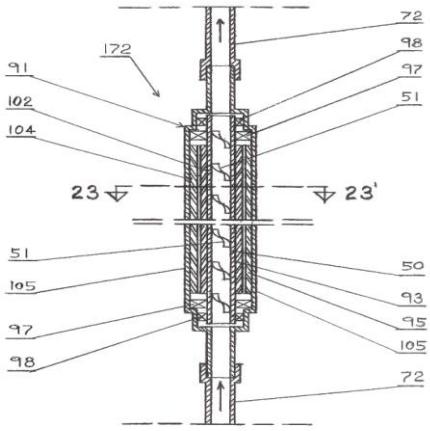


FIG. 22

- **The In-Line-Pump 172 is an integral part of both SCI-GGG and SCI-GHE systems, circulating fluids through closed loop systems.**
- **The In-Line-Pump 172 is an electromotor cylindrical shape and is inserted as a repetitive segment in pipeline.**
- **It has a hollow cylinder shaft of the rotor with spiral blades inside hollow shaft.**
- **Yields maximum flow rate with limited diameter.**

**EXHIBIT " KK "**

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## Schematic view of an Apparatus for Drilling Faster, Deeper, and Wider Well Bore

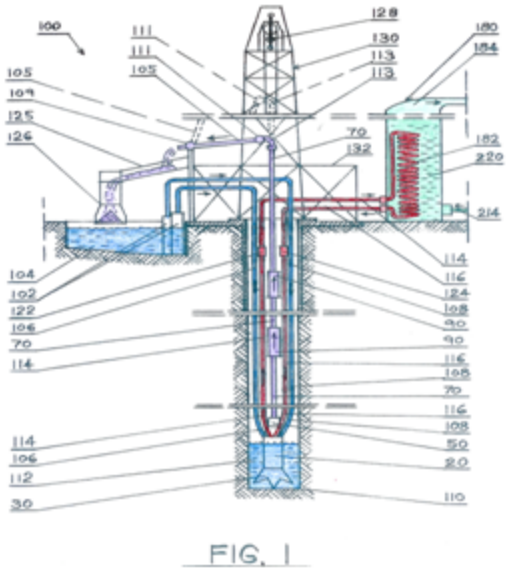

FIG. 1

**EXHIBIT "SS"**

The apparatus and method for drilling deeper and wider well bores consist of:

- A Motorized Drill Head for cutting and shredding ground material;
- A separate excavation line;
- A separate fluid delivery line;
- A separate close loop engine cooling line;
- The excavation line consists of multiple connected stationary segments of the main excavation pipe with periodical segments of an In-Line excavation pump;
- Optionally, whole excavation pipeline can consist of multiple segments of an In-Line excavation pump;

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## Schematic view of an Motorized Drill Head of an Apparatus for Drilling Faster, Deeper, and Wider Well Bore

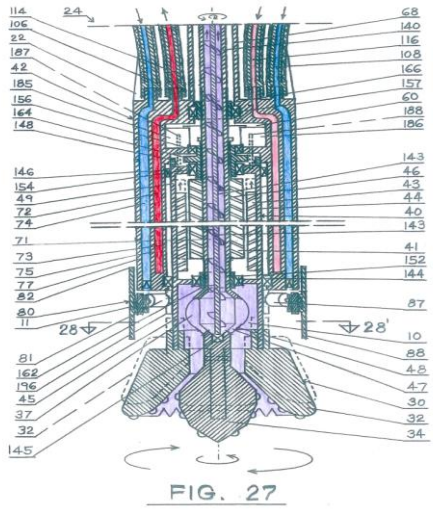

FIG. 27

**EXHIBIT "UU"**

- The diameter of the excavation line and rate of flow of mud and cuttings through it and the diameter of the fluid delivery line and rate of fluid flow through it are in balance requiring only limited fluid column at the bottom of the well bore.
- Fluid column may exist through whole well bore to sustain it during drilling process, but not for excavation reasons.
- The excavation process continues regardless of the diameter of the drill head (wellbore);
- Therefore this method eliminates well known drilling limitations relative to the depth and diameter of the wellbore.

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