

Solar Powered Electrokinetic Soil Desalination

Submitted by:

Terran Corporation/Oasis Petroleum

- ❑ Request for - \$149,960; Total Project Costs - \$346,120
Project Duration: 2-3 years**

PROJECT DESCRIPTION

- The objective of this project is to demonstrate the viability and cost effectiveness of using direct current (DC) power to reduce the sodium and chloride mass contamination in soil and groundwater from brine releases. Typical releases may be from leaking pipelines or storage pit. A secondary objective is to integrate an electrokinetic (EK) remediation system with solar power. Since the EK process relies on DC power to induce migration of chloride and sodium ions (as well as other soluble ions) to emplaced electrode wells, solar panel arrays that generally provide 24-48 volts, could prove to be the ideal power source at remote sites, or eventually any site. This project will include the design, installation and operation of solar powered EK soil desalinization system along with soil monitoring and reports showing the efficacy of the process and comparison to previous traditional remediation efforts. Soil near the Schmitz pad site near Williston, North Dakota became contaminated due to a leaky flange in a brine pipeline. Oasis Petroleum and Terran Corporation found the site to be suitable for the electrokinetic soil desalinization (EKSD) process to extract the salt contamination from the soil using a proprietary extraction system based on electromigration techniques.
- The EKSD process is an effective and economical alternative to conventional excavation or pump and treat. The goal is to remove as much chloride and sodium mass as practical. This project will demonstrate the ability to operate the system using solar power at remote sites where line power is not available, and generators are not economically viable.

TECHNICAL REVIEWERS' RATING SUMMARY

		Technical Reviewer			
Statement	Weighting Factor	<u>G-44-02A</u>	<u>G-44-02B</u>	<u>G-44-02C</u>	<u>Average Weighted Score</u>
Objectives	9	4	5	3	36
Achievability	7	4	5	2	21
Methodology	8	4	5	4	32
Contribution	8	5	5	3	32
Awareness / Background	5	3	4	3	15
Project Management	3	3	3	2	6
Equipment / Facilities	2	3	4	3	6
Value / Industry-Budget	4	4	5	2	12
Financial Match – Budget	4	3	4	3	12
Average Weighted Score		194	233	144	190
Maximum Weighted Score				250 possible points	

TECHNICAL REVIEWER TOTALS

- G-44-02A

Average Weighted Score: **194 out of 250**

FUND

- G-44-02B

Average Weighted Score: **233 out of 250**

FUND

- G-44-02C

Average Weighted Score: **144 out of 250**

FUNDING TO BE CONSIDERED

DIRECTOR'S RECOMMENDATIONS

To include the following deliverables in the final report:

- Compare and contrast economic feasibility for both power and solar on the remediation.
- Best practices recommendation with the approval of the NDDOH.

To fund in the amount of \$240,000.