

DIRECTOR'S COMMENTS

G—044-02

Solar Powered Electrokinetic Soil Desalination
Submitted by: Terran Corporation/Oasis Petroleum
Principal Investigator: Christopher Athmer
Request for: \$149,960
Total Project Costs \$346,120
Duration: 2-3 years

Description of the Project:

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' Comments

Reviewer G-44-02A

This project could help in developing an extremely useful tool to help clean up salt impacted areas from historical oil production in the state that it is cost prohibitive to use the most common dig and haul method.

Recommendation: Fund

Reviewer G-44-02B

This project is an exceptional project in that it provides the potential to remediate brine spills in almost any area without the need to replace soils. There is always an unknown in any pilot test. Similar pilot test have had issues but the applicant has applied lessons learned from those issues.

Recommendation: Fund

Reviewer G-44-02C

If successful, this remediation technique could be useful, but may not meet agency cleanup standards. Therefore, may need further evaluation if this remediation technique is viable. Is 70-80% of chloride and sodium reduction from soil in contaminated source zone acceptable closure limits for the agencies overseeing remediation effort? If not, then what are the acceptable closure limits and are they achievable in this proposal? Prior to remediation, targets should be evaluated prior to granting funding.

Recommendation: Consider Funding

Director's Recommendation:

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.