

## Congressional Notification Profile

### *DEEP TREK PROGRAM SOLICITATION*

TERRA TEK, INC.

**Background and Technical Information:** Research entitled: “Optimization of Deep Drilling Performance; Development and Benchmark Testing of Advanced Diamond Product Drill Bits and HP/HT Fluids to Significantly Improve Rates of Penetration.”

This project will develop and test prototypes of novel drill bits and advances in high-temperature, high-pressure fluids suited for slow, deep-drilling operations. With private industry partners, TerraTek will characterize technology-specific performance issues, benchmark performance of emerging products by conducting full-scale drilling tests in its laboratory, develop and supply new, aggressive bit prototypes and drilling fluids, and field test prototypes.

**Contact Information:**

Selectee: TERRA TEK, INC.

Business Contact: ARNIS JUDZIS  
Business Office Address: UNIVERSITY RESEARCH PARK  
400 WAKARA WAY  
SALT LAKE CITY, UT 84108

Phone Number: (801) 584-2483

Fax Number: (801) 584-2406

E-mail: [judzis@terratek.com](mailto:judzis@terratek.com)

Congressional District: 2nd District

County: Salt Lake County

**Financial Information:**

Length of Contract (months): 36 months

Government Share: \$ 1,691,910

Total value of contract: \$ 2,931,910

**DOE Funding Breakdown:**

Funds: Phase 1 \$ 703,492

Funds: Phase 2 \$ 571,130

Funds: Phase 3 \$ 417,288

**Public Abstract - Optimization of Deep Drilling Performance;**

## **Development and Benchmark Testing of Advanced Diamond Product**

### **Drill Bits and HP/HT Fluids to Significantly Improve Rates of Penetration**

**TerraTek (Contractor), University of Tulsa, Hughes Christensen, BP America, Cococo, INTEQ Drilling Fluids, Marathon Oil Company, ExxonMobil, and National Oilwell**

The proposed three-year program addresses improvements in deep well drilling performance through rigorous proof-of-concept testing of new drilling components at high borehole pressures (22,000 to 26,000 feet simulated depth). The work focuses on the development of novel drill bit technologies and advances in high pressure-high temperature fluids for various deep, slow drilling applications. A phased approach to developing and commercializing “*smart drilling bit-fluid systems*” combines the features of new concept bit technologies and fluids specifically benchmarked and proven for high pressure applications. TerraTek will benchmark tool performance at conditions not possible in other laboratory environments and not practical in expensive field trials.

For domestic operations involving hard rock and deep oil and gas plays, improvements in penetration rates is an opportunity to reduce well costs and make viable certain field developments. An estimate of North American hard rock drilling costs is in excess of \$1,200 MM. Thus potential savings of \$200 MM to \$600 MM are possible if penetration rates are doubled [and assuming bit life is reasonable]. The net result for operators is improved profit margin as well as an improved position on reserves.

TerraTek has assembled a team of Industry and Academic contributors who are recognized leaders in a) hostile environment drilling operations, b) engineering development and large-scale testing, c) downhole tool engineering and supply, d) mechanics and rock cutting characterization, e) rig-site pump equipment developments and f) commercial experience. Objectives include:

1. Characterization of applications: Determine the specific performance issues with roller cone, impregnated and/or PDC bits in the operators’ areas of interest and conduct engineering evaluations of promising concepts.
2. Benchmark performance of emerging products: Full scale drilling tests would be performed in TerraTek’s Drilling and Completions Laboratory. In the wellbore simulator, drilling tests at high pressures in hard rock and others as appropriate will reveal deficiencies and design features required for a next level of performance.
3. With the Industry Team, develop and supply new aggressive impregnated and PDC bit prototypes and HP/HT drilling fluids addressing ROP challenges. ROPs in a variety of rock types is the goal for these deep applications. TerraTek will test, evaluate, and document the performance of these innovative diamond products and drilling fluids.

4. Commercialization and Field Deployment - Conduct field-testing of the prototype developments and proceed with the commercialization of smart bit fluid systems that perform up to operator expectations.