

Idaho Incubation Fund Program

Quarterly Progress Report Form

Report dated March 15, 2012 for 3rd Quarter: Jan-Mar 2012

Proposal No. IF12-001

Name: Warren Barrash

Name of Institution: Boise State University

Project Title: Device for Subsurface Environmental Monitoring, Ready For Prototype

Information to be reported in your progress report is as follows:

1. Provide a summary of project goals/milestones for the period just completed, accomplishments for the period just completed, and plans and goals for the coming quarter:

A. Goal: Modular Hydraulic Packer and Port System (MHPS) Prototype development.

A.1. Previously reported in quarter 1 that the MHPS was performing well in field research applications with some minor leaks. In quarter 2 we conducted post-summer evaluation and testing of prototypes with custom components from COAS and TechHelp, including: assembly and testing with student assistance at staging facility and in lab; recognition of minor leaks due to incomplete solvent welding; testing in wells at research wellfield (Boise Hydrogeophysical Research Site) including testing of two types of rubber-synthetic-blend packer sleeve types that are more contamination resistant than gum rubber.

In quarter 3 we studied cause for incomplete solvent welding and learned our milling design did not include a taper as occurs in commercial PVC fittings so we will try tapered dimensions at the packer collars. Also we studied the cause for insertion tubing catching sometimes before full insertion when we thread the tubing down the riser column to pump water out and deflate the packers after use for testing or sampling in a well. Now we know there are smooth and abrupt corner internal shapes for commercial PVC couplers we use to connect riser sections and cam-locks between modular sections, and we will only use the smooth internal shape couplers in the future.

Plan for quarter 4: we will test use of a small check valve to assist water removal by holding the water high in the insertion tubing for conditions with depth to ground water in a well greater than 22 ft (to ensure peristaltic pump draw).

A.2. Interaction with Solinst Inc. (primary target for sublicensee): including continued technical interaction on materials, sources, testing strategies. *In quarter 3 we*

contacted Solinst to initiate sublicensing discussion and we offered to send an example prototype MHPS. However, Solinst asked to review our patent application first and then declined to pursue a sublicense with us after their review – they said they thought the MHPS wasn't different enough from what they already sell.

Plan for quarter 4: we will develop contacts with other potential sublicensees (e.g., RocTest and Geotech) that (a) are prominent players in the subsurface hydrologic environmental and engineering instrumentation business and (b) we have a long professional relationship with from many previous purchases and interactions on equipment performance and design (see below).

A.3. Modifications; working closely with TechHelp at Boise State for design and prototype improvements, including: shape guide inside packers to maintain roundness when uninflated (significant); tube connectors for easy connecting and disconnecting of tubes and stoppers while keeping 12 connections (significant), and making a simple inexpensive tool to assist with depression of release mechanism; design and fabricating new collars with full-tube-diameter passageway and flush internal connections (significant); seals reset to address minor leaks; first-round prototypes ready for field testing (see A.1) and ready to send to potential licensee (significant).

In quarter 3 TechHelp successfully implemented the above-noted refinements and produced additional units for testing and use in research. The student and faculty member working on this project at TechHelp joined us in the field for testing of prototypes. Then additional units were generated to use in research in the field and test for consistency, and to develop stock for display and distribution to potential vendors.

Plan for quarter 4: TechHelp will document all components and their design and fabrication arrangements, will make last design modifications such as fitting tapers for riser joins at collars, and will then fabricate several additional units for lab and field testing and availability for distribution to potential sublicensees as examples.

B. Goal: Business development for MHPS and new consulting company (Barrash Cardiff & Kitanidis LLC [BC&K]) formed in Idaho in project quarter 1 to market the MHPS and hydrologic and to provide hydrologic engineering services using the MHPS. Tasks identified in the project proposal are discussed below.

B.1. Completion of documents for US patent and filing by patent attorneys in association with BSU by October 2011: See 3. below for US patent filing by patent attorneys on the MHPS on September 14, 2011. Also, see 4. below for details of International Patent Cooperation Treaty (PCT) application filed by patent attorneys for the MHPS on November 16, 2011. --- *as in last quarter's report.*

B.2. Development of license agreement with BSU to market the MHPS by January

2012: Meetings have been held with Mary Givens to develop a draft agreement between BSU and BC&K for a license to market and/or sublicense the MHPS. BC&K is working with tech transfer consultant Tom Harrison of The Harrison Group (THG) to help finalize this agreement.

In quarter 3 we worked with THG and we developed a draft with a combination of modifications to the license agreement template suggested by Mary Givens and by THG, presented this draft to Mary Givens for review by OTT and university attorneys, we learned that we needed to develop a conflict management plan for interactions with Mary or other university officials to avoid university or inventors from interacting with interests for the university and BCK or other personal interest outside university positions. We held a meeting with Mary Givens and university attorneys and a research administrator to discuss the conflict management issue and we received a draft conflict management plan for review. Barrash and Cardiff conducted review of the conflict management plan. Also we started investigating insurance to cover the \$1,000,000 liability requirement in the license agreement.

Plan for quarter 4: we will have our questions on the conflict management plan evaluated by an attorney so we can be sure we understand the plan and, if appropriate, bring modification suggestions to Boise State and resolve the conflict management plan and then resume negotiations for the license (which we expect will proceed quickly). Also we will continue shopping for insurance.

B.3.A. Business plan development and continued market assessment throughout the project period: Consultation with Kevin Learned at the Idaho Small Business Development Center resulted in additional business start-up assistance concept for a near-term consulting project by BC&K using the MHPS and developing a track record for the advanced method developed by BC&K in on-going research.

In quarter 3 we started working with a tech transfer business consultant (THG noted above) who introduced us to other business professionals, and we were encouraged to try real-world applications of our field testing method that uses the MHPS (also encouraged in this direction previously by Kevin Learned) by persons we met at the SERDP-ESTCP Symposium for developing and demonstrating new environmental technologies of interest to the Department of Defense, Department of Energy, and EPA.

As a result: we

met with a venture capital entrepreneur from Australia who regularly visits and invests in the Pacific Northwest;

met with a business media consultant to discuss and get a quote for developing a video infomercial on the MHPS and the hydraulic tomography testing method that we could distribute to potential interested parties by DVD or access to an ftp site;

met with a local environmental consultant with office in Nampa who works with mining, industry, and environmental agencies to improve practices for environmental clean-up and who assists these entities in finding beneficial technologies such as ours;

partnered with engineers at the Army Corps of Engineers Waterways Experiment Station on a pre-proposal to use our technology in collaboration with their direct push technology in a demonstration project under the ESTCP (Environmental Security Technology Certification Program);

joined the Interstate Technology & Regulatory Council (members are professionals from all 50 states, EPA, military branches, environmental and engineering consulting companies, academics) working group on site characterization for some of the most difficult and costly groundwater clean-up problems

began discussions with the Maine Department of Environmental Protection on using our technology (MHPS and method) at problem sites in Maine.

B.3.B. To accomplish B.3.A. without having to prematurely capitalize and fully develop BC&K, we have started planning for service contracts (vs research grants) with Mary Givens (Tech Transfer), Lisa Jordan (Contract Administrator, OSP), and Lisa Nelsen (Grants Administrator, OSP) to use MHPS and other specialized research equipment with new method as university research and development applications and continue to train students while gaining practical experience with the method and equipment in real-world setting(s).

In quarter 3 we made inquiries and prepared a white paper (“pre-proposal”) to collaborate with academic and US Geological Survey researchers who initiated efforts to get year-end supplemental funds so we could try the MHPS and our method at a fractured aquifer research site on a military base in New Jersey. Also we started preparing a white paper (“pre-proposal”) at the request of a large petroleum and industrial company in Italy to use the MHPS and our method at one or two of their problem contamination sites in Italy. Discussions with other interested parties are in the very preliminary stages.

In quarter 4: we plan to continue developing possible applications at real sites using service contracts through Boise State as we develop and improve our method, including use of the MHPS in-well technology, to commercial grade and get the credibility and attention resulting from real applications that will lead to commercial demand for BCK, and thereby support capitalization and full business operation.

B.4. Business plan development and continued market assessment throughout the project period: MHPS marketing and BC&K consulting business were accepted as a project for development of a business plan by students at Boise State in Entrepreneurship Management course ENTREP 420 (New Venture Creation). Interaction with student team throughout the semester resulted in a business plan

presented by the student team before a panel of external experts on December 9, 2011.

B.5. Business plan development and continued market assessment throughout the project period: Barrash and Cardiff continue to publish on the new method and use of the MHPS in the best peer-reviewed journals, and continue to make presentations at national and international professional conferences and symposia that highlight the MHPS and the new method for subsurface characterization that is the basis for BC&K consulting plans. In particular, Barrash presented at the Annual SERDP-ESTCP Symposium in Washington DC Nov 29-Dec 1 which attracts more than a thousand attendees from federal and state agencies, contractors, and academics dealing with groundwater contamination and seeking new equipment and methods to reduce costs and risks for cleanup. Cardiff presented at the American Geophysical Union Annual Meeting in San Francisco (16,000 scientists and engineers attend from all over the world) during Dec 5-9. Participants from appropriate sectors expressed interest and some follow-up opportunities for collaborative research and possible service contract projects were identified and are being followed-up.

In quarter 3 we started this follow-up (see above) and also continued developing presentations for the professional community including: re-submitting a paper to a leading peer-reviewed journal on our 2010 field testing and findings using the MHPS and the hydraulic tomography method (available for download and review at Barrash's ftp site along with other relevant publications and presentations: <ftp://cgiss.boisestate.edu/pub/wbarrash/ESTCP-3DTHT/>); similarly preparing three new manuscripts for leading peer-reviewed journals (one on our method and using the MHPS in refined testing that gives highly resolved results, and two manuscripts on an alternative testing method that will use the MHPS); and have a presentation accepted at a conference in June (Cardiff will present).

In quarter 4: we plan to continue with development and publication of high-quality papers on our method using the MHPS in the best journals and at national and international conferences of professional societies.

B.6. Business plan development and continued market assessment throughout the project period: Meeting October 6, 2011 all day with Maxim Vachon-Savary (Product Line Manager) from FISO Technologies, developer and manufacturer of small-diameter fiber-optic pressure transducers used with the MHPS for hydrologic testing. We discussed incremental modifications to prototype transducers we have been using, and we discussed development of new transducers to use with the MHPS for direct in-situ measurements of water quality parameters needed for groundwater monitoring and remediation.

In quarter 3 we continued working with FISO on modifications such as larger diameter of protective jacketing on transducer extension cables for improved field ruggedness and added "smart" communication of sensor calibration data through

extension cables to the data acquisition system to greatly reduce time for field set-up using the MHPS system (or any other system) and our hydraulic tomography testing method. Similar activities for improvements and expanded applications of instruments will continue in quarter 4.

B.7. Negotiation with and possible formalization of agreements with North American commercial partner(s) by July 2012. We contacted initial target company Solinst with the offer to send current-state prototypes (which we believe are close to commercial status) to them for review and testing as a prelude to sublicense negotiations. Solinst requested review of patent filing before receiving example prototypes and entering negotiations. After review, they said the MHPS different enough from their current lines. Next – two point strategy to develop an agreement with a licensee: (1) We are making initial inquiries with RocTest (also hydrologic and hydrologic engineering equipment manufacturer and distributor, parent company of FISO Technologies), and (2) we are discussing strategies for sublicensing with consultant Tom Harrison.

In quarter 3 we contacted FISO technologies through Maxim Vachon-Savary (see above) to see if may be interest by FISO or their parent company, RocTest, in being a sublicensee for the MHPS. As a result, information has been exchanged with Dr. D. Inaudi, the Chief Technology Officer of FISO/RocTest and a conference call is scheduled to discuss the in-well and testing technologies and consider possible interest in sublicensing. Also continued work with our technology/business consultant (THG) has led to additional contacts and assistance with document review and drafting as described above.

In quarter 4: we plan to pursue discussions on possible sublicensing with FISO/RocTest and others such as GeoTech, and then pursue sublicensing agreements after we have completed the license agreement with Boise State (see above).

2. Provide a summary of budget expenditures for the period just completed:

In the third quarter, \$12,989 in salaries, \$3,900 in fringe benefits, and \$475 in OE.

3. List patents, copyrights, plant variety protection certificates received or pending:

Patent application title: Modular Hydraulic Packer-and-Port System was filed on 09/14/2011 with the USPTO as Serial No. 13/232,876.

4. List invention disclosures, patent, copyright and PVP applications filed, technology licenses/options signed, start-up businesses created, and industry involvement:

(a) PCT Application Filed – No. PCT/US2011/061032 – Corresponding to US Application No: 13/232,846 – in the U.S. Patent and Trademark Office on November 16, 2011

Title: Modular Hydraulic Packer-and-Port System

(b) We (as BC&K) are negotiating with Mary Givens, Director of Technology Transfer at Boise State, to acquire the exclusive patent and technology license agreement for the MHPS. To assist with this negotiation, BC&K has hired a technology transfer consultant (Tom Harrison of The Harrison Group).

5. Include funding burn rate:

The burn rate for the first three quarters amounts to 75% of available funds being expended. At the end of the first quarter, 14% of the total funds had been expended, 27% being expended in the second quarter, and 35% expended in the third quarter.

6. Any other pertinent information: