

Report Title/Type: Seventeenth Quarterly Technical Progress Report for project entitled "Establishment of an Industry-Driven Consortium Focused on Improving the Production Performance of Domestic Stripper Wells"

Reporting Period: October 1, 2004 – December 31, 2004

Principal Authors: Joel L. Morrison

Report Issue Date: January 4, 2005

Doe Award Number: Grant No. DE-FC26-00NT41025

Submitting Organization:  
The Pennsylvania State University  
The Energy Institute  
C-211 Coal Utilization Laboratory  
University Park, Pennsylvania 16802-2323

## **DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

## **ABSTRACT**

The Pennsylvania State University, under contract to the U.S. Department of Energy, National Energy Technology Laboratory will establish, promote, and manage a national industry-driven Stripper Well Consortium (SWC) that will be focused on improving the production performance of domestic petroleum and/or natural gas stripper wells. The consortium creates a partnership with the U.S. petroleum and natural gas industries and trade associations, state funding agencies, academia, and the National Energy Technology Laboratory.

This report serves as the seventeenth quarterly technical progress report for the SWC. Key activities for this reporting period include: 1) organizing and hosting the SWC fall technology transfer meetings in Oklahoma City, Oklahoma and State College, Pennsylvania, 2) planning of the upcoming SWC spring proposal meeting, 3) release of the SWC Request-for-proposals (RFP), 4) revision of the SWC By-Laws, and 5) the SWC Executive Council nomination and election for 2005-2006 term members.

**TABLE OF CONTENTS**

	<u>Page</u>
DISCLAIMER.....	i
ABSTRACT .....	ii
1.0 INTRODUCTION .....	1
2.0 EXPERIMENTAL.....	1
3.0 RESULTS AND DISCUSSION.....	2
3.1 Fall Technology Transfer Meetings .....	2
3.2 Spring Proposal Meeting .....	3
3.3 Request-for-Proposals .....	3
3.4 By-Law Revision .....	3
3.5 Executive Council Nomination and Election.....	4
4.0 CONCLUSIONS .....	4
5.0 REFERENCES .....	4
6.0 APPENDICES .....	4

## **1.0 INTRODUCTION**

The Pennsylvania State University, under contract to the U.S. Department of Energy (DOE), National Energy Technology Laboratory (NETL), is in the process of establishing an industry-driven stripper well consortium that will be focused on improving the production performance of domestic petroleum and/or natural gas stripper wells. Industry-driven consortia provide a cost-efficient vehicle for developing, transferring, and deploying new technologies into the private sector. The Stripper Well Consortium (SWC) will create a partnership with the U.S. petroleum and natural gas industries and trade associations, state funding agencies, academia, the National Energy Technology Laboratory, and the National Petroleum Technology Office.

Consortium technology development research will be conducted in the areas of reservoir remediation, wellbore clean up, and surface system optimization. Consortium members elected an Executive Council that will be charged with reviewing projects for consortium co-funding. Proposals must address improving the production performance of stripper wells and must provide significant cost share. The process of having industry develop, review, and select projects for funding will ensure that the consortium conducts research that is relevant and timely to industry. Co-funding of projects using external sources of funding will be sought to ensure that consortium funds are highly leveraged.

## **2.0 EXPERIMENTAL**

A description of experimental methods is required by the DOE for all quarterly technical progress reports. In this program, Penn State is responsible for establishing and managing an industry-driven stripper well consortium. Technology development research awards are made on a competitive basis. Therefore, this section is not applicable to the Penn State contracted activities. Technical reports from the individual researchers will be required to contain an experimental discussion section and will be submitted to consortium members and DOE for their review.

### **3.0 RESULTS AND DISCUSSION**

Key activities for this reporting period include: 1) organizing and hosting the SWC fall technology transfer meetings in Oklahoma City, Oklahoma and State College, Pennsylvania, 2) planning of the upcoming SWC spring proposal meeting, 3) release of the SWC Request-for-proposals (RFP), 4) revision of the SWC By-laws, and 5) the SWC Executive Council solicitation and election for 2005-2006 term members.

#### **3.1 Fall Technology Transfer Meetings**

The SWC was engaged in two fall technology transfer meetings during this reporting period.

**Oklahoma City, Oklahoma.** The first 2004 SWC technology transfer meeting was held in collaboration with the Oklahoma Marginal Well Commission (OMWC) 2004 Technology Trade Fair on October 26, 2004 in Oklahoma City, OK. The SWC was a co-sponsor of the event and organized 12 exhibit booths to showcase past and present SWC projects which included Advanced Resources, Inc., Brandywine Energy & Development Co., Colorado School of Mines, Composite Engineers, James Engineering, The Pennsylvania State University, Texas A&M, and Tubel Technologies. The SWC also invited the Rocky Mountain Oilfield Testing Center (RMOTC) to take part in the exhibit space to further promote their efforts with respect to the SWC Projects.

The 2004 Trade Expo dedicated a portion of the event to technological presentations. The SWC was responsible for 8 of the 9 scheduled technological presentations. The presentation schedule is included in Appendix A.

The Expo was host to over 1200 attendees from the oil and gas industry and drew 150 exhibitors. This Expo provided an opportunity for SWC to meet face to face with both large and small petroleum and natural gas companies and to showcase the technologies developed under the SWC.

**State College, Pennsylvania.** The second technology transfer meeting was held at the Penn Stater Hotel and Conference Center in State College, PA on November 16, 2004. The meeting was host to presentations of 11 projects currently funded by the SWC. The event captured the attention of over 40 attendees including our international members, who traveled from both Venezuela and Canada to be part of the workshop. The meeting agenda is included as Appendix B.

### **3.2 Upcoming Meetings**

The SWC is in the process of organizing its Spring meeting which will be dedicated to reviewing new proposals. The Spring meeting will be held on March 8-9, 2005, in San Antonio, Texas. At this meeting, presentations will be heard from the Principal Investigators of proposals submitted to the SWC for co-funding, in response the 2005 Request-for-Proposals.

### **3.3 2005 Request-for-Proposals (RFP)**

The SWC RFP was released and circulated in October 2004. The RFP submission deadline is 4 PM ESTC on February 8, 2005. The SWC RFP was posted on the SWC website, circulated to current and past SWC members, provided to industrial trade associations, and provided to the Petroleum Technology Transfer Council for distribution nationwide.

### **3.4 Revision of SWC By-Laws**

The SWC is revising its By-Laws to create a Supporting Membership tier which will allow companies that wish to submit proposals to the SWC the ability to engage the consortium at a reduced level of commitment. Under this scenario, companies pay a meeting registration fee which is due at the time of their proposal submission rather than applying for a Full membership. This scenario still will require the company to join the consortium to ensure they are aware and abide by the SWC governing principles – it's By-Laws.

The suggested changes were mailed to the SWC Executive Council which unanimously approved the suggested changes. The Consortium submitted these changes to the Department of Energy and is awaiting formal approval.

### **3.5 Executive Council 2005-2006 Term Nomination and Election**

On November 24, 2004 the SWC began the solicitation for 4 new Executive Council members to be elected to serve the 2005-2006 term on the Council. The deadline for responding to the solicitation was December 13, 2004. At that time the SWC received response from 6 members who were interested in running for a seat on the Executive Council.

The election process began on December 16, 2004 with the voting to conclude on January 3, 2005. The election results will be disseminated to the membership early in January 2005.

### **4.0 CONCLUSIONS**

Key activities for this reporting period include: 1) organizing and hosting the SWC fall technology transfer meetings in Oklahoma City, Oklahoma and State College, Pennsylvania, 2) planning of the upcoming SWC spring proposal meeting, 3) release of the SWC Request-for-proposals (RFP), 4) revision of the SWC By-laws, and 5) the SWC Executive Council nomination and election for 2005-2006 term members.

### **5.0 REFERENCES**

A listing of referenced materials is required by the DOE for each quarterly technical progress report. This technical progress report for the SWC did not utilize any reference material.

### **6.0 APPENDICES**

## APPENDIX A: 2004 TRADE EXPO PRESENTATIONS

### 2004 Trade Expo Presentations Agenda

October 26, 2004  
10:00 a.m. to 3:00 p.m.

- 10:00 a.m. *GAS OPERATED AUTOMATIC LIFT (GOAL) PETROPUMP***  
Brandywine Energy & Development Co. has developed a gas operated automatic lift plunger lift tool to remove fluids from stripper wells. The system is unique in that it operates automatically using an on tool pressure activated valve pre set to retrieve and deliver a fixed volume of fluid each run and then automatically return to the well bore for additional fluid when required.
- 10:30 a.m. *VORTEX FLOW TOOLS***  
Vortex Flow, LLC has developed a revolutionary flow development chamber that takes a disorganized single or multiphase flow and transforms it to a spiral flow. The vortex created by this reduces the friction that causes pressure to drop as fluids flow through a pipe. Three different tools have been developed.
- 11:00 a.m. *MWC PRESENTS: GAS PROCESSING CONTRACTS & NEGOTIATIONS***  
Understanding the various types of processing agreements in today's gas markets. Steve Reese has been involved in the natural gas industry since 1981. Reese has handled regulatory filings with FERC, in-house expert testimony, strategy development for gas plant supply, and the writing of contracts, amendments and settlement agreements.
- 11:30 a.m. *WEATHERBEE PUMP***  
W & W Vacuum & Compressors, Inc. is developing a novel type of variable capacity compressor/pump for low productivity gas production operations. The pump has no wasted motion as two chambers are loading while two chambers are unloading. The pump has a capacity control mechanism which allows the flow rate of the device to be varied to meet increased or decreased demands without changing the rotation rate of the drive shaft.
- 12:00 p.m. *CHEMICAL INJECTOR FOR PLUNGER LIFT GAS WELLS***  
Composite Engineers, Inc. has developed a simple, economical chemical system that requires no special tools to install, no service rig and no downtime. The Plunger Conveyed Chemical System consists of a modified plunger identical to the one presently being used and a chemical chamber located on the top of the lubricator.
- 12:30 p.m. *OILFIELD BRINE DESALINATION TRAILER***  
Texas A&M University has developed a mobile produced brine desalination unit to test onsite the efficiency of produced brine cleanup. The unit tests the performance of key processes used to cleanup the brine and measures electrical power usage, a major cost factor of reverse osmosis desalination.
- 1:00 p.m. *ENGINEERING DECISION TREE FORMS***  
James Engineering, Inc. has developed a series of procedure guides using decision tree forms which can help operators improve production from their stripper wells. The first is a low cost methodology which analyzes and suggests corrective actions for stripper wells experiencing abnormal production decline. The second details cost effective fluid removal options and the third identifies cost effective corrosion mitigation procedures.
- 1:30 p.m. *LOW COST REAL TIME DOWNHOLE WIRELESS GAUGE***  
Tubel Technologies, Inc. has developed a new downhole wireless gauge that addresses the needs of the oil and gas producers for a simple system to automate and optimize the hydrocarbon production. The system eliminates cables, clamps and splices inside the wellbore increasing reliability, lowering costs and reducing significantly the time required for deployment of the completion system in the well.
- 2:00 p.m. *INTERMITTENT GAS CHAMBER LIFT***  
The Pennsylvania State University is developing a new production system for low volume oil and gas wells as an alternative to conventional lift systems such as rod pumping. The chamber lift process involves the injection of gas into the oil column via a small diameter tubing string that is set in the production tubing. The gas then displaces the accumulated fluid to the surface.
- 2:30 p.m. *TO BE DETERMINED***

## APPENDIX B: STATE COLLEGE, PA MEETING AGENDA



### WORKSHOP AGENDA

**State College Technology Transfer Workshop**  
State College, Pennsylvania  
(Penn Stater Conference Center, Executive Suites)  
**November 16, 2004**

- 8:00-9:00 Breakfast Buffet (The Gardens)  
Meeting Registration (Executive Suites)
- 9:00-9:15 Welcoming Comments  
Joel Morrison, *Stripper Well Consortium*
- 9:15-9:45 Design, Construction, and Evaluation of an Accurate, Low-Cost Portable  
Production Tester  
Ken Oglesby, *Oak Resources*
- 9:45-10:15 Produced Water Treatment: Developing a Project to Market a Program to Allow  
the Sale of Treated Oil Field Produced Brine for Beneficial Use  
David Burnett, *Texas A&M*
- 10:15-10:30 BREAK (Executive Suites)
- 10:30-11:00 PVT Study of the Interaction of Nitrogen and Crude Oil  
Assad Abboud, *Penn State University*
- 11:00-11:30 Low Friction Production Tubing for Stripper Gas Wells  
David Smith, *Dyna Coil*
- 11:30-12:00 Building and Testing a New Type of Compressor for Stripper Well Production  
Application  
Paul Weatherbee, *W&W Vacuum*

12:00-1:00 LUNCH (The Gardens)

1:00-1:30 Hydraulic Fracture Imaging  
Roger Willis, *Universal Well Services*

1:30-2:00 Plunger Conveyed Chemical System for Plunger Lift Well  
Sam Farris, *Composite Engineers*

2:00-2:30 Restimulation of Under-stimulated Shallow Gas Zones  
John Holko, *Lenape Resources, Inc.*

2:30-2:45 BREAK (Executive Suites)

2:45-3:15 Construct, Install, and Test GOAL Pumps  
Paul Yaniga, *Brandywine Energy Company*

3:15-3:45 Field Testing of the Vortex DXR Retrievable Insert Tool in Conjunction with  
Other Lifting Methods  
Brad Fehn, *Vortex Flow*

3:45-4:15 Plunger Lift Process Optimization Using a Surface System  
Paul Tubel, *Tubel Technologies*

4:15-5:00 Informal Discussion – All

5:00 Meeting Adjourned