Summary of Oil and Gas Research Program Projects
January 20, 2010
Karlene Fine, Industrial Commission Executive Director

This Summary provides information on projects completed since the August 2009 meeting and the status of ongoing projects. This is an update from the last summary prepared by Dave Fischer which was provided at the last meeting and in a subsequent e-mail.

Since August, 2009 there have been 4 projects completed/or near completion. Attached are one page summaries on:
- North Dakota Petroleum Council’s Teacher Education Program (G-013-025) – North Dakota Petroleum Council
- Commercial Driver Training Program (G-017-038) – Fort Berthold Community College

You have heard presentations today on 2 of these 4 projects:
- Plains CO2 Reduction Partnership Program – Phase II (Contract G-005-014) – EERC
- Purpose-Fit Portable Multi-Phase Production Measurement System (G-015-032) – Ward Williston

Currently there are 11 projects ongoing. You have had presentations today on 3 of these 11 projects:
- Plains CO2 Reduction Partnership – Phase III (Contract G-015-030) – EERC
- Bakken Water Opportunities Assessment – Phase I (G-018-036) – EERC
- Determination of Middle Bakken & Three Forks Sanish Zones (G018-039) – Continental Resources

Attached are summary pages on the remaining 8 projects. Those projects are:
- Education of Oilfield Fire Safety (Contract G-005-013) – ND Association of Oil and Gas Producing Counties
- Cretaceous Gas/Shale Gas Expansion (Contract G-006-016) – Continental Resources
- Geomechanical Study of Bakken Formation in the Nesson Anticline (G-015-031) – UND
- Oil Can! Good Neighbor Initiative and Outreach Program (G-016-034) – ND Petroleum Council
- Improved Directional Drilling Technology for the Bakken (G017-037) – Laserlith Corporation
- North Dakota Petroleum Council Oil and Gas Education Program (G-018-040) – ND Petroleum Council
- Identification of Shallow Biogenic Gas Systems in Eastern North Dakota (G-019-041) – GeoShurr
- Remote Monitoring & Rep Conditions Salt Water Injection (G-018-042) – Pedigree Technologies

Also attached is a listing of all the projects that have been funded by the Oil and Gas Research Program since its inception. Here are some key statistics:

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<thead>
<tr>
<th>Category</th>
<th>Projects</th>
<th>OGRP funds expended and outstanding commitments</th>
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"North Dakota Petroleum Council's Teacher Education Program"
Submitted by North Dakota Petroleum Council
Principal Investigator: Ron Ness, President

PARTICIPANTS

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*In-kind services are also provided by the North Dakota Petroleum Council staff, Petroleum Council membership, Department of Mineral Resources, Energy Career Awareness Partnership and Forest Service staff support.

Project Schedule – 24 months
Contract Date – July 19, 2007
Start Date – June 1, 2007
Completion Date – June 1, 2009

Project Deliverables:
Status Report: August 1, 2007
Status Report: August 1, 2008
Final Report: June 1, 2009

OBJECTIVE/STATEMENT OF WORK:
The objective of the North Dakota Petroleum Council Teacher Education Seminar is to educate teachers about the economic benefits and career opportunities provided by the North Dakota oil and gas industry enabling them to educate their students about the industry. This project is a continuance of the Oil and Gas Research Program's participation in an important and successful outreach program. In addition this funding includes the costs of a newsletter titled Oil and Gas Tidbits.

STATUS
All status reports have been received along with the final report. This project funded the North Dakota Petroleum Council Teacher Education Seminars for the years 2007 (a three-day seminar in Bismarck) and 2008 (a four-day seminar in Bismarck). These were the 16th and 17th Teacher Education Seminars. Since inception of the seminars 633 teachers have participated. It is believed that the information gained by these teachers could have exposed tens to thousands of students and their parents about the oil and gas industry.

This project also funded the production and distribution of the newsletter titled Oil and Gas Tidbits. Tidbits was distributed in July 2007 (Workforce Needs Study), March 2008 (focus on distribution of oil tax revenues), August 2008 (focus on education efforts of the industry to educate the public—Town Hall meetings and Energy Career Awareness), December 2008 (economic growth of the oil and gas industry from 2005-2007 and economic impact study), June, 2009 (focus on developing technology in North Dakota's oil industry), August 2009 (focused on the Oil Can! Bakken Rocks Cookfest) and October 2009 (focused on the Royalty Owner Information Center). The October 2009 Tidbits was distributed to over 1,400 individuals by direct mail, another 700 via e-mail and 500 copies were printed for distribution at presentations. (Note there was an October 2007 Tidbits issued regarding the Economic Impact of the Petroleum Industry in North Dakota but it was not funded under this project.)

01/13/10
Contract No. G-017-038
“Commercial Driver Training Program”
Submitted by Fort Berthold Community College
Principal Investigator: Dr. Clarice Baker-Big Back

PARTICIPANTS

Sponsor | Cost Share
--- | ---
Fort Berthold Community College | $125,206
North Dakota Industrial Commission | $11,900
Total Project Cost | $137,106

Project Schedule – 12 months
Project Deliverables:
Contract Date – May 28, 2009
Status Report: June 30, 2009
Start Date – December 1, 2008
Final Report: November 30, 2009
Completion Date – November 30, 2009

OBJECTIVE/STATEMENT OF WORK:
Fort Berthold Community College has developed a Commercial Driver Training Program to train individuals interested in careers in driving, with a focus on providing a skilled, safe, workforce for the oil industry. The application requested funding for program start-up and operations for one year, including two part-time positions, fees, stipends and tuition for 15 financially needy trainees.

The Oil and Gas Research Program funding of $11,900 was limited to being used for the salaries and fringe benefits of the two part-time positions. The funding was utilized for the Safety/Permit Training and the Project Manager.

STATUS
Fort Berthold Community College provided its reports on a timely basis. The final report shows that this program served a total of 51 students. A total of 10 students successfully completed the class and are currently working in the oil and gas industry on the Fort Berthold Reservation as truck drivers. One of the students owns a trucking company and hires local truckers. The College originally had requested $62,900 in funding. In that the Oil and Gas Research Program was unable to provide funding at that level, the College sought funding from other sources. The College was able to obtain funding from TERO and Job Service to help with the costs of training the students.

1/13/10
**Contract No. G-005-013**

"Education of Oilfield Fire Safety"

Submitted by: ND Association of Oil and Gas Producing Counties

Principal Investigator: Vicky Steiner

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**PARTICIPANTS**

**Sponsor** | **Cost Share**
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ND Insurance Premium Tax (state appropriation) | $100,000
City of Dickinson (Energy Impact Fund) | $50,000
City of Dickinson (land value) | $17,500
ND Association of Oil and Gas Producing Counties and The City of Dickinson Fire Department (in-kind salaries) | $19,000
North Dakota Industrial Commission | $15,000
Total Project Cost | $201,500

**Project Schedule – 24 months**

**Project Deliverables:**

Contract Date – December 13, 2005 | Status Report: March 31, 2006
Start Date – August 1, 2005 | Status Report: August 31, 2007

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**OBJECTIVE/STATEMENT OF WORK:**

To provide education to 3,000 volunteer and staff firefighters in western and central North Dakota and other state officials about oilfield fire safety and encourage them to learn more about oilfield fire safety by attending, training at the Dickinson-based Williston Basin Oilfield Fire Training facility.

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**STATUS**

Contract executed. The March 31, 2006 and August 31, 2007 status reports were provided. An extension was requested for completion of this project by December 31, 2008 or until such time as funding has been utilized for newsletters. The following newsletters have been printed and distributed:

- June, 2006 – Firefighting Tips
- August, 2006 – Patterson 490 Fire
- June 2007 – Water-Foam-Gel
Contract No. G-006-016
“Cretaceous Gas/Shale-Gas Expansion”
Submitted by Continental Resources Inc.
Principal Investigator: Dr. Michael Husband / Archie Taylor / Gene Carlson

PARTICIPANTS

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Project Schedule – 12 months
Contract Date – March 13, 2006
Start Date – March 1, 2006
Completion Date – March 31, 2007

Project Deliverables:
Status Report: June 30, 2006
Status Report: October 31, 2006
Status Report: December 31, 2006
Final Report: March 31, 2007

OBJECTIVE/STATEMENT OF WORK:
The project was designed to provide information on how the use of newer well log technologies could expand current North Dakota shallow gas production and generate interest in Cretaceous gas prospects statewide. The objectives of the project are to develop a method of evaluating the shallow gas potential of the Pierre Shale and Eagle Sand in the Cedar Hills area, creating a template that can be used/modified for exploration through the State. The template will be developed by collecting data from normal and special core analysis, coupled with a series of modern well log suites. Well log signatures will be compared to the core and core analysis. From this extensive data set, the best combination of logging suites for the identification of producing Cretaceous gas reservoirs can be identified, and a useable well logging template developed. This was to be done in two steps. Step 1 – Use log and core data to build a template for evaluating logs from other wells. Step 2 – Compare production from the wells to validate the template.

STATUS
The contract was executed. The first status report was received and it is posted on the Industrial Commission/OGRP website. Several contacts have been made since receipt of the first status report requesting the filing of the additional and final reports or at a minimum a request for an extension. To date the Commission has paid $75,000 of their commitment of $186,120.
Contract No. G-05-031
“Geomechanical Study of Bakken Formation Nesson Anticline, Williams County, ND”
Submitted by University of North Dakota
Principal Investigator: Dr. Zhengwen Zeng

PARTICIPANTS

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Project Schedule – 24 months
Contract Date – April 16, 2008
Start Date – January 1, 2008
Completion Date – December 31, 2009

Project Deliverables:
Status Report: June 30, 2008
Status Report: December 31, 2008
Status Report: June 30, 2009
Final Report: December 31, 2009

OBJECTIVE/STATEMENT OF WORK:
This project has four objectives:
1. Determine the in-situ stress field of the targeted formation for better design of horizontal wells and hydraulic fracturing.
2. Measure the geomechanical properties, such as rock strength, to improve well stability during both drilling and production stages;
3. Develop local geomechanical laboratory capacities to serve the state and the regional demand; and
4. Establish lab facilities to teach lab classes for courses that include geomechanics components.

STATUS
Contract executed with the condition that the applicant obtain a dollar for dollar match from industry. The applicant provided evidence that commitments totaling $100,000 had been received.

The December 31, 2008 progress report was received. During the July 1, 2008 through December 31, 2008 time period the following work was completed:
1. Completed two papers on Bakken formation geomechanics:
   a. Geomechanical study of Bakken formation for improved oil recovery,
   b. Geomechanical stability assessment of Williston Basin formations for petroleum production and CO2 sequestration
2. Estimated the average in-situ stresses (overburden pressure and horizontal stress) of the Bakken formation in the ND Williston Basin
3. Developed and tested an alternative triaxial geomechanical testing method,
4. Built a portable Bakken Shale core sampling system,
5. Completed core observation and fracture description of all the 22 industrial partners' cored Bakken Formation rocks. These core description and microfracture observation set up the foundation for future in-depth study.

Using Bakken well logs, average Bakken formation in-situ stresses were estimated based on the results of all 22 Bakken wells. While this provides a light to the in-situ stress fields, more detailed study is ongoing based on each of these 22 wells. One of the major components in this project is an alternative method for lab geomechanical tests under reservoir conditions (temperature, pore pressure, and in-situ stresses). This method has been successfully developed, tested and verified. A portable shale core sampling system was designed and built so as to be used in the NDGS Core Library for plugging 1-in diameter by 2-in long Bakken samples for geomechanical tests. The portable core sample system has been completed and tested using a reference shale sample. Ongoing efforts are focused on obtaining the Bakken shale samples for the testing.

Prior to the August 6, 2009 meeting the Oil and Gas Research Program Technical Advisor met with the principal investigator. Mr. Fischer's summary report to the Council stated the following:

- Laboratory is complete and operational.
- An alternative triaxial testing system has been developed:
  a) Pumps, core holder and oven
  b) Control and data acquisition system
- Research team has finished core observation and fracture description core;
- Using Bakken well logs, average Bakken formation in-situ stresses have been estimated for cored wells in study;
- Laboratory tests are underway and will continue;
- Approximately 4 papers have been published in journals and/or presented at national and international conferences. (Copies of these papers are available in the Commission files.)
- As a result of this program an additional (approximately) 1 million dollars have been contributed to the program; additional funds are anticipated;
- This program has been incorporated into a "North Dakota Center of Excellence" program;
- The program has attracted new students to UND (around 10 new students (1/2 are at the graduate level); additional student interest has been identified, including transfers from other universities; some students have had to be turned down at this time to allow for program and growth to be able to accommodate them.

01/14/10
Contract No. G-016-034

"Oil Can! Good Neighbor Initiative and Outreach Program"
Submitted by North Dakota Petroleum Council
Principal Investigator: Ron Ness, President

PARTICIPANTS

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Project Schedule – 24 months

| Contract Date – April 6, 2009                      | Project Deliverables: |
| Start Date – September 15, 2008                    | Status Report: April 15, 2009 |
| Completion Date – November 15, 2010               | Status Report: November 15, 2009 |
|                                                | Status Report: May 15, 2010   |
|                                                | Final Report: November 15, 2010|

OBJECTIVE/STATEMENT OF WORK:
This project will focus on engaging in a continuous dialog about the key issues relating to oil and gas development with the neighbors, policymakers and the general public. The education and outreach efforts will strive towards adapting to the key interests of our neighbors, the policymakers while using a lessons learned approach as we construct the initiatives to meet desired objectives. It is anticipated that the program will have to be flexible, adapting as new issues, ideas and concerns occur. The Initiative will stress responsible development by industry and includes improving relationships and communications with our neighbors and a commitment to environmental protection.

STATUS
Contract executed. One of the conditions of this contract is that there is coordination in the planning and implementation of the program with the Department of Mineral Resources Director. Written confirmation has been provided that the Director has been involved.

The first status report has been received for the September, 2008 through March, 2009 time period and is posted on the Industrial Commission/Oil and Gas Research Program website. The Oil Can! program has been developed based on feedback from the eight Town Hall meetings held in 2008. This program is a part of the good neighbor initiative to partner with the Petroleum Council’s current energy education outreach efforts. The program will have several deliverables all with a focus of not only improved communications to landowners, stakeholders, neighbors and policy makers, but continually working to improve actions and responses to questions and concerns by all North Dakotans.

During the first phase of this contract an action committee/advisory committee was established and the program was named and a branding logo was developed. The guiding principles for the program have been developed:

1) Listen first
2) Broaden outreach
3) Respect others
New website features have been implemented on the North Dakota Petroleum Council website with links to the Department of Mineral Resources website. Two town hall meetings were held November 11 & 12 in Bowbells, Powers Lake, Parshall, Stanley and Killdeer. Approximately 450 citizens attended these meetings. Media relations included newspaper advertising throughout western North Dakota. In addition there has been radio advertising. During the spring of 2009 the Oil Can! program served as a means to promote responsible road care in western North Dakota during the unusually wet spring weather. Advertisements ran in all major western newspapers listing proper steps to be taken to avoid excessive road damage during softer road conditions. Both radio packages also ran 30 second advertisements which encouraged the oil and gas industry to take extra precautions while driving heavy equipment and vehicles on western roads. This program also sponsored a “Roughneck Player of the Game” for UND Sioux hockey and basketball games. Planning for Phase II of the project took place during the first seven months.

Oil Can! through Phase I has proven to be a valuable tool for improving communications between industry, key stakeholders, policy makers and the general public. Oil Can! provides an immediate response mechanism for situations, such as impacts to roads and urging the oil and gas industry to use discretion. This was an important, time sensitive issue and the immediate proactive steps through Oil Can! appeared to have been successful.

The second status report has been received for the April 15 – November 15, 2009 time period. The status report is posted on the Industrial Commission/Oil and Gas Research Program website. During this time period the goals of the Oil Can! program were further refined to be:

- Assess and effectively respond to the issues, concerns and needs of the stakeholder groups as they relate to being a “good neighbor” and “good steward;”
- Increase the level of awareness, understanding and support for the oil and gas industry in North Dakota among key stakeholder groups, especially as it relates to positive economic employment impacts; and
- Build and reinforce a unified brand identity and positive image for the oil and gas industry in North Dakota that utilizes Oil Can! as a known brand affiliated with the education and outreach efforts of the Petroleum Council.

During this Phase II time period the program included the hosting of community events, development and distribution of safety and education materials, development and post of web-based information and media coverage.

On October 5, 2009 the Petroleum Council received the Interstate Oil and Gas Compact Commission Chairman’s Stewardship Award in the category of Energy Education for the Oil Can! project.

The Community Outreach was achieved through the Petroleum Council’s donation to the American Red Cross ($80,000 for North Dakota flood relief), the 2009 Bakken Rocks CookFest and the development of the Safety Alert flyer. This flyer emphasizes that oil well facilities are private property and should not be used by anyone other than trained industry personnel. The 2009 Bakken Rocks CookFest brought together over 1,800 people in the western part of State. (Killdeer and Stanley)

New web-based informational resources were implemented during this time period. Two informational sections were developed – a Royalty Owner Information Center and Frequently Asked Questions.
Media efforts continued during this phase utilizing newspapers and radio as well as sponsorship of UND Roughneck Performance of the Game for Fighting Sioux football and hockey radio broadcasts and Impact Player of the Game for western North Dakota high school sports.

01/14/10
Contract No. G-017-037  
"Improved Directional Drilling Technology for the Bakken Formation"  
Submitted by Laserlith Corporation  
Principal Investigator: Wallace Tang

PARTICIPANTS

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Project Schedule – 12 months

- Contract Date – June 22, 2009
- Start Date – June 1, 2009
- Completion Date – June 30, 2010

Project Deliverables:

- Status Report: September 30, 2009
- Status Report: December 31, 2009
- Status Report: March 31, 2010
- Final Report: June 30, 2010

OBJECTIVE/STATEMENT OF WORK:
The objective of this project as originally submitted is to increase the efficiencies of horizontal drilling in the Bakken Formation through a redesign of drilling tools by including the use of miniature gyroscopes in the drilling assemblage. The result of the project will be a prototype miniature MEMS gyroscope demonstrated at temperature typical in the drilling environment. High-temperature shock-resistant MEMS gyroscopes enable the directional sensor to be positioned next to the drill bit, resulting in a reduction of backtracking, more accurate navigation and time-savings. The original request from Laserlith was for $500,000. The Commission funded only Phase I of the project. The goal for Phase I is to develop the micromechanical sensing element, select the specialized high temperature semiconductor foundry and design the sensor circuit. The deliverable for the 1-year Phase I project is the test data demonstrating the ability of the micromechanical sensor to operate in the simulated down-hole temperatures.

STATUS

The September 30, 2009 quarterly report was received. A copy of the non-confidential report has been posted on the Industrial Commission website. It states in part: “The main focus of the last quarter was to design a basic MEMS gyroscope and perform temperature sensitivity analysis on it to study the effects of temperature. FEA modelers were used to study thermal-structural interactions for fixed-fixed flexure structures and simplified gyroscope frames.

In the first simulation, the fixed-fixed flexure, one of the basic and critical parts of the gyro was studied. This was performed for temperatures ranging from 0 to 200 degrees C. The maximum displacement observed is a 0.6% deflection of the total thickness of the structure.

As each study confirmed thermal compatibility, the next level of complexity was added to create a more realistic representation of the actual gyro. The same input parameters for the simulation were used. The results showed that the beams had made less out-of-plane deformation (maximum of 0.1%) along its length. Structural deformation of the device layer is reduced since the substrate will expand along with the flexure as opposed to the last study where the anchors were fixed.
The next step toward demonstrating the thermal robustness of the MEMS gyroscope design was to include a full structure simulation at a temperature of 200 degrees C. The total deformation at this temperature was considered negligible. All of these results confirm that the thermal effects the gyro would encounter in a drilling environment will not affect its performance.

The December 31, 2009 quarterly report was received. A copy of the non-confidential portion of the report has been posted on the Industrial Commission website. During the past quarter the high temperature gyroscope designs were completed. Computer simulation results indicate that the gyro sensor design will not buckle under the harsh thermal conditions and should operate successfully. An initial MEMS fabrication run was also performed to produce MEMS test structures within design specifications for linewidth and sidewall quality. An initial circuit design has been developed for driving the gyroscopes and sensing changes in capacitance in the range of picofarads.
Contract No. G-019-040
“North Dakota Petroleum Council Oil and Gas Education Program”
Submitted by North Dakota Petroleum Council
Principal Investigator: Ron Ness, President

PARTICIPANTS

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*In-kind services are also provided by the North Dakota Petroleum Council staff, Petroleum Council membership, Department of Mineral Resources, Energy Career Awareness Partnership and Forest Service staff support.

Project Schedule – 36 months
合同日期 – 2010年1月XX日
开始日期 – 2009年6月1日
完成日期 – 2012年6月30日

Project Deliverables:
状况报告: XXXX
状况报告: XXXX
最终报告: 2012年6月30日

OBJECTIVE/STATEMENT OF WORK:
The overall objective of this project is the continuance of three education and outreach programs regarding the oil and gas industry. The three programs are: 1) Energy Career Awareness Partnership (ECAP); 2) Teacher Education Seminar and 3) Oil & Gas Tidbits. These education efforts have a proven track record of success and have been nationally recognized and modeled by other industries in North Dakota. These education programs provide targeted education to students, teachers, parents, policymakers and the general public.

ECAP is a year-round program that puts someone in classrooms across the state on a regular basis to make presentations, conduct seminars, attend trade-shows and hold training sessions about careers in the energy industry. ECAP encourages students to consider career opportunities in North Dakota’s energy industry when they begin thinking about what career paths and courses to take in high school and college. The ECAP expenses are for three school years – salary benefits for 3 years along with related travel and materials.

The Teachers Education Seminar is a 4-day course that consists of classroom and field experiences. As a result of the Seminar the teachers gain a better understanding of the complexity of the oil and gas industry and develop a factual basis and background of the substantial costs and risk required to explore, produce and refine a barrel of oil. In addition the Seminar educates teachers about the economic benefits and career opportunities provided by the North Dakota oil and gas industry enabling them to educate their students about the industry. This proposal includes funding for four years – 2009, 2010, 2011 and 2012.
The *Oil and Gas Tidbits* is a quarterly one-page educational newsletter. This publication is designed to provide short articles on the use of new technology and items of interest to policymakers across the state to educate them about the oil and gas industry. This funding includes 10 issues of the *Oil & Gas Tidbits* from January 2010 through June 30, 2012 (30 months).

**STATUS**
Contract being reviewed by applicant. The June 2009 Teacher Seminar was held and was successful based on the feedback from the teachers.

01/14/10
Contract No. G-019-041
“Identification of Shallow Biogenic Gas Systems in Eastern North Dakota – Phase I”
Submitted by GeoShurr Resources LLC
Principal Investigator: George W. Shurr

PARTICIPANTS

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Project Schedule – 6 months  
Contract Date – December 8, 2009  
Start Date – December 1, 2009  
Completion Date – Phase I – June 15, 2010

Project Deliverables:  
Status Report: March 15, 2010  
Final Report: June 15, 2010

OBJECTIVE/STATEMENT OF WORK:
The objective of this project is to generate information that will enhance exploration and development of shallow biogenic gas in counties in eastern North Dakota that are currently not producing oil or gas. The methodology employed in this investigation would utilize published structural and stratigraphic information, satellite images as well as compilation of published gravity and magnetic, syntheses of Precambrian basement geology to identify regional lineament zones as “sweetspots.” The deliverables would include a map of regional lineament zones, locations of ranked sweetspots and a set of supporting field and laboratory measurements.

Conditions placed on the Phase I funding was that the applicant work with the North Dakota Geological Survey. The deliverable for the Phase I work is to be an interim report to the Council post January 1, 2010. The deliverable for the Phase I work shall include a map depicting the regional lineament zones.

STATUS
The contract has been executed and the work has been started. The applicant has held meetings with the North Dakota Geological Survey.
Contract No. G-019-042
"Remote Monitoring and Reporting of Conditions for Salt Water Injection Sites"
Submitted by Pedigree Technologies
Principal Investigator: Will Shulstad

PARTICIPANTS

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<td><strong>Total Project Cost</strong></td>
<td><strong>$ 50,862</strong></td>
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Project Schedule – 39 months
Contract Date – December 29, 2009
Start Date – September 1, 2009
Completion Date – November 1, 2012

Project Deliverables:
Status Report: January 15, 2010
Final Report: November 1, 2012

OBJECTIVE/STATEMENT OF WORK:
To develop capabilities to allow for remote data collection from injection well sites allowing for continuous monitoring of those sites as well as providing reportable injection data to government agencies. Pedigree Technologies proposes the creation and demonstration of a system for remote, automated monitoring and reporting of conditions at salt water injection sites with the following technical objectives:

1) The system will regularly monitor and record pressure readings from gauges in the (a) tubing and (b) annual regions of injection wells as well as the (c) volume of material injected.
2) This data will be stored at and made accessible from a remote location at Pedigree Technologies' data center.
3) From this data, reports will be automatically generated meeting State of North Dakota reporting requirements.
4) The system will be field-tested at ten injection sites in North Dakota operated by Berenergy Corp.

STATUS
Contract has been executed. Pedigree Technologies has begun the work on the project.

01/13/10
<table>
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<tr>
<th>Project</th>
<th>Company</th>
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<th>Date Awarded</th>
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<td>D Identification of a Shallow Gas Source System in Southwestern Steele County ND</td>
<td>Fischer Oil &amp; Gas</td>
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<td>UND</td>
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<td>Laserlift Corporation</td>
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<td>D Determination of Middle Bakken &amp; Three Forks Shale Sand Shales</td>
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