QUARTERLY PROGRESS REPORT

To
DOE-NETL
David P. Cercone, Program Manager
Award Number: DE-FE0006821

SMALL SCALE FIELD TEST DEMONSTRATING CO_2 SEQUESTRATION IN ARBUCKLE SALINE AQUIFER AND BY CO_2-EOR AT WELLINGTON FIELD, SUMNER COUNTY, KANSAS

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Date of Report: April 17, 2017
DUNS Number: 076248616

Recipient: University of Kansas Center for Research &
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047

Project/Grant Period: 10/1/2011 through 9/30/2017
Twenty First Quarterly Report
Period Covered by the Report: October 1, 2016 through December 31, 2016

Signature of Submitting Official:
eugene holubnyak
Yevhen 'Eugene' Holubnyak

EXECUTIVE SUMMARY

PROJECT OBJECTIVES

The objectives of this project are to understand the processes that occur when a maximum of 70,000 metric tonnes of CO_2 are injected into two different formations to evaluate the response in different lithofacies and depositional environments. The evaluation will be accomplished through the use of both in situ and indirect MVA (monitoring, verification, and accounting) technologies. The project will optimize for carbon storage accounting for 99% of the CO_2 using lab and field testing and comprehensive characterization and modeling techniques.

CO_2 will be injected under supercritical conditions to demonstrate state-of-the-art MVA tools and techniques to monitor and visualize the injected CO_2 plume and to refine geomodels developed using nearly continuous core, exhaustive wireline logs, and well tests and a multi-component 3D seismic survey. Reservoir simulation studies will map the injected CO_2 plume and estimate tonnage of CO_2 stored in solution, as residual gas, and by mineralization and integrate MVA results and reservoir models shall be used to evaluate CO_2 leakage. A rapid-response mitigation plan will be developed to minimize CO_2 leakage and provide comprehensive risk management strategy. A documentation of best practice methodologies for MVA and application for closure of the carbon storage test will complete the project. The CO_2 shall be supplied from a reliable facility and have an adequate delivery and quality of CO_2.

SCOPE OF WORK

Budget Period 1 includes updating reservoirs models at Wellington Field and filing Class II and Class VI injection permit application. Static 3D geocellular models of the Mississippian and Arbuckle shall integrate petrophysical information from core, wireline logs, and well tests with spatial and attribute information from their respective 3D seismic volumes. Dynamic models (composition simulations) of these reservoirs shall incorporate this information with laboratory data obtained from rock and fluid analyses to predict the properties of the CO_2 plume through time. The results will be used as the basis to establish the MVA and as a basis to compare with actual CO_2 injection. The small scale field test shall evaluate the accuracy of the models as a means to refine them in order to improve the predictions of the behavior and fate of CO_2 and optimizing carbon storage.

Budget Period 2 includes completing a Class II underground injection control permit; drilling and equipping a new borehole into the Mississippian reservoir for use in the first phase of CO_2 injection; establishing MVA infrastructure and acquiring baseline data; establishing source of CO_2 and transportation to the injection site; building injection facilities in the oil field; and injecting CO_2 into the Mississippian-age spiculitic cherty dolomitic open marine carbonate reservoir as part of the small scale carbon storage project.

In Budget Period 3, contingent on securing a Class VI injection permit, the drilling and completion of an observation well will be done to monitor injection of CO_2 under supercritical conditions into the Lower Ordovician Arbuckle shallow (peritidal) marine dolomitic reservoir.

Monitoring during pre-injection, during injection, and post injection will be accomplished with MVA tools and techniques to visualize CO_2 plume movement and will be used to reconcile

simulation results. Necessary documentation will be submitted for closure of the small scale carbon storage project.

PROJECT GOALS

The proposed small scale injection will advance the science and practice of carbon sequestration in the Midcontinent by refining characterization and modeling, evaluating best practices for MVA tailored to the geologic setting, optimize methods for remediation and risk management, and provide technical information and training to enable additional projects and facilitate discussions on issues of liability and risk management for operators, regulators, and policy makers.

The data gathered as part of this research effort and pilot study will be shared with the Southwest Sequestration Partnership (SWP) and integrated into the National Carbon Sequestration Database and Geographic Information System (NATCARB) and the 6th Edition of the Carbon Sequestration Atlas of the United States and Canada.

Project Deliverables by Task

1.5 Well Drilling and Installation Plan (Can be Appendix to PMP or Quarterly Report)
1.6 MVA Plan (Can be Appendix to PMP or Quarterly Report)
1.7 Public Outreach Plan (Can be Appendix to PMP)
1.8 Arbuckle Injection Permit Application Review go/no go Memo
1.9 Mississippian Injection Permit Application Review go/no go Memo
1.10 Site Development, Operations, and Closure Plan (Can be Appendix to PMP)
2.0 Suitable geology for Injection Arbuckle go/no go Memo
3.0 Suitable geology for Injection Mississippian go/no go Memo
11.2 Capture and Compression Design and Cost Evaluation go/no go Memo
19 Updated Site Characterization/Conceptual Models (Can be Appendix to Quarterly)
21 Commercialization Plan (Can be Appendix to Quarterly Report).
30 Best Practices Plan (Can be Appendix to Quarterly or Final Report)

CO_2-EOR Accomplishments

1. Day-to-day field operations similar to that reported in previous two quarters (Q19 and Q20) and are a continuation of Tasks 12–15
2. Continued monitoring of CO_2 plume movement
   a. Recorded volumes of CO_2 produced, oil, and brine recovered
   b. Only seven wells are being monitored based on past geochemical analyses that indicate the CO_2 plume has largely stabilized. Wells are currently being sampled for on-site (performed by KGS) and lab-based geochemical analyses (performed by Baker Chemicals). CO_2 gas quality measurements are being performed by Berexco staff.
3. The primary CO_2 plume has been managed by pressure maintenance including use of two nearby injection wells and targeted fluid withdrawal in eight surrounding wells. The CO_2 injection conforms largely to the stratigraphic architecture recorded in the geocellular model. Key work for the remainder of the CO_2-EOR phase is to continue measuring all inputs and

outputs to obtain accurate measurement of CO_2 sequestered in the reservoir and the incremental oil produced from a single injection cycle.

4. On December 31, 2016 the daily CO_2 amount recorded was 1-8 MCFD down from 190 MCFD on September 30th. As of December 31, 2016, the cumulative produced CO_2 accounts for 18% of the injected volume (up from 16% in September).
5. Preliminary decline curve analysis has been performed that predicts incremental oil production for the field for next 4-5 years
6. The existing 3D seismic survey was re-processed and delivered. Currently, geophysical team is working on resolving seismic anisotropy to image fracture patterns and orientations in Mississippian reservoir.

Geological storage and Class VI Permit Accomplishments

1. Since mid-April 2016, continuous (1-sec) baseline pressure measurements have been acquired in the perforated lower Arbuckle zone in the shut-in Class VI injector (See Appendix 1). Because of this monitoring, the well has not been retrofitted for installation of MVA tools (BP2 Milestone).
2. After discussions with EPA, new Requests for Information (RfI) were received through official information exchange tool. Request #13 is related to financial responsibility and request #14 is related to Area of Review. Request #14 was submitted to EPA for a review and request #13 was forwarded to Berexco's financial and insurance teams for review.

Q20 Tasks

Site Characterization of Mississippian Reservoir for CO_2-EOR –Wellington Field

The CO_2 injection was completed in 165 days or approximately 5 months with an average of 120 tonnes per day of CO_2 injected (Figures 1 and 2). Oil production rates remain at about 22–25 BOPD. On December 31, 2016 the daily CO_2 amount recorded was 0 MCFD; however, some wells occasionally still produce CO_2 with the total average production rate of 1-8 MCFD. As of December 31, 2016, the cumulative produced CO_2 accounts for 18% of the injected volume (up from 16% in September). Only the seven innermost wells are currently being sample for on-site (performed by KGS) and lab-based geochemical analyses (performed by Baker Chemicals). The low amounts of recovered CO_2 (Figures 1 and 2) and evidence of diffusion in brine data indicate the flood is conformable and is not bypassing through conductive fractures. Key observations this quarter: 1) incremental oil production is 2X greater than before injection (Figure 2; 2) the pH in well 69 stabilized (5.41); 3) the temperature in Well 47 continues to remain low at 9°C, 4) the wellhead pressure in well 61 has recovered from 80 psi to 250 psi, and; 5) the amount of CO_2 vented dropped (Figures 2 and 3). These observations are consistent with the cessation of CO_2 injection and the flood-front sweeping laterally away from the injector. In addition, efforts were made in the field to control CO_2-related corrosion within the pilot area.

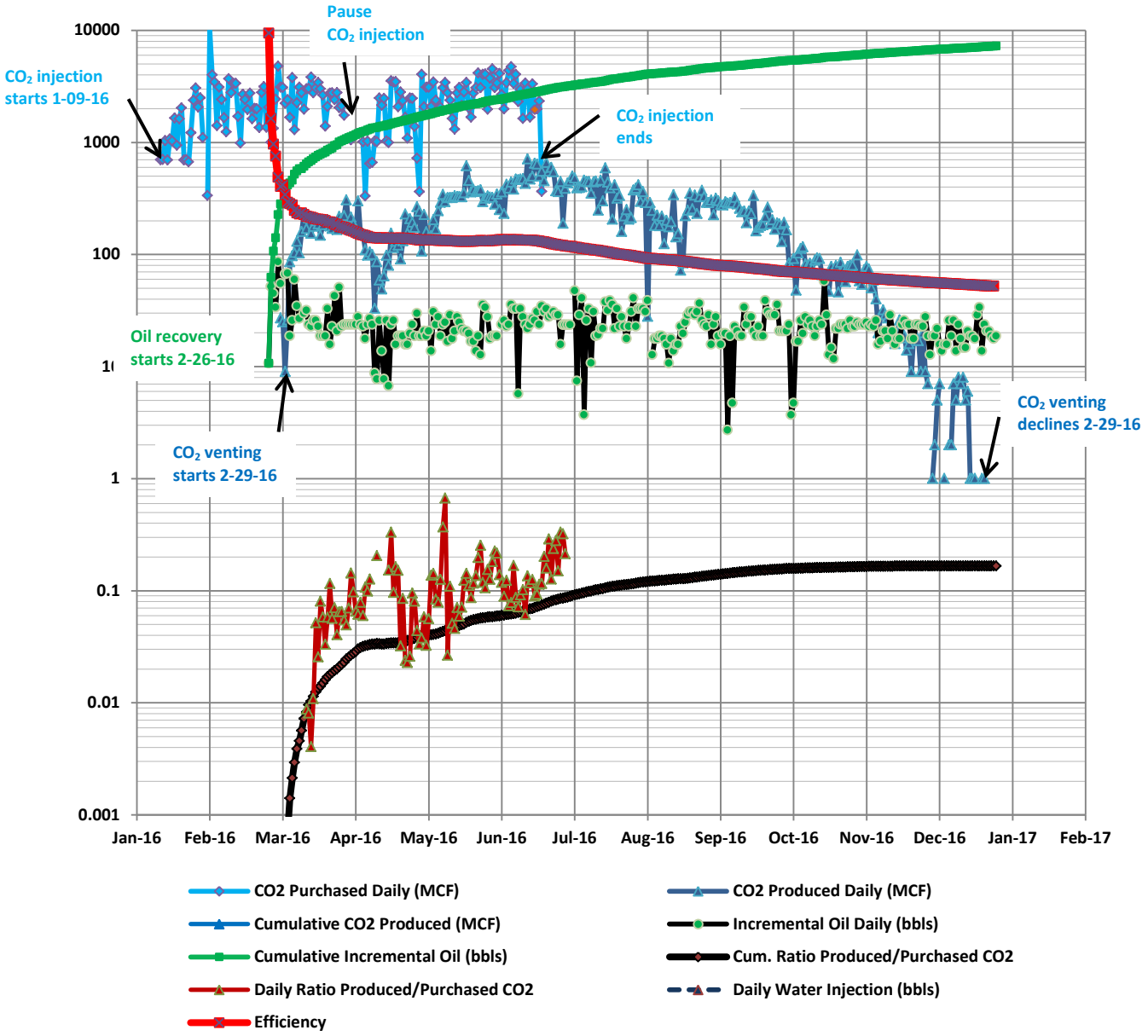

Figure 1. CO_2 injected and CO_2 and oil recovered in pilot scale injection in the Mississippian oil reservoir in Wellington Field.

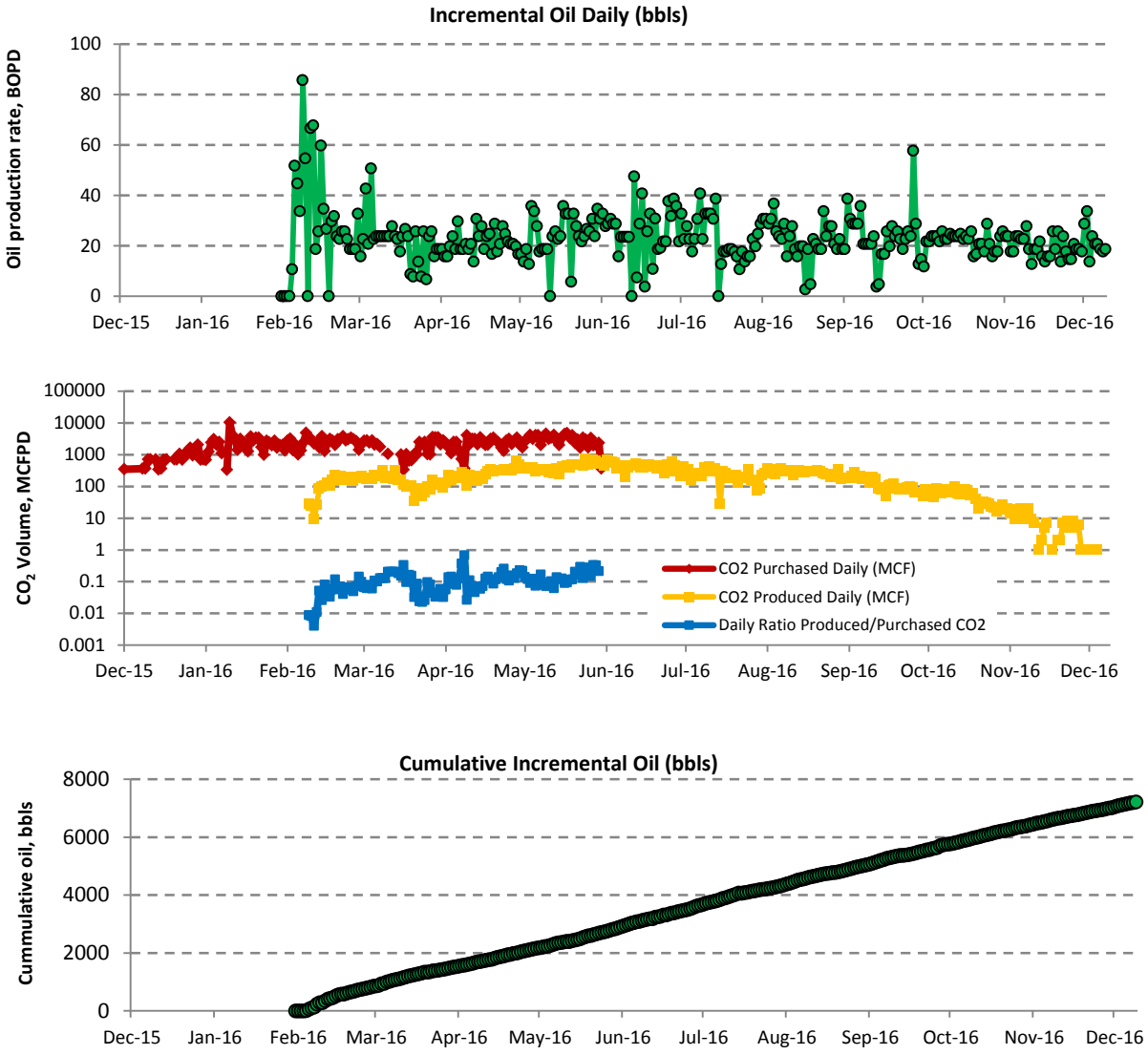

Figure 2. Incremental and cumulative barrels of oil recovered, comparison of CO_2 recovered vs. purchased. CO_2 recovered has remained at low levels compared to the amount of CO_2 that has been injected. Incremental oil has actually increased slightly since water injection began indicating that the CO_2 is being pushed away rather uniformly away from the injection well, #2-32. The response closely resembles what has been forecast from the simulations.

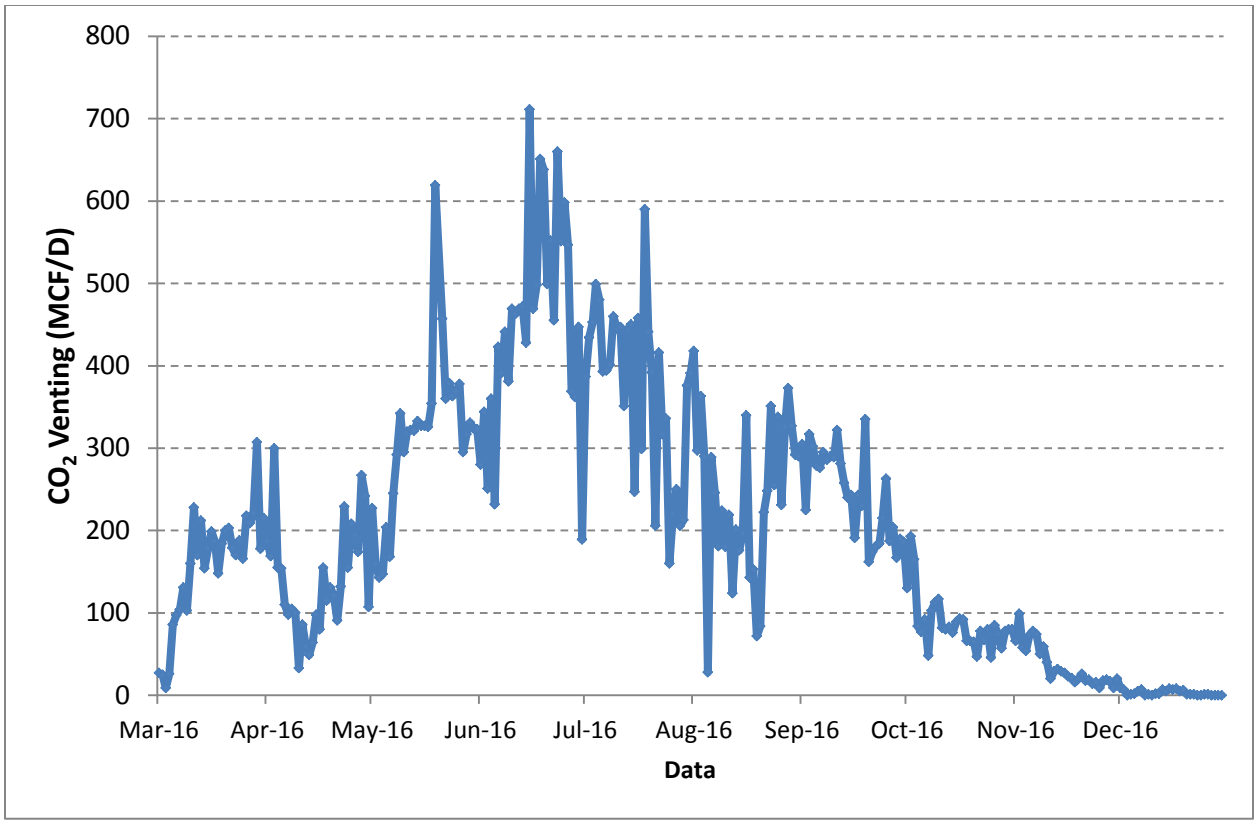

Figure 3. Total CO_2 vented in MCFD. The amount vented has declined to at 1–8 MCFD.

Decline Curve Analysis

Decline curve analysis is essential for forecasting production and estimation of a lifespan of an oil field or parts of oil field. It provides necessary projections for estimating economic benefits and a lifespan of available resources.

Decline curve analysis was performed for an entire Wellington field and separate field batteries. The analysis projects and compares oil production that would be generated by current waterflood and CO_2 EOR. The part of the field where CO_2 EOR was performed is connected to East Nelson battery. According to decline curve analysis, this particular part of a field is projected to generate incremental oil until approximately year 2022 with total projected recovered oil ranging from 15,000 to 32,000 bbls (Figure 4). However, if production from a small pilot EOR is compared to an entire field, the incremental oil production by EOR does not appear to be as significant (Figure 5).

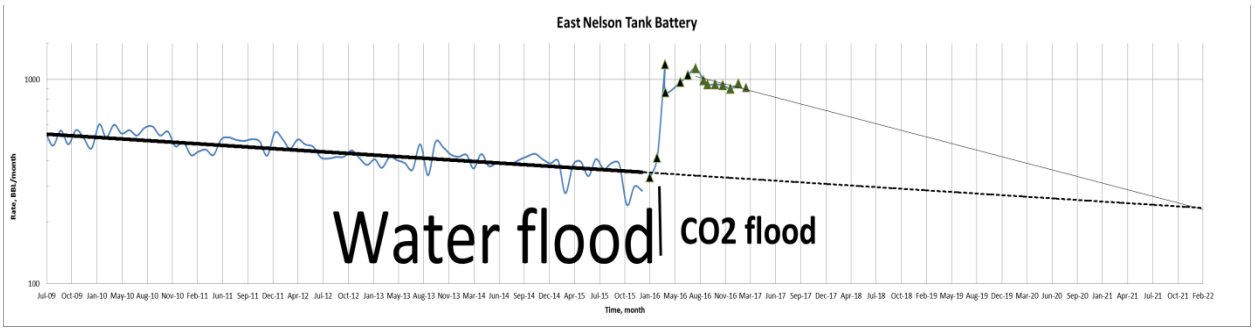

Figure 4. Oil production by waterflood and CO_2 EOR is compared for East Nelson battery. Blue solid line is historical waterflood production. Green line with triangles is historical production data for CO_2 EOR. Black dotted line is oil production forecast for waterflood. Grey solid line is projected incremental oil production for CO_2 EOR.

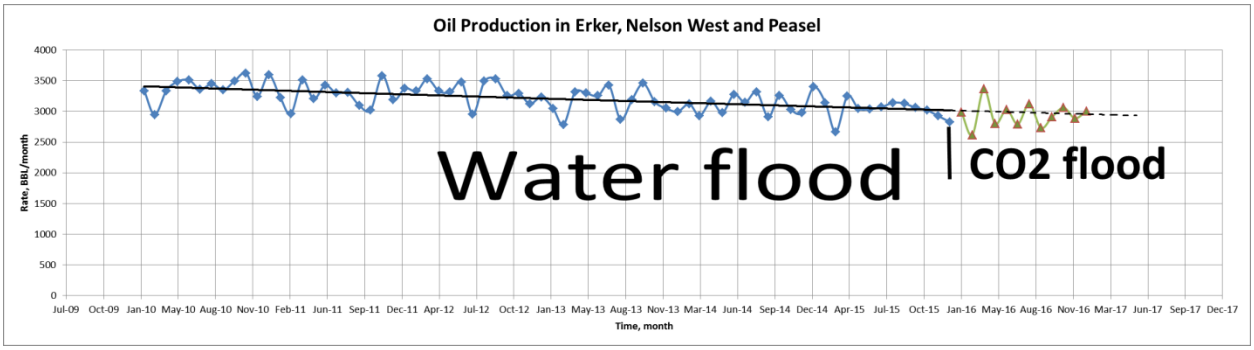

Figure 5. Oil production by waterflood and CO_2 EOR is shown for a larger portion of Wellington field. Blue line is historical waterflood production. Green line with triangles is historical production data for CO_2 EOR. If production from a small pilot EOR is compared to an entire field, the incremental oil production by EOR does not appear to be as significant.

Fault Mapping and Geomechanical Analysis

The study has been performed to analyze potential for injection-induced seismicity in Wellington Field area. The analysis is based on (1) mapping of subsurface faults and estimate in-situ stresses, (2) performing slip and dilation tendency analysis to identify optimally oriented faults relative to the estimated stress field, and (3) determination of pressure changes required to induce slip, both at reservoir depth and basement depth. Through the use of 3D seismic reflection data, 12-near vertical faults were identified with fault planes striking between 325° to 049° and the majority oriented NNE (Figure 6), consistent with nodal planes from moment tensor solutions from recent earthquakes in Kansas and Oklahoma. Fault lengths range from 210 to 4,450+ m and vertical separations range from 12-33 m. The majority of faults cut through both reservoirs, with a number that clearly cut the top basement reflector. Stress magnitudes were estimated using step rate tests (Shmin = 18.4 MPa), density logs (Sv = 36.6 MPa), and calculations from wells with drilling induced tensile fractures (SHmax = 31.3-45.9 MPa) at the gauge depth of 1,484m. Slip

and dilation tendency analysis indicates that faults striking <020° are stable under reservoir conditions, whereas faults striking 020°-049° may have a moderate to high risk for reactivation with increasing pore fluid pressure. These faults would require a pore fluid pressure increase of at least 1.1 MPa to 7.6 MPa at 1,117 m (Mississippian) and 1.31 MPa to 9.8 MPa at 1,484 m (Arbuckle) to reach failure. Given the proposed injection volume, it is unlikely that faults will be reactivated at reservoir depths. However, at basement depths, high rate injection operations could reach pressures beyond the critical threshold for slip, as demonstrated by the large number of injection induced earthquakes west of the study area.

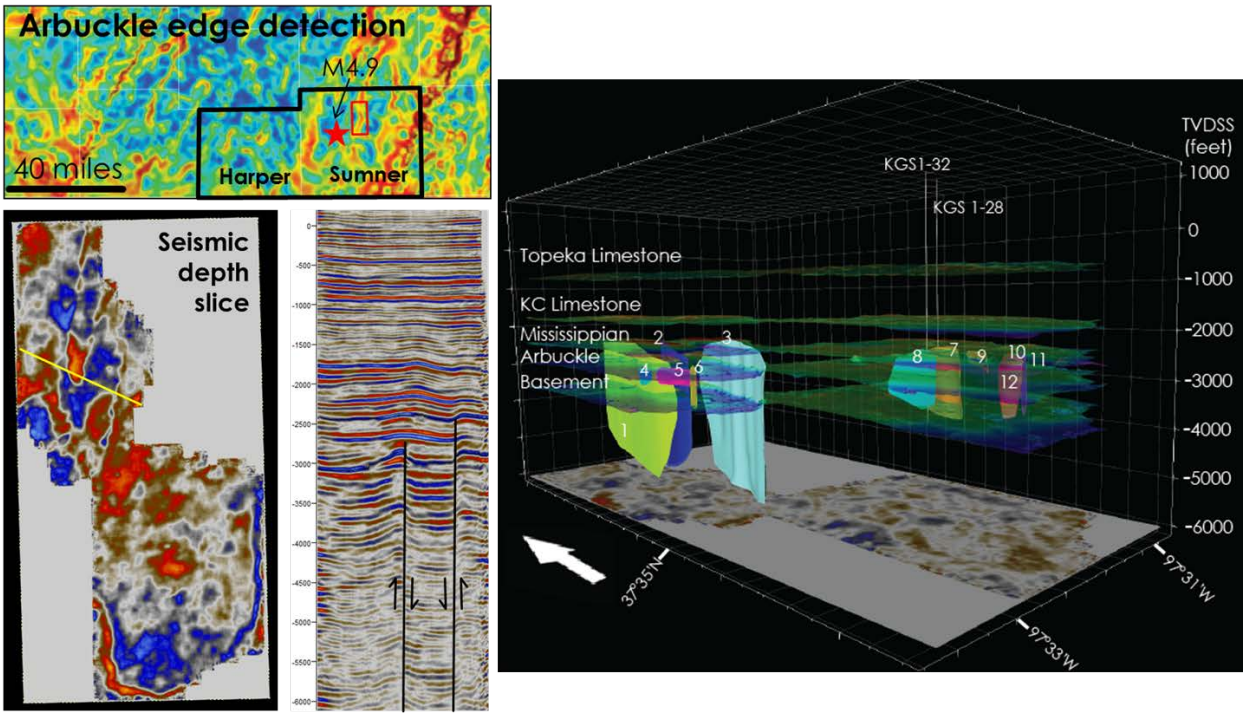

Figure 6. Faults cut Mississippian, Arbuckle, and basement

SUMMARY

1. Produced (i.e., vented) CO_2 accounts for 18% of the CO_2 injected
2. The Wellington seismometer array provides a dependable earthquake catalog and is updated on a weekly basis.
3. Decline curve analysis was performed and East Nelson battery is projected to generate incremental oil until approximately year 2022 with total projected recovered oil ranging from 15,000 to 32,000 bbls
4. 12-near vertical faults were identified with fault lengths range from 210 to 4,450+ m and vertical separations range from 12-33 m. The majority of faults cut through both reservoirs, with a number that clearly cut the top basement reflector. Given the proposed injection volume, it is unlikely that faults will be reactivated at reservoir depths.

PROJECT SCHEDULE

Schedule and costs for Arbuckle CO_2 injection

Wellington project currently is scheduled to end on March 30, 2017. The information for the Determinations and Findings (D&F) is being prepared for a submission in January-February 2017. This new D&F suggest changes in scope of work for Wellington project if difficulties with EPA UIC well Class VI permit are going to continue.

The completion date anticipated for the Arbuckle CO_2 injection is anticipated to be the end of July 2017. The one year post injection site care as proposed to EPA would begin in March 2018 and continue through August 2019 according to current projections.

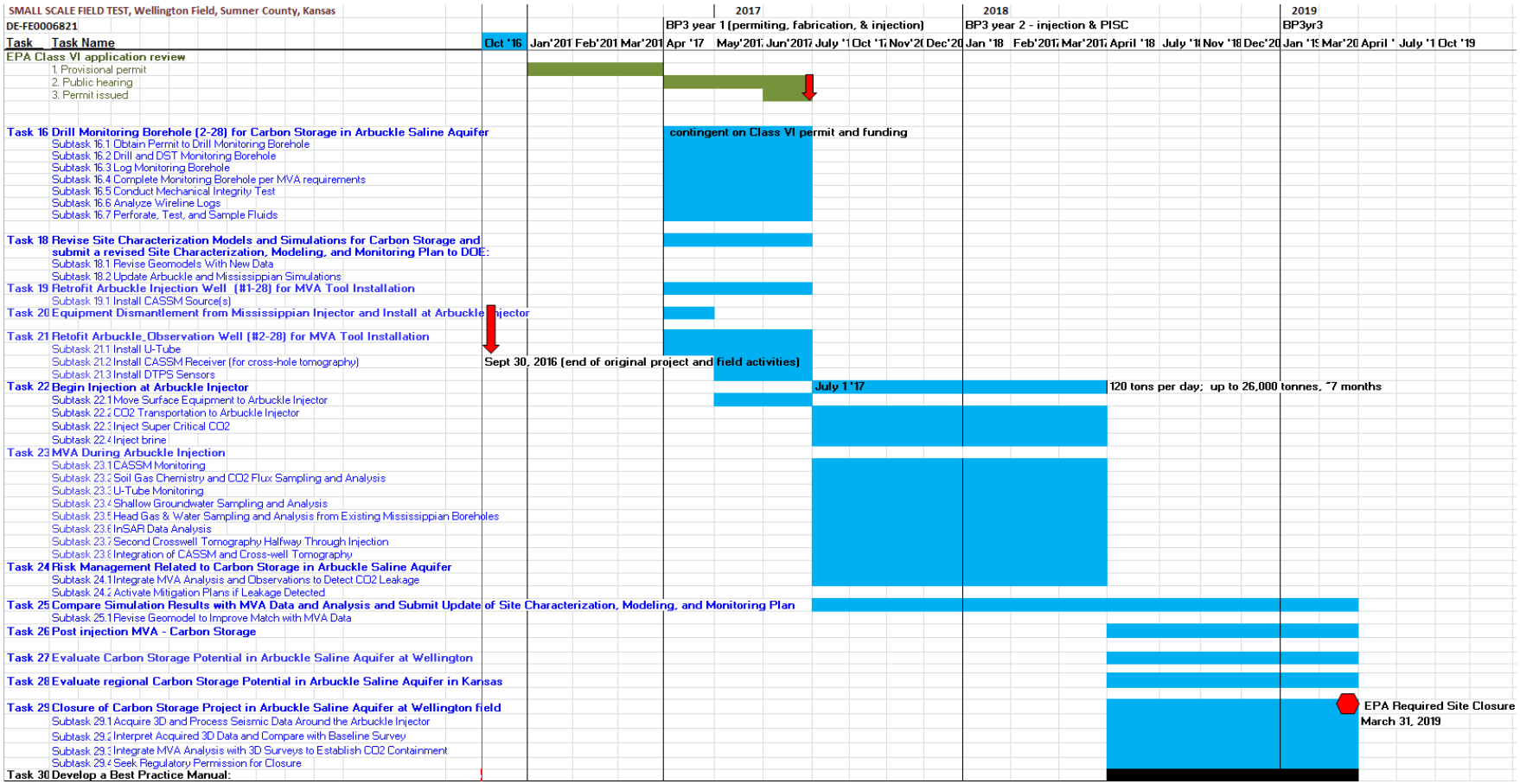
SMALL SCALE FIELD TEST, Wellington Field, Sumner County, Kansas
DE-FE0006821
2017
2018
2019
BP3 year 1 (permiting, fabrication, & injection)
BP3 year 2 - injection & PISC
BP3yr3
Task _ Task Name
Oct '16 Jan'201 Feb'201 Mar'201 Apr '17 May'201 Jun'2017 July '1 Oct '1 Nov'2 Dec'20 Jan '18 Feb'201 Mar'201 April '18 July '1 Nov '18 Dec'20 Jan '1 Mar'20 April ' July '1 Oct '19
EPA Class VI application review
1. Provisional permit
2. Public hearing
3. Permit issued
Task 16 Drill Monitoring Borehole (2-28) for Carbon Storage in Arbuckle Saline Aquifer
contingent on Class VI permit and funding
Subtask 16.1 Obtain Permit to Drill Monitoring Borehole
Subtask 16.2 Drill and DST Monitoring Borehole
Subtask 16.3 Log Monitoring Borehole
Subtask 16.4 Complete Monitoring Borehole per MVA requirements
Subtask 16.5 Conduct Mechanical Integrity Test
Subtask 16.6 Analyze Wireline Logs
Subtask 16.7 Perforate, Test, and Sample Fluids
Task 18 Revise Site Characterization Models and Simulations for Carbon Storage and submit a revised Site Characterization, Modeling, and Monitoring Plan to DOE:
Subtask 18.1 Revise Geomodels With New Data
Subtask 18.2 Update Arbuckle and Mississippian Simulations
Task 19 Retrofit Arbuckle Injection Well (#1-28) for MVA Tool Installation
Subtask 19.1 Install CASSM Source(s)
Task 20 Equipment Dismantlement from Mississippian Injector and Install at Arbuckle Injector
Task 21 Retofit Arbuckle_Observation Well (#2-28) for MVA Tool Installation
Subtask 21.1 Install U-Tube
Subtask 21.2 Install CASSM Receiver (for cross-hole tomography)
Subtask 21.3 Install DTPS Sensors
Sept 30, 2016 (end of original project and field activities)
Task 22 Begin Injection at Arbuckle Injector
July 1 '17
120 tons per day; up to 26,000 tonnes, ~7 months
Subtask 22.1 Move Surface Equipment to Arbuckle Injector
Subtask 22.2 CO2 Transportation to Arbuckle Injector
Subtask 22.3 Inject Super Critical CO2
Subtask 22.4 Inject brine
Task 23 MVA During Arbuckle Injection
Subtask 23.1 CASSM Monitoring
Subtask 23.2 Soil Gas Chemistry and CO2 Flux Sampling and Analysis
Subtask 23.3 U-Tube Monitoring
Subtask 23.4 Shallow Groundwater Sampling and Analysis
Subtask 23.5 Head Gas & Water Sampling and Analysis from Existing Mississippian Boreholes
Subtask 23.6 InSAR Data Analysis
Subtask 23.7 Second Crosswell Tomography Halfway Through Injection
Subtask 23.8 Integration of CASSM and Cross-well Tomography
Task 24 Risk Management Related to Carbon Storage in Arbuckle Saline Aquifer
Subtask 24.1 Integrate MVA Analysis and Observations to Detect CO2 Leakage
Subtask 24.2 Activate Mitigation Plans if Leakage Detected
Task 25 Compare Simulation Results with MVA Data and Analysis and Submit Update of Site Characterization, Modeling, and Monitoring Plan
Subtask 25.1 Revise Geomodel to Improve Match with MVA Data
Task 26 Post injection MVA - Carbon Storage
Task 27 Evaluate Carbon Storage Potential in Arbuckle Saline Aquifer at Wellington
Task 28 Evaluate regional Carbon Storage Potential in Arbuckle Saline Aquifer in Kansas
Task 29 Closure of Carbon Storage Project in Arbuckle Saline Aquifer at Wellington field
EPA Required Site Closure
March 31, 2019
Subtask 29.1 Acquire 3D and Process Seismic Data Around the Arbuckle Injector
Subtask 29.2 Interpret Acquired 3D Data and Compare with Baseline Survey
Subtask 29.3 Integrate MVA Analysis with 3D Surveys to Establish CO2 Containment
Subtask 29.4 Seek Regulatory Permission for Closure
Task 30 Develop a Best Practice Manual:

Figure 7. Previous page. Updated Gantt Chart of Wellington Project with revised schedule for proposed BP3 Arbuckle injection.

MILESTONE STATUS REPORT

Task	Budget Period	Number	Milestone Description	Status
Task 2.	1	1	Site characterization of Arbuckle Saline Aquifer System – Wellington Field	Completed
Task 3.	1	2	Site Characterization of Mississippian reservoir for CO_2 EOR – Wellington Field	Completed
Task 10.	2	3	Pre-injection MVA – establish background baseline readings	Completed
Task 13.	2	4	Retrofit Arbuckle injection well (#1-28) for MVA tool installation	Completed
Task 18.	3-yr1	5	Compare simulation results with MVA Data and analysis and submit update of site characterization, modeling, and monitoring plan	Completed
Task 22.	3-yr1	6	Recondition Mississippian boreholes around Mississippian CO_2-EOR injector	Completed
Task 27.	3-yr2	7	Evaluate CO_2 geologic storage potential of CO_2 EOR pilot	Completed
Task 28.	3-yr2	8	Evaluate potential of incremental oil recovery and CO_2 geologic storage by CO_2 EOR – Wellington Field	In Progress

FUTURE PLANS

1. Continue post-injection monitoring on a monthly basis for wells that are responding to flood.
2. Continue weekly sampling of wells to monitor production including CO_2, oil, and brine recovered
3. Perform on-site and lab geochemical analysis for select wells with the exception of alkalinity that is limited only to measurements at the well
4. Continue operation of the Wellington seismometer array
5. Continue baseline pressure measurements in the perforated lower Arbuckle zone of the shut-in Class VI injection well
6. Continue to acquire SAR satellite images and recording cGPS for analysis of ground motion
7. Contrast 2-D seismic (pre-and post-CO_2 injection in the Mississippian) to determine plume's extent
8. Passive seismic monitoring will continue as a very important component for DOE and EPA.
9. Submit a BP3 contingency plan for D&F.

PRODUCTS

Publications, conference papers, and presentations

Nolte K., Tsoflias G. P. and L. W. Watney (2016), Monitoring the Increase in Seismicity in South-Central Kansas, Abstract S43C-2871, Fall AGU Meeting, San Francisco, Calif., December 12-16, 2016.

Watney W.L., Bidgoli T.S., Victorine J., Simpson P., Holubnyak Y., Nolte K., Tsoflias G.P., Wreath D. and T.R. Birdie (2016) Continuous Pressure and Temperature Monitoring in Lower Arbuckle Saline Aquifer in Wellington Field, Sumner County, Kansas – Response to the M5.8 Pawnee Earthquake, Abstract S51E-3166, Fall AGU Meeting, San Francisco, Calif., December 12-16, 2016.

Schwab, D.R. (Bidgoli T.S. – Committee Chair), 2016, Characterizing the potential for fault reactivation related to fluid injection through subsurface structural mapping and stress field analysis, Wellington Field, Sumner County, KS: [M.S. thesis] Lawrence, Kansas, University of Kansas, 62 p.

Holubnyak, Y., Watney, W., T., Rush, J., Fazelalavi, M., Reservoir Modeling of CO_2 Injection in Arbuckle Saline Aquifer at Wellington Field, Sumner County, Kansas, Kansas Geological Survey Open File Report, OFR 2016-29

Holubnyak, Y., Watney, W., Birdie, T., Rush, J., Fazelalavi, M., Wreath, D., Pilot Scale CO_2 EOR in Mississippian Carbonate Reservoir at Wellington Field in South-Central Kansas, GHGT-13, Lausanne, Switzerland, November, 2016

Holubnyak, Y., Williams, E., Watney, W., Bidgoli, T., Rush, J., Fazelalavi, M., Gerlach, P., Calculation of CO_2 Storage Capacity for Arbuckle Group in Southern Kansas: Implications for a Seismically Active Region, GHGT-13, Lausanne, Switzerland, November, 2016

PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

A project organization chart follows (Table 1). The work authorized in this budget period includes office tasks related to preparation of reports and application for a Class VI permit to inject CO_2 into the Arbuckle saline aquifer, and operational field activities relevant to the project.

Table 1. Updated Organizational Chart.

Organizational Structure
Small Scale Field Test – Wellington Field (FE0006821)

UNIVERSITY OF KANSAS Center for Research		
Kansas Geological Survey		
Name	**Project Job Title**	**Primary Responsibility**
W. Lynn Watney	Project Manager, Joint PI	Geology, Information Synthesis, Point of Contact
Jason Rush	Joint PI	Geology, Static Modeling, Data Integration, Synthesis
Yevhen 'Eugene' Holubnyak	Petroleum Engineer	Reservoir Engineering, Dynamic Modeling, Synthesis
Tiraz Birdie	Consulting Engineer	Hydrological Engineering, Dynamic Modeling, Injection Permit Application Preparation, Synthesis
John Doveton	Co-PI	Log-petrophysics, geostatistics
Kerry D. Newell	Co-PI	Fluid geochemistry
Fatemeh 'Mina' FazelAlavi	Engineering Assistant	Log analysis, well test analysis, reservoir engineering
John Victorine	Software Programmer	Database management, well tool design, data processing
KU Department of Geology		
George Tsoflias	Co-PI	Wellington Seismometer Array, Seismic imaging
Jenifer Roberts	Co-PI	Microbial geochemistry
Leigh Sterns	Affiliated Scientist	cGPS processing for InSAR interpretation
Berexco, LLC		
Dana Wreath	Vice President	Management, engineering
Staff at Wellington Field		Daily operations
Berexco Drilling Team		Drilling, completions
Lawrence Berkley National Laboratory		
Tom Daley	Co-PI	Geophysics, crosshole and CASSM data
Barry Freifeld	Co-PI	Mechanical engineering, U-Tube
T.Birdie Consulting		
Trilobite Testing, Inc.		

IMPACT

The response of the CO_2-EOR has been successful. Downhole pressure monitoring is important in validating hypotheses to explain the effects of large scale injection. All of information requested EPA by has been submitted for the application of a Class VI injection permit.

CHANGES/PROBLEMS

P.I. Lynn Watney has been away since November 1, 2016 due to an illness. He is expected to return to the office in early April 2017. During this period of time Jason Rush (Joint PI) will

fulfill the obligations of the project P.I. Lynn Watney has forwarded all files relevant to the project to the joint P.I., which includes draft reports, memos, and proposals related to the project. Funds are very tight due to the no cost time extensions necessary to permit review and response to for the Class VI permit.

BUDGETARY INFORMATION

Cost Status Report

Budget Category	NCE #1 9/1/15 - 11/30/15 Actual	NCE #2 12/1/15 - 2/29/16 Actual	NCE #3 3/1/16 - 9/30/16 Actual	NCE #4 10/1/16 - 1/18/17 Actual	NCE #4 1/19/17 - 3/31/17 Projection	09/1/14 - 03/31/17 TOTAL
11002-Unclas Sal	39,213.00	50,741.52	133,289.35	46,207.50	22,243.17	349,534.82
11003-Key Salary	20,761.72	34,405.15	51,607.71	5,338.73	2,324.91	142,021.63
11006-Statebonus			-			-
11101-Stud Salar	9,517.10	10,675.00	8,815.39	329.00	2,868.88	52,110.37
11701-Fringe	16,912.21	24,635.35	51,003.24	13,939.81	-	131,310.77
12001-Sup & Exp	101.75	2,473.56	120.76	-	-	16,147.71
12002-Other Exp	428.60	8,010.14	4,071.41	50,539.03	14,940.00	81,618.44
Other	*31.00*	*6,804.53*	*1,659.11*			*8,692.51*
Verizon	*397.60*	*1,205.61*	*2,412.30*	*2,022.03*	*2,940.00*	*12,408.93*
FairfieldNodal						-
Trilobite Testing				*3,000.00*	*12,000.00*	*15,000.00*
Paragon				*45,517.00*		*45,517.00*
13001-Dom Travel	7,034.79	780.84	(491.15)	836.07	2,500.00	18,443.08
14001-Equipment			-			-
19000-Fac & Adm	30,932.02	27,747.67	64,588.36	30,469.44	11,668.01	218,708.80
19001&12003-Subs	107,387.37	119,260.80	2,758,183.88	166,161.02	125,045.00	3,994,650.55
Berexco	*62,737.99*	*112,800.60*	*2,681,890.71*	*164,536.02*	*120,000.00*	*3,746,553.62*
TBirde	*33,995.00*	*6,460.00*	*46,865.00*	*1,625.00*	*5,045.00*	*181,513.18*
KSU	*10,654.38*		*29,428.47*			*66,584.05*
LBNL						-
19003-Tuit No Fa	6,942.20		2,089.04	-	4,010.00	17,530.36
Total DOE	**239,230.76**	**278,730.03**	**3,073,277.99**	**313,821**	**185,600**	**5,022,077**
Cost Share						
11002-Unclas Sal			36,785.52			36,786
11003-Key Salary			18,982.16			18,982
11701-Fringe			15,434.23			15,434
19000-Fac & Adm			-			-
19006-Nonku Cs			-			1,563,073
Total Cost Share	-	-	71,201.91	-	-	1,634,275
% Cost Share						
Grand Total	239,230.76	278,730.03	3,144,479.90	313,821	185,600	6,656,352