


RESEARCH PERFORMANCE PROGRESS REPORT

1. COVER PAGE DATA ELEMENTS: Mandatory

Federal Agency and Organization Element to Which Report is Submitted	U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL)
Federal Grant or Other Identifying Number Assigned by Agency	DE-FE0029085
Project Title	Long-Term Methane Emissions Rate Quantification and Alert System for Natural Gas Storage Wells and Fields
PI Name, Title and Contact Information	Ann P. Smith, Vice President apsmith@gsi-net.com; 512.346.4474
Submission Date	July 27, 2017
DUNS Number	181780776
Recipient Organization	GSI Environmental Inc. 9600 Great Hills Trail, Suite 350E Austin, Texas 78759
Project Period	October 1, 2016 to May 31, 2019
Reporting Period End Date	June 30, 2017
Report Term or Frequency	Quarterly
Signature of Submitting Official	

2. ACCOMPLISHMENTS: Mandatory

a) What are the major goals of the project?

The primary goal of the project is to employ a novel combination of complementary measurement methods and technologies to detect and accurately quantify average annual methane emissions from underground natural gas storage facilities, including from above-ground equipment leaks plus seepage at the ground surface from underground leaks.

b) What was accomplished under these goals?

All project goals for the third quarter (Q3) reporting period of April 2017 – June 2017 were met. A summary of the activities performed to achieve project goals during Q3 is included below.

Secretary Perry: A brief meeting was held with Secretary Perry on April 27th, 2017 in Dallas, Texas during the Earth Day celebration. The importance of measuring product loss was discussed. DOE project flyers were left with Secretary Perry and his staff for dissemination.

EFD Sponsors Meeting: A presentation was given in the Woodlands, Texas on April 25th, 2017 that included a discussion on project accomplishments and

challenges. Attendees included representatives from Shell, Chevron, HARC, RPSEA, and multiple universities.

AUVSI XPONENTIAL Conference and Tradefair: A presentation was given on May 10th in Dallas Texas that included a discussion on sampling technologies used in field programs and how automation could improve the accuracy of data collected. 23 attendees attended the presentation.

TCEQ Trade Fair: Meetings were held with TCEQ Commissioners on May 16th and 17th regarding the value of the DOE projects. Texas Commissioners included Bryan Shaw, Toby Baker and Jon Niermann, as well as retired Commissioners Ralph Marquez and Kathleen White.

Completion of Field Campaign 1 and Preliminary Data Analysis: During Budget Period 1, GSI completed the first field campaign at 52 gas storage wells in 3 facilities in the Gulf Coast Region and Utah. We conducted emissions measurements, counted surface infrastructure components, and collected activity data and/or quantified component-specific leak rates, ground level seeps and ambient air concentrations from >1600 components. Preliminary results will be discussed, project status will be updated and justification to proceed with funding for Budget Period 2 will be provided.

c) What opportunities for training and professional development has the project provided?

Interns from Queens University and the University of Texas at Austin were trained in data collection techniques in the field and data analysis of high flow and OP-FTIR data.

d) How have the results been disseminated to communities of interest?

Field activities were shared real-time and immediately following completion of field programs with operators and the DOE Project Manager. Preliminary results from field campaign 1 were discussed with the operators and project team members.

Presentations and/or meetings regarding the project have been conducted at 4 separate events that included attendance from industry, academia, trade organizations, and interested individuals.

e) What do you plan to do during the next reporting period to accomplish the goals?

Results from the initial field program will be analyzed to develop preliminary emissions estimates from storage wells and disaggregated components. Planning will commence for implementation of the flux chamber/in-ground sensors field campaign to commence as early as possible in October 2017.

A continuation application will be developed and submitted in accordance with the SOPO, and the GO/NO GO decision point will be evaluated by DOE NETL representatives.

DOE Phase 1 Report Meeting: A webex will be hosted on July 13th to detail achievements of field programs and preliminary data analysis and discuss deliverables for Phase 1 with DOE HQ and NETL representatives . Project status/progress, and results will be presented and the completion of decision point criteria will be discussed to support the request to proceed with funding for Budget Period 2.

3. PRODUCTS: Mandatory

a) Publications, conference papers, and presentations

i. Journal publications.

Not Applicable during this reporting period.

ii. Books or other non-periodical, one-time publications.

Not Applicable during this reporting period.

iii. Other publications, conference papers and presentations.

EFD Sponsors Meeting: A presentation was given in the Woodlands, Texas on April 25th, 2017 that included a discussion on project accomplishments and challenges. Attendees included representatives from Shell, Chevron, HARC, RPSEA, and multiple universities.

AUVSI XPONENTIAL Conference and Tradefair: A presentation was given on May 10th in Dallas Texas that included a discussion on sampling technologies used in field programs and how automation could improve the accuracy of data collected. 23 attendees attended the presentation.

b) Website(s) or other Internet site(s)

Not Applicable during this reporting period.

c) Technologies or techniques

Not Applicable during this reporting period.

d) Inventions, patent applications, and/or licenses

Not Applicable during this reporting period.

e) Other products

Not Applicable during this reporting period.

4. PARTICIPANTS & OTHER COLLABORATING ORGNIZATIONS: Optional

a) What individuals have worked on the project?

Name:	Richard L. Bowers
Project Role:	Co-Principal Investigator
Nearest Person Month Worked:	0.5
Contribution to the Project:	Developed project deliverables and coordinated field activities with project partners.
Funding Support	None
Collaborated with individual in foreign country:	No
Travelled to foreign country:	No

Name:	Cole Van De Ven
Project Role:	Technical Field Team Member
Nearest Person Month Worked:	0.5
Contribution to the Project:	Data Validation and Analysis
Funding Support	None
Collaborated with individual in foreign country:	No
Travelled to foreign country:	No

b) What other organizations have been involved as partners?

Organization Name:	Utah State University
Location of Organization:	Vernal, Utah
Partner's contribution to the project:	Subcontractor leading effort to collect gas emission samples during field trials.
Financial Support:	None
In-kind Support:	None
Facilities	Labs at Bingham Research Center, Utah State University, Vernal, UT; mobile hi-flow sampler and trailer
Collaborative Research	None
Personnel Exchanges:	None
More detail on partner and contribution:	None

Organization Name:	Houston Advanced Research Center (HARC)
Location of Organization:	The Woodlands, Texas
Partner's contribution to the project:	Assisted with efforts to coordinate TASC participation.
Financial Support:	None
In-kind Support:	None
Facilities	HARC Labs in the Woodlands, TX
Collaborative Research	None
Personnel Exchanges:	None
More detail on partner and contribution:	None

Organization Name:	Colorado State University
Location of Organization:	Fort Collins, Colorado
Partner's contribution to the project:	Subcontractor assisting in effort to design underground sensor network for high resolution leak monitoring.
Financial Support:	None
In-kind Support:	None
Facilities	CSU Labs in Fort Collins, Colorado
Collaborative Research	None
Personnel Exchanges:	None
More detail on partner and contribution:	None

c) Have other collaborators or contacts been involved?

Not Applicable during this reporting period.

5. IMPACT: Optional

a) What is the impact on the development of the principal discipline(s) of the project?

Preliminary results from methane emissions monitoring at gas storage wells and their components is improving understanding of sources, emissions rates and influences of activity data (e.g., production rates, equipment size and age, component type).

b) What is the impact on other disciplines?

Preliminary results may lead to better analysis and understanding of emissions from comparable systems (e.g., marginal and non-marginal producing wells).

c) What is the impact on the development of human resources?

Not applicable during this reporting period.

d) What is the impact on physical, institutional, and information resources that form infrastructure?

Not applicable during this reporting period.

e) What is the impact on technology transfer?

Technology transfer is being consistently performed throughout the project via TASC meetings, focused group meetings with team members and operators, conferences and workshops. These technology transfer activities improve labor skills of participating engineering and scientific companies and increase managerial education and project efficiency by getting real-time feedback on sampling protocols and data analysis.

f) What is the impact on society beyond science and technology?

Better understanding of air emissions sources reduces environmental impacts and minimizes loss to the industry.

g) What dollar amount of the award's budget is being spent in foreign country(ies)?

None.

6. CHANGES/PROBLEMS: Mandatory

a) Changes in approach and reasons for change

Not applicable during this reporting period.

b) Actual or anticipated problems or delays and actions or plans to resolve them

Not applicable during this reporting period.

c) Changes that have a significant impact on expenditures

Not applicable during this reporting period.

d) Significant changes in use or care of human subjects, vertebrate animals, and/or Biohazards

Not Applicable to this Award.

e) Change of primary performance site location from that originally proposed

Not applicable during this reporting period.

7. SPECIAL REPORTING REQUIREMENTS: Mandatory

Not applicable during this reporting period.

8. BUDGETARY INFORMATION: Mandatory

A Cost Status Report is included as Attachment 1. In addition, graphs depicting the status of the budgeted versus cumulative costs of the overall project, technical transfer and cost share are included at Attachment 2.

Research Performance Progress Report

Attachment 1: Cost Plan/Status

DE-FE0029085: Long-Term Methane Emissions Rate Quantification and Alert System for Natural Gas Storage Wells and Fields

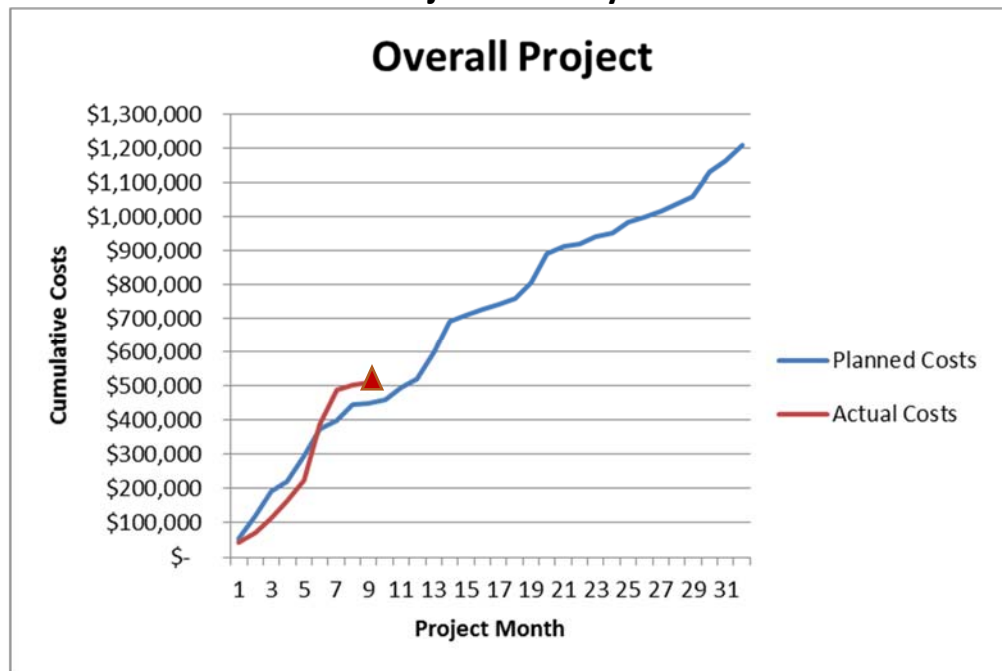
Baseline Reporting Quarter	Budget Period 1								Budget Period 2								Budget Period 3					
	Q1		Q2		Q3		Q4		Q1		Q2		Q3		Q4		Q1		Q2		Q3 *	
	10/01/2016 - 12/31/2016		01/01/2017 - 03/31/2017		04/01/2017 - 06/30/2017		07/01/2017 - 09/30/2017		10/01/2017 - 12/31/2017		01/01/2018 - 03/31/2018		04/01/2018 - 06/30/2018		07/01/2018 - 09/30/2018		10/01/2018 - 12/31/2018		01/01/2019 - 03/31/2019		04/01/2019 - 06/30/2019	
	Q1	Cumulative Total	Q2	Cumulative Total	Q3	Cumulative Total	Q4	Cumulative Total	Q1	Cumulative Total	Q2	Cumulative Total	Q3	Cumulative Total	Q4	Cumulative Total	Q1	Cumulative Total	Q2	Cumulative Total	Q3	Cumulative Total
Baseline Cost Plan																						
Federal Share	\$ 173,000.00	\$ 173,000.00	\$ 28,000.00	\$ 201,000.00	\$ 151,000.00	\$ 352,000.00	\$ 169,000.00	\$ 521,000.00	\$ 188,645.00	\$ 709,645.00	\$ 49,986.00	\$ 759,631.00	\$ 152,089.00	\$ 911,720.00	\$ 42,367.00	\$ 954,087.00	\$ 63,582.00	\$ 1,017,669.00	\$ 111,628.00	\$ 1,129,297.00	\$ 79,152.00	\$ 1,208,449.00
Non-Federal Share		\$ -	\$ 10,500.00	\$ 10,500.00	\$ 88,000.00	\$ 98,500.00	\$ 32,500.00	\$ 131,000.00	\$ -	\$ 131,000.00	\$ -	\$ 131,000.00	\$ 142,000.00	\$ 273,000.00		\$ 273,000.00	\$ -	\$ 273,000.00	\$ -	\$ 273,000.00	\$ 32,000.00	\$ 305,000.00
Total Planned	\$ 173,000.00	\$ 173,000.00	\$ 38,500.00	\$ 211,500.00	\$ 239,000.00	\$ 450,500.00	\$ 201,500.00	\$ 652,000.00	\$ 188,645.00	\$ 840,645.00	\$ 49,986.00	\$ 890,631.00	\$ 294,089.00	\$ 1,184,720.00	\$ 42,367.00	\$ 1,227,087.00	\$ 63,582.00	\$ 1,290,669.00	\$ 111,628.00	\$ 1,402,297.00	\$ 111,152.00	\$ 1,513,449.00
Actual Incurred Cost																						
Federal Share	\$ 113,409.00	\$ 113,409.00	\$ 274,728.10	\$ 388,137.10	\$ 123,206.81	\$ 511,343.91		\$ 511,343.91		\$ 511,343.91		\$ 511,343.91		\$ 511,343.91		\$ 511,343.91		\$ 511,343.91		\$ 511,343.91		\$ 511,343.91
Non-Federal Share		\$ -	\$ 131,400.00	\$ 131,400.00		\$ 131,400.00		\$ 131,400.00		\$ 131,400.00		\$ 131,400.00		\$ 131,400.00		\$ 131,400.00		\$ 131,400.00		\$ 131,400.00		\$ 131,400.00
Total Incurred Cost	\$ 113,409.00	\$ 113,409.00	\$ 406,128.10	\$ 519,537.10	\$ 123,206.81	\$ 642,743.91	\$ -	\$ 642,743.91	\$ -	\$ 642,743.91	\$ -	\$ 642,743.91	\$ -	\$ 642,743.91	\$ -	\$ 642,743.91	\$ -	\$ 642,743.91	\$ -	\$ 642,743.91	\$ -	\$ 642,743.91
Variance																						
Federal Share	\$ (59,591.00)	\$ (59,591.00)	\$ 246,728.10	\$ 187,137.10	\$ (27,793.19)	\$ 159,343.91		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
Non-Federal Share	\$ -	\$ -	\$ 120,900.00	\$ 120,900.00	\$ (88,000.00)	\$ 32,900.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -
Total Variance	\$ (59,591.00)	\$ (59,591.00)	\$ 367,628.10	\$ 308,037.10	\$ (115,793.19)	\$ 192,243.91	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

* The project end date is May 30, 2019

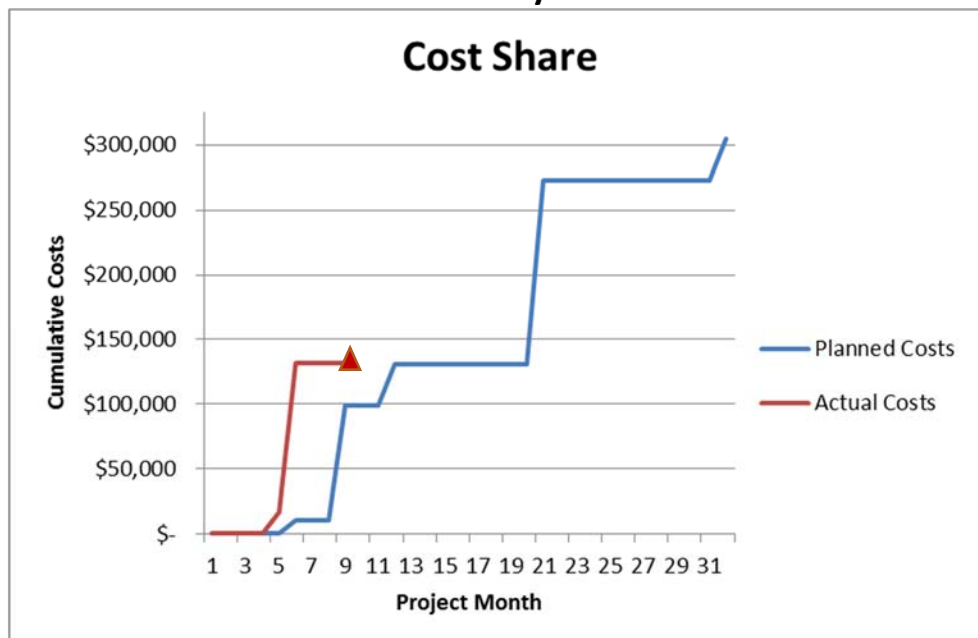
RESEARCH PERFORMANCE PROGRESS REPORT

Attachment 2: Summary Charts of Actual vs. Planned Expenditures DE-FE0029085: Costs through June 30, 2017

Total Project Costs by Month



Cost Share by Month



DE-FE0029085

**Summary Charts of Actual vs. Planned Expenditures
Costs through June 30, 2017, cont.**

Technology Transfer by Month

