

**Scope of Work For**  
**Project 14-023**  
**Assessment of Two Remote Sensing Technologies to Control Flare**  
**Performance**

Prepared for

Air Quality Research Program (AQRP)  
The University of Texas at Austin

by

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1. Establish Industry Advisory Committee (April 2014)

The first task for this project will be to confirm the constitution of the Industry Advisory Committee (IAC) and determine a tentative schedule for periodic teleconferences, which will be the primary manner in which the committee will meet. The IAC will provide input and review at four points in the project: 1) Initially in development of the field test plan, review of the methodology for making the combustion efficiency (CE) reference measurements, and review of the criteria that will be used for evaluating the technologies being tested; 2) Review of the Quality Assurance Project Plan (QAPP); 3) Observation of the Field Tests; and 4) Review of the draft final report. Vincent Torres will have sole responsibility for this task but Tom Edgar and the IAC will also contribute to completion of this task.

2. Conduct Preliminary Site Visit (May-June 2014)

Desirably within the first two months after the start of the project, a site visit to the Petrologistics, LLC plant will be conducted. The purposes of this site visit will be to identify all safety requirements for conducting the field tests at the plant; obtain a better understanding of how measurements of the composition and flow rate of the vent gas are made and their accuracy and how measurements of the steam flow rate are made and their accuracy; determine the range of variation that will be possible for the vent gas flow rate and its composition; identify where the CE reference measurements team will be allowed to operate, where the technologies being evaluated can set up their instrumentation, and where the project team will be housed during the field tests; and identify any other physical, operational or administrative considerations that the project team must consider in developing the field test plan and in preparing the update to Quality Assurance Project Plan (QAPP). Representatives from the technologies being evaluated will also be asked to attend so that they too can obtain information first-hand on the plant configuration that may impact or limit their ability to make CE measurements. Representatives of the IAC and the TCEQ Project Liaison will also be invited to attend the site visit. Vincent Torres will have lead responsibility for this task but Tom Edgar, Jim Thomas and representatives from the IAC, Petrologistics LLC, ARI, LSI and Providence LLC will also participate in this task.

3. Review and Address Challenges in Methodology for Making CE Measurements (June-July 2014)

Due to the height of where the sampling of the flare plume will be made and the variability of the wind flow, there will be challenges in capturing flare plume samples for the CE reference measurements. Therefore, during and immediately after the site visit, members of the project team making the CE reference measurements will use the information obtained during the site visit to define any unanticipated challenges that may impact making the CE reference measurements and how those challenges will be addressed. Based on this assessment, any limitations (frequency of measurements, accuracy of measurements, duration of tests, etc.) in making the CE reference measurements will be defined and this information incorporated into the development of the proposed field test plan and the update to the QAPP. Vincent Torres will have lead coordinating responsibility for this task but ARI will have lead technical responsibility for this task and representatives from the IAC and Petrologistics LLC will also assist in determining solutions to the challenges identified in this task.

4. Preparation of Proposed Field Test Plan (July- August 2014)

After the site visit, a detailed preliminary field test plan will be prepared that defines the tests that will be performed, estimated duration of each test, target vent gas flow rates and compositions as well as corresponding steam assist flow rates, and schedule for night time tests. The CE reference and other flare plume compound measurements that will be made during the field tests will also be specified in the preliminary test plan. The IAC will then be asked to review the preliminary test plan, proposed process and flare plume measurements and measurement approaches, and criteria that will be used for evaluating the technologies being tested. Their input will then be incorporated and a proposed test plan developed along with process and flare plume measurements for the test series proposed. This information will then form the basis of data and information for the update to the QAPP, which will also be reviewed by the IAC. Vincent Torres will have lead responsibility for this task but Tom Edgar, Jim Thomas and representatives from the IAC, Petrologistics LLC, and ARI will also contribute to the completion of the proposed test plan.

5. Update QAPP (June – Early August 2014)

After development of the proposed test plan, the project's Category III QAPP submitted with this work Plan will be updated. This updated QAPP will be delivered approximately four months after this Work Plan is approved. Vincent Torres will have lead responsibility for this task but Tom Edgar, Jim Thomas and representatives from the IAC, Petrologistics LLC, ARI, and Providence LLC will contribute material for and/or review the draft of the QAPP before it is submitted.

6. Plan and Make Arrangements for Logistics Support Needed and Identify Date for Field Tests (August-September 2014)

There will be some logistics preparation required at the plant to support the field tests. This will be primarily to make arrangements to house the project team (trailer with electrical utilities and data communications system for plant vent gas measurement data and CE reference measurements) and to begin identifying potential dates for the field tests. This task will involve coordinating project team members' schedules with available dates at the plant to conduct the field tests. Vincent Torres will have lead responsibility for this task but Jim Thomas will oversee site preparation in coordination with representatives from Petrologistics LLC, ARI, LSI and Providence LLC.

7. Conduct Field Tests (October - November 2014)

For a period of approximately seven days, including set-up and tear-down, the field tests will be conducted at the Petrologistics LLC plant. Representatives of the IAC, including the TCEQ Project Liaison, will be invited to observe the field tests. The field tests will be conducted in a single blind manner, i.e., representatives from the technologies being evaluated will not be provided reference CE or flare plume data for the tests on which they will be evaluated. They will only be provided vent gas flow and composition data. Vincent Torres will have lead responsibility for this task but Tom Edgar, Jim Thomas, a TBD UT employee, and representatives from the IAC, Petrologistics LLC, ARI, LSI and Providence LLC will also participate in this task.

8. Post-Process Field Test Data and Obtain Measurements of Comparison Test Points from Technologies Being Evaluated (December 2014 - February 2015)

Immediately after the field tests, vent gas flow rate data, reference CE and flare plume measurement data, and visual imagery collected during the tests must be validated, catalogued and captured in the project data base. Measurements of CE made by the technologies being evaluated will also be obtained from these project participants. Vincent Torres will have lead coordinating responsibility for this task but Denzil Smith, the Edgar Group, Petrologistics LLC, ARI, LSI and Providence LLC will also post process their own data.

9. Conduct Analysis to compare Measurements from Technologies Being Evaluated (February - March 2015)

Once all validated data have been received, measurements made by the technologies being evaluated will be compared to the CE reference measurements for all valid data points. A statistical analysis of this comparison will be conducted. In addition to this quantitative comparison, a qualitative comparison of factors determined to be critical by the IAC in implementing these technologies will also be conducted and included in the analysis. Vincent Torres will have lead responsibility for this task but representatives from the IAC and ARI will also help define the analysis to be performed. As needed for analysis of video images, Denzil Smith may also be needed for assistance in analyzing video.

10. Prepare Draft Final Report (March - May)

A draft final report will be prepared and submitted to the IAC for review. Input from the IAC will be incorporated in the final report. Vincent Torres will have lead responsibility for this task but Tom Edgar, Jim Thomas and representatives from the IAC, Petrologistics LLC, ARI, LSI and Providence LLC will also review drafts of the final report before it is submitted.

11. Prepare and Submit Final Report (June 2015)

The final report will then be prepared and submitted to the AQRP Project Manager. Vincent Torres will have lead responsibility for this task but Tom Edgar, Jim Thomas and representatives from the IAC, Petrologistics LLC, ARI, LSI and Providence LLC will also participate as needed to complete this task.

**Deliverables**

It is understood that the AQRP requires certain reports (deliverables) to be submitted on a timely basis and at regular intervals. All reports will be written in third person and will follow the State of Texas accessibility requirements as set forth by the Texas State Department of Information Resources. Report templates and accessibility guidelines found on the AQRP website at <http://aqrp.ceer.utexas.edu/> will be followed. The following deliverables will be provided by the project.

**Executive Summary**

The Executive Summary will provide a brief description of the planned project activities, and will be written for a non-technical audience.

Due Date: Friday, May 30, 2014

### Quarterly Reports

The Quarterly Report will provide a summary of the project status for each reporting period. It will be submitted to the TCEQ Project Manager as a Word doc file, not to exceed 2 pages and will be text only. No cover page will be provided. The Quarterly Reports will be provided per the following schedule.

Report	Period Covered	Due Date
Quarterly Report #1	March, April, May 2014	Friday, May 30, 2014
Quarterly Report #2	June, July, August 2014	Friday, August 30, 2014
Quarterly Report #3	September, October, November 2014	Monday, December 1, 2014
Quarterly Report #4	December 2015, January & February 2015	Friday, February 27, 2015
Quarterly Report #5	March, April, May 2015	Friday, May 29, 2015
Quarterly Report #6	June, July, August 2015	Monday, August 31, 2015

### Technical Reports

Technical Reports will be submitted monthly to the TCEQ Project Manager and TCEQ Liaison as a Word doc using the AQRP FY14-15 MTR Template found on the AQRP website. The Technical Reports will be provided per the following schedule.

Report	Period Covered	Due Date
Technical Report #1	Project Start - May 31	Monday, June 9, 2014
Technical Report #2	June 1 - 30, 2014	Tuesday, July 8, 2014
Technical Report #3	July 1 - 31, 2014	Friday, August 8, 2014
Technical Report #4	August 1 - 31, 2014	Monday, September 8, 2014
Technical Report #5	September 1 - 30, 2014	Wednesday, October 8, 2014
Technical Report #6	October 1 - 31, 2014	Monday, November 10, 2014
Technical Report #7	November 1 - 30 2014	Monday, December 8, 2014
Technical Report #8	December 1 - 31, 2014	Thursday, January 8, 2015
Technical Report #9	January 1 - 31, 2015	Monday, February 9, 2015
Technical Report #10	February 1 - 28, 2015	Monday, March 9, 2015
Technical Report #11	March 1 - 31, 2015	Wednesday, April 8, 2015
Technical Report #12	April 1 - 28, 2015	Friday, May 8, 2015
Technical Report #13	May 1 - 31, 2015	Monday, June 8, 2015

## Financial Status Reports

Financial Status Reports will be submitted monthly to the AQRP Grant Manager (Maria Stanzione) by each institution on the project using the AQRP FY14-15 FSR Template found on the AQRP website. The Financial Status Reports will be provided per the following schedule.

Report	Period Covered	Due Date
FSR #1	Project Start - May 31	Monday, June 16, 2014
FSR #2	June 1 - 30, 2014	Tuesday, July 15, 2014
FSR #3	July 1 - 31, 2014	Friday, August 15, 2014
FSR #4	August 1 - 31, 2014	Monday, September 15, 2014
FSR #5	September 1 - 30, 2014	Wednesday, October 15, 2014
FSR #6	October 1 - 31, 2014	Monday, November 17, 2014
FSR #7	November 1 - 30 2014	Monday, December 15, 2014
FSR #8	December 1 - 31, 2014	Thursday, January 15, 2015
FSR #9	January 1 - 31, 2015	Monday, February 16, 2015
FSR #10	February 1 - 28, 2015	Monday, March 16, 2015
FSR #11	March 1 - 31, 2015	Wednesday, April 15, 2015
FSR #12	April 1 - 28, 2015	Friday, May 15, 2015
FSR #13	May 1 - 31, 2015	Monday, June 15, 2015
FSR #14	June 1 - 30, 2015	Wednesday, July 15, 2015
FSR #15	Final FSR	Wednesday, August 15, 2015