

## AQRP Monthly Technical Report

<b>PROJECT TITLE</b>	Evaluating Methods for Determining the Vapor Pressure of Heavy Refinery Liquids	<b>PROJECT #</b>	17-007
<b>PROJECT PARTICIPANTS</b>	UT Austin	<b>DATE SUBMITTED</b>	September 5, 2017
<b>REPORTING PERIOD</b>	<b>From:</b> August 1, 2017 <b>To:</b> August 31, 2017	<b>REPORT #</b>	10

A Financial Status Report (FSR) and Invoice will be submitted separately from each of the Project Participants reflecting charges for this Reporting Period. I understand that the FSR and Invoice are due to the AQRP by the 15<sup>th</sup> of the month following the reporting period shown above.

### Detailed Accomplishments by Task

During the month of August, the project team (PT) made progress on the following activities:

#### **Task 4.2 Project reports and presentation**

The July Monthly Technical Report was prepared and submitted.

#### **Task 4.3 Purchase and receipt of Automated Mini-method Instrument**

No further work performed on this task as it was complete as of the end July 2017.

#### **Task 4.4 Identify labs to conduct the ASTM D2879, E1719, and D323 testing**

No further work performed on this task as it was complete as of the end July 2017.

#### **Task 4.5 Obtain Materials for testing and Material Safety Data Sheets**

No further work performed on this task as it was complete as of the end July 2017.

#### **Task 4.6 Remove Identifying and VP Information from MSDSs, Prepare Samples, and Send First Stage Samples with “Sanitized” MSDSs to Labs for Testing**

No further work performed on this task as it was complete as of the end July 2017.

#### **Task 4.7 For first stage of samples, UT Austin measures VP of materials using Automated Mini-method and reports results; Commercial labs conduct their sample measurements of first stage samples and report results**

The PT continued to have problems with the Grabner instrument. After another replacement unit was received, it too failed by mid August and was returned to Grabner. It is not anticipated that a replacement will be sent or repair of this unit will occur in time to conduct any further measurements with this mini method model.

In conducting a detailed review of the VP measurements of three of the five materials made using the Eralytics instrument, the PT discovered that there were numerous problems with the

measurement results. A hypothesis of each problem was proposed to and investigated/confirmed by the manufacturer. A detailed summary of these problems will be provided in the final report as some were still being confirmed at the end of the month. The nature of the problems appear to be the result of programming errors with the operation of the instrument, the handling of the raw measurements, and curve fitting of the raw VP measurements. After numerous discussions with the Eralytics engineers, it does not appear that the problems with this instrument can be addressed before the project ends. The PT is continuing to analyze the data and will report the results of the analysis and assessment of the measurements in the final report.

**Task 4.8 Conduct study of activity model binary interaction parameters to gain insight into the applicability of using light end composition and Raoult's Law to estimate the vapor pressure of heavy refinery liquids**

No additional work was performed on this task during the reporting period.

**Task 4.9 Analyze and Assess the VP Measurements for First Stage Samples**

The PT began receiving measurement results (one lab) in early August. By the end of the month, results from three of the four labs had been received. As these results have arrived, the PT has performed initial quality assurance to ensure compliance with the purchase order and to ask questions of any data or information reported that was not clear. Preliminary review and analysis of the VP measurements was performed and initial questions of the measurements or measurement conditions have been submitted to the respective lab. Not all replies had been received by the end the month.

**Task 4.10 Remove Identifying and VP Information from MSDSs, Prepare Samples, and Send Second Stage Samples with "Sanitized" MSDSs to Labs for Testing**

There will be no need to conduct this task.

**Task 4.11 For the Second Stage of Samples, Test Samples Using an Automated Mini-method Designed to Measure the VP of Low Volatility Materials (e.g., the Grabner MINIVAP VPXpert-L); Commercial Labs Conduct their Sample Measurements of First Stage Samples and Report Results**

There will be no need to conduct this task.

**Preliminary Analysis**

See the summary of progress for Task 4.7 earlier in this report.

**Data Collected**

Initial VP measurement data were obtained using the Eralytics EV10 instrument. It had not been final QCed at the end of the reporting period.

**Identify Problems or Issues Encountered and Proposed Solutions or Adjustments**

One of the mini method instruments failed a third time in June. A replacement unit was received in late July. This unit failed when used in mid August and was returned to the manufacturer. It is not anticipated that a replacement will be sent or repair of this unit will occur in time to conduct any further measurements with this mini method model.

The PT discovered that there were numerous problems with the Eralytics instrument measurement results. A hypothesis of each problem was proposed to and investigated/confirmed by the manufacturer. A detailed summary of these problems will be provided in the final report

While the PT has encountered challenges using the two mini method instruments in making VP measurements, the information learned and data gathered in assessing these challenges is invaluable. It will provide qualitative results for the project and will contribute greatly to understanding the ability of each instrument as currently configured in making VP measurements in the VP range of heavy liquids and of those specifically used for this project.

**Goals and Anticipated Issues for the Succeeding Reporting Period**

Begin to plan for writing of the project final report.

**Detailed Analysis of the Progress of the Task Order to Date**

**Do you have any publications related to this project currently under development? If so, please provide a working title, and the journals you plan to submit to.**

Yes       No

**Do you have any publications related to this project currently under review by a journal? If so, what is the working title and the journal name? Have you sent a copy of the article to your AQRP Project Manager and your TCEQ Liaison?**

Yes       No

**Do you have any bibliographic publications related to this project that have been published? If so, please list the reference information. List all items for the lifetime of the project.**

Yes       No

**Do you have any presentations related to this project currently under development? If so, please provide working title, and the conference you plan to present it (this does not include presentations for the AQRP Workshop).**

Yes       No

**Do you have any presentations related to this project that have been published? If so, please list reference information. List all items for the lifetime of the project.**

Yes       No

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Submitted to AQRP by  
Principal Investigator Vincent M. Torres