

## 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>	October 5, 2017
<b>REPORTING PERIOD</b>	<b>From:</b> September 1, 2017 <b>To:</b> September 30, 2017	<b>REPORT #</b>	11

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 September, the project team (PT) made progress on the following activities:

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

The August Monthly Technical Report and the Quarterly Report for the period ending August 31 were 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 decided not to attempt to make any further VP pressure measurements with the Eralytics EV10 instrument using the multi-temperature measurement option after confirmation that problems with the instrument’s programming and operation result in measurements that the instrument manufacturer agreed would be incorrect. The decision was made to return the instrument to the manufacturer. The remainder of the month was spent documenting these issues

and planning for their inclusion in the final report. Work continued on documentation of the issues with the Grabner instrument.

**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 received the results of VP measurements from the remainder of the labs. These results were quality control checked, reviewed and analyzed. The preliminary analysis of the commercial lab VP measurements had not been concluded at the end of the month but three of the labs were able to report measurements made using the methods assigned to them. Only one lab could not perform VP measurements using ASTM Method D2879. Further investigation into why this lab could not perform these measurements has not resulted in an explanation that supports their assertion.

**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**

The preliminary analysis of the VP measurements made with the Grabner and Eralytics mini method instruments are complete. In summary, from this analysis it was determined that from the very limited number of measurements conducted using the Grabner instrument, i.e., the instrument failed every time it was used except once, it cannot be determined if it can be used reliably to make accurate measurements of the test materials. The analysis of the Eralytics EV10 instrument confirms that the instrument could make measurements of the VP of the test materials but the accuracy of these measurements could not be verified due to programming and operational problems experienced with the instrument.

Commercial lab results indicate that the methods prescribed can be performed but the PT has not confirmed the accuracy of the measurements.

**Data Collected**

No additional data were obtained during 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 preparing the draft 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