AQRP Monthly Technical Report

PROJECT TITLE	Evaluating Methods for Determining the Vapor Pressure of Heavy Refinery Liquids	**PROJECT #**	16-007
PROJECT PARTICIPANTS	UT Austin	**DATE SUBMITTED**	March 8, 2017
REPORTING PERIOD	**From:** February 1, 2017 **To:** February 28, 2017	**REPORT #**	04

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 15th of the month following the reporting period shown above.

Detailed Accomplishments by Task
During the month of February, the project team (PT) made progress on the following activities:

Task 4.2 Project reports and presentation
The January Monthly Technical Report was prepared and submitted.

Task 4.3 Purchase and receipt of Automated Mini-method Instrument
The PT obtained and reviewed Grabner vapor pressure (VP) measurement results for the No. 6 oil sample the PT sent them last month. These measurements were compared to the measurements made by Eralytics on a sample of material from the same lot. The analysis showed that the results were in relative agreement, which was very encouraging news. However each had employed a different method to make their measurement. Discussions continue regarding provision of one or both company's instruments for the project. The PT asked Eralytics if it would be possible to make VP measurements with their instrument as low as 40 degrees C. They were also asked which solvent they used to clean the instrument between samples.

Task 4.4 Identify labs to conduct the ASTM D2879, E1719, and D323 testing
The PT received a quote from Chilworth for making measurements using Method D2879. The PT determined the tentative list of labs to be used and the cost for making VP measurements by these labs using the appropriate method prescribed.

Task 4.5 Obtain Materials for testing and Material Safety Data Sheets
The PT continued to pursue John McDonald as a source for heavy liquids. We are awaiting receipt of samples ordered (i.e., 2 liters of No. 6 oil and liquid asphalt).

4.6 Remove Identifying and VP Information from MSDSs, Prepare Samples, and Send First Stage Samples with "Sanitized" MSDSs to Labs for Testing
Began assembling the sample-dispensing system and submitted purchase orders for the remaining items needed.

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
No further progress to report on this task.

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
Compared the NIST-modified UNIFAC model VP predictions of the three formulations being considered for our "known" recipe to predictions of the VP of the same three formulations using the Peng-Robinson equation of state model. The analysis of these results is continuing.

Task 4.9 Analyze and Assess the VP Measurements for First Stage Samples
Based on a review of selected research literature to understand water content effects on VP and whether it must be removed for vapor pressure testing, it has been decided to gauge the effect of water on the vapor pressure using the NIST-modified UNIFAC model and the water content in the sample. This requires knowing the water content of the samples, which will be known using the specifications for the materials

Task 4.10 Remove Identifying and VP Information from MSDSs, Prepare Samples, and Send Second Stage Samples with "Sanitized" MSDSs to Labs for Testing
No work performed on 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
No further progress to report on this task.

Preliminary Analysis
None performed during the report period.

Data Collected
None collected during the report period.

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments
The costs for laboratory analysis have increased, five to ten times more that originally quoted at the time of the proposal. If this holds true, fewer materials may have to be used to remain within the project budget allocation.

Goals and Anticipated Issues for the Succeeding Reporting Period
The preliminary indication is that both the Grabner and Eralytics automated mini-vap instrument can be used to measure the vapor pressure of the materials being investigated on this project. If this proves to remain correct, it would be desirable if both instruments could be included in the study. If the cost to do so exceeds the project budget, a decision will need to be made which instrument should be used for the project as each uses a different method to make the VP measurement.

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 __X_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 __X_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 __X_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 __X_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 __X_No

Submitted to AQRP by

Principal Investigator Vincent M. Torres