

## AQRP Monthly Technical Report

<b>PROJECT TITLE</b>	Evaluating Methods for Determining the Vapor Pressure of Heavy Refinery Liquids	<b>PROJECT #</b>	16-007
<b>PROJECT PARTICIPANTS</b>	UT Austin	<b>DATE SUBMITTED</b>	December 9, 2016
<b>REPORTING PERIOD</b>	<b>From:</b> November 3, 2016 <b>To:</b> November 30, 2016	<b>REPORT #</b>	01

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

Project 17-007 Work Plan was approved and a issued a start date of November 3, 2016. During the remainder of November, project personnel made progress on the following activities:

#### **Task 4.1 Prepare and submit Work Plan**

The Work plan was submitted and approved. The project was issued a start date of Nov. 3, 2016. The Team scheduled and began weekly project team calls.

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

The November Quarterly Report was prepared and submitted.

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

The Team discussed and decided it would strengthen the credibility of the project results if the project had a Technical Advisory Committee to provide technical review and comments on certain activities of the project. The Project Principal Investigator (PI) sought and obtained approval to constitute a Technical Advisory Committee, subject to parameters established by AQRP. Prepared a work plan that combines elements of the project SOW with elements of the QAPP and contacted six people (a mix of industry, regulatory personnel, and scientists) to ask them if they would be willing to review the work plan

Arranged for an on-site demonstration of the Grabner minivap instrument using the No. 6 and asphalt samples for December 14 and cleared space in a lab walk-in hood for possible demo test location. Contacted Arash Kiani of Eralytics to arrange on-site demo of their instrument.

**Task 4.4 Identify labs to conduct the ASTM D2879, E1719, and D323 testing** Studied Researched viable sources/databases, including the accreditation agency, which does not have a search-by-method feature, to identify labs accredited for ASTM methods D2879, D323, and E1719 for vapor pressure measurements. Also reviewed CARB Method 310 (an adjunct to D2879), focusing on the de-gassing step, and investigated equipment needed to use CARB 310/ASTM D2879.

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

Began work on identifying sources for the materials that will be used as vapor pressure test samples of heavy refinery liquids for the project. Developed more accurate estimates for the minimum amount of the heavy refinery liquids material that will be needed for each type of material sample. Contacted the EPA about being a potential source for test samples of heavy refinery liquids. Learned that they will not be able to do so. Also contacted John McDonald about providing material for test samples of heavy refinery liquids. Contacted Peter Weaver about sourcing material for test samples of heavy refinery liquids.

Contacted John Molloy at NIST about where the vapor pressure data on the safety data sheet for their No. 6 oil standards came from and about sourcing samples; they sent us some No. 6 oil and put the team in touch with the NIST lead on vapor pressure measurements. Prepared a list of questions for Traci Johnson at IMTT and talked to her and exchanged emails about sourcing material for tests samples of heavy refinery liquids, her experience using the Grabner and an Eralytics instruments to measure the vapor pressure of heavy refinery liquids, and her experience with heated sampling pistons, etc. Obtained initial samples (1 liter) of No. 6 oil and asphalt to use to “test” the ability of the Grabner instrument before proceeding with its purchase. Obtained access to a flammable storage refrigerator for sample storage. Contacted Castrol and Radco about the provenance of their vapor pressure data.

Initiated development of a sample preparation standard operating procedure (SOP) for the heavy refinery liquids. Initiated development of a procedure to prepare a mixture with a “known” vapor pressure similar to the storage vapor pressure of No. 6 oil and liquid asphalt.

#### **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**

Investigated use of the center’s environmental chamber for its potential use as a testing site for the minivap technique.

#### **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**

Initiated development of a spreadsheet version of the NIST-modified UNIFAC model to identify any non idealities in our “known” vapor pressure mixture and also to assess the viability of using GC-MS to quantify the lighter ends in heavy refinery liquids along with Raoult’s Law in order to estimate the vapor pressure of these liquids.

#### **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**

None identified.

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

To schedule a demonstration at UT Austin of the automated mini-vap instrument that will be purchased for the project.

**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