AV-19-14 RFP, Alternative Aviation Fuels-Water Solubility and Demulsiblity Impact

Answers to questions received

1. **Question**: Reference to Section 4.1.3 on p5; Section 4.1.3 is 'missing' in our copy of the RFP document. Has any significant information been omitted?

   Answer: The reference to Section 4.1.3 has been changed to "Phase I".

2. **Question**: Is there a requirement to filter the as-received fuels, eg, to 1 micron or less?

   Answer: Since particles will exert an impact on surface tension and interfacial tension, as part of the method development, the performer should ensure that all fuels and water used for these measurements are free of significant particulate contamination. While it is anticipated that all test fuels will clear and bright, filtration through a 0.45µ nylon microporous filter, using an appropriately Earthed apparatus as for Gravimetric measurements, ASTM D5452, for example, should be adequate to ensure fuel cleanliness.

3. **Question**: Can a KF technique similar but not identical to that described in ASTM D6304 be used?

   Answer: Yes, any method that produces results of equal or greater precision than D6304 can be used, as long as the method used is well documented in the final report.

4. **Question**: Who is responsible for defining the water concentrations to be used in tests? For instance, lower concentrations might be used for Phase I solubility tests than the Phase II demulsibility tests.

   Answer: Water concentrations and procedures will be included in the proposal. However, in general a fuel:water ratio of 1:1 is generally used in demulsibility testing. Water solubility in aviation fuels is shown in the CRC handbook (4^{th} Ed. pp 2-57 to 2-60) to be less than 0.02 volume percent over a temperature range of -10 °C to 80°C.

5. **Question**: How are the results to be presented in the Phase II demulsibility tests if some fuels/blends significantly longer than 8 hours to settle/demulsify?

   Answer: Any settling times of a fuel or blend that does not settle or demulsify in 8 hours should be reported as "> 8 hours"

6. **Question**: Phase III specifies that interfacial tension measurements are obtained over a temperature range of -15°C to +40°C. Since IFT measurements cannot be conducted below 0°C, is this correct ?

   Answer: No, that section of the SOW was rewritten as follows to correct any ambiguities:

   It has previously been established (CRC Aviation Fuel Handbook), that the surface tension of neat petroleum and FT aviation fuels tends to be linearly related to temperature. Measurements of interfacial tension and surface tension will be acquired from these fuel samples at a sufficient number and range of temperatures that adequately establishes their relationships to temperature and water content. Ideally, this would involve measurements at 5 - 10 temperatures over a range from

approximately -15°C to +40°C for surface tension and approximately 4°C to +40°C for interfacial tension. Total number = 78 samples x 5 (minimum) temperatures = 390 for both IFT and ST for a total minimum of 780 determinations.

7. **Question**: Who is responsible for sourcing test fuels?

   Answer: The CRC will source the test fuels as the selection and composition is critical to give an appropriate range of products/chemical compositions for the program. If the CRC is unable to access a particular fuel type through Industry networks, a suitable replacement will be chosen.

8. **Question**: Could a PhD student be employed for part of this test programme to support a PhD, with additional in-depth fuels-related studies?

   Answer: Yes, as long as the work is overseen by a knowledgeable advisor to ensure good experimental technique, accuracy and precision of measurement.

9. **Question**: How rigid are the time elements associated with each phase?

   Answer: The time elements are only suggested, it is the responsibility of the bidder to include their proposed times and costs associated with each program element.

10. **Question**: Would CRC consider allocating different phases of this work to different groups or organizations?

    Answer: The program is structured such that each phase of the program will be accomplished after successful completion of the previous phase. CRC reserves the right to award the later phases to other parties, or change the content based on the results of the earlier phases, if deemed advantageous to do so. The aim is to gain the best technical insight into this important aviation fuel parameter as possible.

11. **Question**: Has a tentative starting date for this work been assigned?

    Answer: No, the applicant can propose a suitable start date. CRC funds would be released to match the proposed timing.

12. **Question**: In costing the proposed work, do you require costs to be shown in US Dollars or £ Sterling?

    Answer: Program costs should be shown in US Dollars.