

Product: **Military Jet A-1**

Sample Location: Tank D  
Laboratory ID: 061719-7879  
Report Date: 6/17/19  
Tank Transfer:

Contract Number: SPE60-18-D-0503 Pipeline  
Crude Processing Technique: SPE602-18-D-0503 Truck  
Crude Oil Source: Atmospheric  
ANSC

| ANALYSIS                                  | RESULT | UNIT           | SPECIFICATION <sup>1</sup> (°F)                                    | METHOD    | CODE   |
|-------------------------------------------|--------|----------------|--------------------------------------------------------------------|-----------|--------|
| <b>APPEARANCE</b>                         |        |                |                                                                    |           |        |
| Visual Inspection @ 20°C                  | pass   | pass/fail      | Visually free of undissolved water, sediment and suspended matter. | D4176     | 030    |
| <b>COMPOSITION</b>                        |        |                |                                                                    |           |        |
| Acid Number                               | 0.021  | mg KOH/g       | 0.10 max                                                           | D3242     | 100C   |
| Aromatics                                 | 20.6   | vol%           | 26.5 max                                                           | D6379     | 110    |
| Sulfur, Mercaptan                         | 0.0008 | mass%          | 0.003 max                                                          | D3227     | 130    |
| Sulfur, Total                             | 0.096  | mass%          | 0.3 max                                                            | D4294     | 150F   |
| <b>VOLATILITY</b>                         |        |                |                                                                    |           |        |
| Distillation by Auto                      |        |                |                                                                    | D86       | 200A   |
| Initial Boiling Point                     | 142.7  | °C             | Report                                                             | D86       | 201    |
| 10% Recovered                             | 164.3  | °C             | 205 max (401)                                                      | D86       | 202    |
| 20% Recovered                             | 173.6  | °C             | Report                                                             | D86       | 203    |
| 50% Recovered                             | 202.0  | °C             | Report                                                             | D86       | 204    |
| 90% Recovered                             | 254.9  | °C             | Report                                                             | D86       | 205    |
| Final Boiling Point                       | 273.5  | °C             | 300 max (572)                                                      | D86       | 211    |
| Distillation Residue                      | 1.2    | vol%           | 1.5 max                                                            | D86       | 213    |
| Distillation Loss                         | 0.7    | vol%           | 1.5 max                                                            | D86       | 214    |
| Flash Point (Corrected)                   | 103    | °F             | 100 min                                                            | D56       | 220A   |
| Flash Point (Corrected)                   | 39.5   | °C             | 38 min                                                             | D56       | 220A   |
| API Gravity @ 15.6 °C                     | 42.7   | °API           | 37 min to 51 max                                                   | D4052     | 231B   |
| Density @ 15.6 °C                         | 0.8115 | kg/L           | 0.775 min to 0.840 max                                             | D4052     | 230B   |
| <b>FLUIDITY</b>                           |        |                |                                                                    |           |        |
| Freezing Point                            | -48.1  | °C             | -47 max (-53)                                                      | D7153     | 300E   |
| Viscosity @ -20 °C                        | 4.233  | cSt            | 8.0 max                                                            | D445      | 310A   |
| <b>COMBUSTION</b>                         |        |                |                                                                    |           |        |
| Net Heat of Combustion (Sulfur Corrected) | 43.095 | MJ/kg          | 42.8 min                                                           | D3338     | 400C   |
| Naphthalenes                              | 2.36   | vol%           | 3.0 max                                                            | D1840     | 120    |
| Smoke Point (Manual)                      | 20.0   | mm             | 18.0 min                                                           | D1322     | 420    |
| <b>CORROSION</b>                          |        |                |                                                                    |           |        |
| Copper Strip, 2 h @ 100 °C                | 1a     | Classification | 1 max                                                              | D130      | 500    |
| <b>THERMAL STABILITY</b>                  |        |                |                                                                    |           |        |
| JFTOT (2.5 hours at control temperature)  |        |                |                                                                    |           |        |
| Test Temperature                          | 265    | °C             | 260 min                                                            | D3241     | 600B   |
| Filter Pressure Drop                      | 0.1    | mm Hg          | 25 max                                                             | D3241     | 601A   |
| Tube Deposit Rating                       | <1     | Rating         | <3 max                                                             | D3241     | 602A   |
| <b>CONTAMINANTS</b>                       |        |                |                                                                    |           |        |
| Existent Gum                              | 3      | mg/100 ml      | 7 max                                                              | IP540     | 710A   |
| MSEP-A (Neat)                             | 100    | Rating         | 85 min                                                             | D3948     | 751    |
| MSEP-A (Stadis 450)                       | 89     | Rating         | 70 min                                                             | D3948     | 750    |
| MSEP-A (FSII & 5403)                      | 89     | Rating         | 70 min                                                             | D3948     | 750-17 |
| <b>ADDITIVES</b>                          |        |                |                                                                    |           |        |
| FSII                                      | 0.10   | vol%           | 0.07 min to 0.10 max                                               | D5006     | 830A   |
| Corrosion Inhibitor                       | 16.8   | mg/l           | 12.0 min to 23.0 max                                               | QPL-25017 | 840    |
| Conductivity                              | 97     | pS/m           | 50 min to 600 max                                                  | D2624     | 900    |
| Conductivity Test Temperature             | 22.2   | °C             |                                                                    | D2624     | 901    |

<sup>1</sup> Product will comply with ASTM D1655

**Remarks:**

QAR approves the segregated batch as represented by these test results for DESC procurement.  
All additives injected at point of shipment.

  
QAR DESC/Alaska

  
PSI QC Representative

20 June 2019

6-20-19