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VARIATION OF JP-8 PROPERTIES IN CONUS AND POTENTIAL IMPLICATIONS DURING BLENDING WITH SYNTHETIC PARAFFINIC KEROSENE (SPK)

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For each shipment of military fuel procured in the United States, the location, volume, and chemical and physical properties of the fuel are recorded by the Defense Energy and Support Center (DESC) in the Petroleum Quality Information System (PQIS) database. The availability of Synthetic Paraffinic Kerosene (SPK) produced via the Fischer-Tropsch (FT) process has provided a supplemental domestic fuel source. Due to potential operational issues and limitations in available quantities, it may be necessary to blend the SPK fuel with JP-8 for implementation. In fact, the JP-8 military fuel specification, MIL-DTL-83133F, was recently modified (11 April 2008) to allow blending of up to 50% SPK with a certification JP-8. The resulting mixture must have a minimum aromatic content of 8%, a minimum specific gravity of 0.775 g/mL, and satisfy all other specification requirements.

Recent efforts have focused on identifying the effect of blend percentage on the resulting chemical and physical properties. This allows for safe operability of the aircraft with information about the expected fuel performance. An analysis of the PQIS data was performed in this effort for selected fuel properties to identify time-dependent statistical trends to determine if property values can be predicted in the future. Specifically, the 1999-2006 PQIS data (aromatic content from 1997-2006) were analyzed to determine if the properties of JP-8 fuel vary as a function of years and/or region in which the fuel was procured. Discrete data and trends were examined for the neat JP-8 property values and were used to predict potential changes in properties due to blending with SPK. The purpose of this was to predict the resulting blend properties and maximum allowable percentage of synthetic fuel which could be blended while still satisfying the JP-8 fuel specifications. The poster presentation will detail the statistical analyses performed for each fuel property of interest and discuss potential implications of blending of 50% SPK on resulting fuel properties using the property trends identified.