Fuel Certification and Qualification

Washington, DC
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Panel Session Overview

* Qualification Process Overview
  * Mark Rumizen, FAA
* D4054 Clearinghouse
  * Steve Zabarnick, UDRI
* IH² Candidate Sustainable Alternative Jet Fuel
  * Joanna Bauldreay, Shell
How do we Certify SAJF?

1. FAA Approved Operating Limitations Based on ASTM Fuel Specifications

2. D4054 SAJF Evaluation Process

3. D7566 Drop-In Jet Fuel Spec

4. D1655 = D7566

Conventional Jet Fuel Spec
Drop-In Jet Fuel Spec

New SAFJ Meets Existing Operating Limitations, Therefore Approved to Use on Virtually All Existing Aircraft

Then New SAJF Annex Added to Drop-In Fuel Spec

If New SAJF Meets Conventional Jet Fuel Spec & Properties

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A Decade of Alternative Jet Fuel

- May 24, 2006: CAAFI Established
- June 2009: FT-SPK Annex A1
  - June 2009: ASTM D7566 Issued
- December 2009: ASTM D4054 Issued
- July 2011: HEFA-SPK Annex A2
- November 2015: FT-SPK/A Annex A4
- June 2014: SIP Annex A3
- April 2016: ATJ-SPK Annex A5
  - Isobutanol Feedstock Only
- June 2018: ATJ-SPK Annex A5
  - Ethanol Feedstock Added

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Key Challenge in Process

1. FAA Approved Operating Limitations Based on ASTM Fuel Specifications

2. D4054 SAJF Evaluation Process
   - If New SAJF Meets Conventional Jet Fuel Spec & Properties

3. D7566 Drop-In Jet Fuel Spec
   - Then New SAJF Annex Added to Drop-In Fuel Spec


New SAFJ Meets Existing Operating Limitations, Therefore Approved to Use on Virtually All Existing Aircraft

ASTM D4054 Evaluation Process

Let’s Take a Closer Look at the Evaluation Process
Process Improvement Initiatives

- D4054 Fast Track Annex
- D4054 Clearinghouse
D4054 Fast Track Annex

For SAJF with Conventional Compositions

Compositional and Process Screening Data

Tier 1: Specification Properties
Tier 2: Fit-For-Purpose Properties

Phase 1 ASTM Research Report

Lite Test Program (Tier 1+ Only)

Tier 3: Component/Rig Testing
Tier 4: Engine/APU Testing

Phase 2 ASTM Research Report

Fast Track Research Report

Currently Under Review by ASTM, Expect Approval Early Next Year

ASTM Specification
ASTM Balloting Process

OEM Review & Tier 3 & 4 Requirements
OEM Review & Approval

FAA Review

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D4054 Clearinghouse

Dr. Steven Zabarnick
University of Dayton Research Institute
Candidate Fuels in Queue

Exploratory Discussions

Global BioEnergies?
POET?
SBI BioEnergies?
Vertimas?
GSR/GTI?

Tier 1
- Shell IH²
- IHI Bb-Oil HEFA
- ATJ-SKA (Byogy, Swed Biofuels)
- HDCJ (KiOR) (Inactive)

Tier 2
- HFP-HEFA (Green Diesel)

Tier 3
- Virent SAK
- Virent SK (Inactive)

Tier 4
- ARA CHJ

OEM Review & Approval

FAA Review
- Accept
- Reject
- Re-Eval As Required

ASTM Balloting Process
- ASTM Review
- ASTM Specification

Phase 2 ASTM Research Report

Annex A1 FT-SPK
Annex A2 HEFA
Annex A3 SIP
Annex A4 FT-SKA
Annex A5 ATJ SPK (Isobutanol)

ATJ (Ethanol) added to Annex A5 April 1
Gantt Schedule for Current Fuels

- **ARA Responding to OEM comments on Phase 1 Research Report**
- **Boeing/Neste deciding on future actions in response to OEM comments on Phase 1 Research Report**
- **Virent Responding to OEM comments on Phase 1 Research Report**
- **Awaiting submittal of test fuel to UDRI**
- **Tier 1 & 2 testing initiated, developing NJFCP/Tier 3 Test Plan**