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## Safety 1<sup>st</sup> Alert – Critical Issue – DEF Contamination

Last month, another jet fuel contamination event occurred at an FBO in Southwest Florida. This latest incident marks the third time in 18 months that Diesel Exhaust Fluid, or DEF has contaminated the fuel supply of a jet fuel truck. In all three cases, multiple in-flight engine failures occurred, with the possibility of significant damage to aircraft fuel systems and engines. Fortunately, none of these cases resulted in an aircraft crash.

Following the first contamination incident in late 2017, NATA, through its Safety Committee, reviewed the risk of jet fuel contamination with DEF and created a free DEF Contamination Prevention training course. This most recent incident, however, highlights yet again, just how serious the DEF contamination risk is, and how it is still a very real threat. **FBOs and aircraft operators must be diligent in ensuring that staff are not only properly trained, but that company policies and procedures used to prevent DEF contamination are being followed.**

The following Q & A highlights key information all FBOs and fuel providers should be aware of.

- **What is Diesel Exhaust Fluid (DEF) and what is it used for?**  
DEF is a urea and water-based fluid that is required by federal regulations to be used in the emission reduction systems of modern diesel engine vehicles. DEF is NOT a fuel additive, aviation or otherwise. It is a clear liquid, stored in a specialized tank on the chassis of diesel engine vehicles, that is then injected into the engine exhaust to promote reduction of noxious emissions.
- **How does DEF get into jet fuel?**  
Details of the latest incident are still pending, but in previous incidents, the identified risk involves line service personnel mistaking DEF for Fuel System Icing Inhibitor (FSII, Prist®, Dice® DiEGME) and adding DEF to the FSII storage tanks on mobile refuelers. DEF and FSII are both clear, colorless liquids and if DEF is mistakenly added to a FSII storage tank, contamination can be very difficult, if not impossible to detect.
- **What happens when DEF contaminated jet fuel is delivered to aircraft?**  
Although the exact mechanism is unclear, the urea in DEF reacts with certain jet fuel chemical components to form crystalline deposits in the fuel system. These deposits then flow through the aircraft fuel system and accumulate on fuel filters and other fuel system components which can and has led to inflight engine shutdowns (see figures 1 and 2).



*Figure 1: DEF crystallization on aircraft fuel filter.*



*Figure 2: DEF crystallization in aircraft fuel tank.*

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- **Has there been any guidance from the FAA on the issue of DEF contamination?**  
Yes. Click the links below for more information:  
[SAIB HQ-18-28](#)  
[SAFO 18015](#)
  
  - **What can FBOs and other fuel providers do to reduce the risk of DEF contamination?**  
In addition to the above guidance offered by the FAA, NATA recommends FBOs and other fuel providers reference the Safety 1<sup>st</sup> Operational Best Practice [OBP-36 DEF Handling and Contamination Prevention](#).
  
  - **What should I do if I believe that jet fuel has been contaminated with DEF?**  
Discard any jet fuel that has been removed from an affected aircraft because it is suspected of being contaminated with DEF. The contaminated fuel should not be used on aircraft or other vehicles. NATA recommends that all FBOs and other aviation fuel providers work with their fuel distributor to develop a response protocol to aviation fuel contamination incidents. Such a protocol should include the training needs for FBO staff.
  
  - **How can my team access the free NATA Safety 1<sup>st</sup> DEF Contamination Prevention training?**
    1. Companies that currently use the NATA [Safety 1<sup>st</sup> Training Center](#) can simply assign DEF Contamination Prevention training as they would any other Safety 1<sup>st</sup> course.
    2. Companies that do not currently use the NATA Safety 1<sup>st</sup> program can contact us at [safety1st@nata.aero](mailto:safety1st@nata.aero) for complementary access to the DEF Contamination Prevention training.
    3. We are working on bringing DEF Contamination Prevention training to [www.preventmisfueling.com](http://www.preventmisfueling.com), where NATA currently offers a free Misfueling Prevention training program.

**For more information or for additional questions please contact NATA at [safety1st@nata.aero](mailto:safety1st@nata.aero)**