PRELIMINARY

HM-251 NTSB 4/3/15 LETTER
ENHANCED AFFTAC MODEL RESULTS

NTSB cited a pool fire survival time for a jacketed car without a thermal blanket to be 108 minutes based on the work of the 87.6 task force. This analysis was done prior to March of 2012. Since that time the AFFTAC model has been enhanced as follows:

1. The effects of radiation heat transfer from the insulation jacket to the tank are now accounted for.
2. The pressure relief valve model has been enhanced to reflect lab test results of actual PRD's.
3. The failure model has been enhanced to reflect lab tests of commonly used tank steels at elevated temperatures.
4. A thorough, comprehensive validation study has been completed to confirm AFFTAC is functioning as intended.

This enhanced, and more accurate model, now predicts the following nominal range of survival times for a tank car in a crude oil pool fire, depending on water content:

Non-Jacketed legacy 7/16" tank: 50 – 72 minutes.

Non-jacketed CPC-1232 1/2" tank: 54 – 78 minutes.

Jacketed legacy or CPC-1232 7/16" tank with fiberglass insulation: 134 - 205 minutes.

Jacketed legacy or CPC-1232 7/16" tank with ½" thermal blanket: 320 - 514 minutes.

Baseline propane pressure car with thermal blanket: 136 minutes.

Conditions for all analyses are:

- Tank overturned 120% from upright.
- Tank not mechanically damaged enough to weaken tank shell.
- Commonly applied PRDs available to the tank car industry.

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