

percent (this will establish appropriate maintenance inspection procedures and intervals as required in paragraph III(a) of these special conditions).

(b) The applicant must submit a Monte Carlo analysis that demonstrates that the FRS, when functional, reduces the overall fleet flammability exposure of each fuel tank with an FRS installed for warm day ground and climb phases to a level equal to or less than 3 percent of operational time in each of these phases for the following conditions—

(1) The analysis must use the subset of 80° F and warmer days from the Monte Carlo analyses done for overall performance; and

(2) The flammability exposure must be calculated by comparing the time during ground and climb phases for which the tank was flammable and not inert, with the total time for the ground and climb phases.

(c) The applicant must provide data from ground testing, and flight testing that—

(1) Validate the inputs to the Monte Carlo analysis needed to meet paragraphs II(a), (b), and (c) of these special conditions; and

(2) Substantiate that the NEA distribution is effective at inerting all portions of the tank where the inerting system is needed to show compliance with these paragraphs.

(d) The applicant must validate that the FRS meets the requirements of paragraphs II(a), (b), and (c) of these special conditions with any combination of engine model, engine thrust rating, fuel type, and relevant pneumatic system configuration approved for the airplane.

(e) Sufficient accessibility for maintenance personnel, or the flightcrew, must be provided to FRS status indications that are necessary to meet the reliability requirements of paragraph II(a) of these special conditions.

(f) The access doors and panels to the fuel tanks (including any tanks that communicate with an inerted tank via a vent system), and to any other enclosed areas that could contain NEA in the event of a system failure, must be permanently stenciled, marked, or placarded as appropriate to warn maintenance crews of the presence of a potentially hazardous atmosphere.

(g) Oxygen-enriched air produced by the nitrogen generation system must not create a hazard during normal operating conditions. It must be established that no single failure or malfunction or probable combination of failures will jeopardize the safe operation of the airplane.

III. Maintenance

(a) Airworthiness Limitations must be identified for all maintenance and/or inspection tasks required to identify failures of components within the FRS that are needed to meet paragraphs II(a), (b), and (c) of these special conditions.

(b) The applicant must provide the maintenance procedures that will be necessary and present a design review that identifies any hazardous aspects to be considered during maintenance of the FRS that will be included in the instructions for continued airworthiness (ICA) or appropriate maintenance documents.

(c) To ensure that the implications of component failures affecting the FRS are adequately assessed on an on-going basis, the applicant must—

(1) Demonstrate effective means to ensure collection of FRS reliability data. The means must provide data affecting FRS availability, such as component failures, and the FRS inoperative intervals due to dispatch under the MMEL;

(2) Provide a report to the FAA on a quarterly basis for the first five years of service introduction. After that period, continued quarterly reporting may be replaced with other reliability tracking methods found acceptable to the FAA or eliminated if it is established that the reliability of the FRS meets, and will continue to meet, the exposure requirements of paragraphs II(a) and II(b) of these special conditions;

(3) Provide a report to the validating authorities for a period of at least two years following introduction to service; and

(4) Develop service instructions or revise the applicable airplane manual, per a schedule agreed upon by the FAA, to correct any failures of the FRS that occur in service that could increase the fleet flammability exposure of the tank to more than 3 percent.

Appendix 1

Monte Carlo Analysis

(a) A Monte Carlo analysis must be conducted for the fuel tank under evaluation to determine fleet average flammability exposure for the airplane and fuel type under evaluation. An analysis for a fuel tank is defined in Appendix 2 of these special conditions and must be used as the basis for development of the Monte Carlo analysis to satisfy these special conditions. Parameters used in the Monte Carlo analysis must include:

(1) FRS Performance—as defined by system performance.

(2) Cruise Altitude—as defined by airplane performance.

(3) Cruise Ambient Temperature—as defined in Appendix 2 of these special conditions.

(4) Overnight Temperature Drop—as defined in Appendix 2 of these special conditions.

(5) Flash Point—as defined in Appendix 2 of these special conditions.

(6) Fuel Burn—as defined by airplane performance.

(7) Fuel Load—as defined by airplane performance.

(8) Fuel Transfer—as defined by airplane performance.

(9) Fueling—as defined by airplane performance.

(10) Ground Temperature—as defined in Appendix 2 of these special conditions.

(11) Mach Number—as defined by airplane performance.

(12) Mission Distribution—the applicant must either provide their own data with substantiation or use what is defined in Appendix 2 of these special conditions for mission distribution.

(13) Oxygen Evolution—as defined by airplane performance or as defined in Appendix 2 of these special conditions.

(14) Range—as defined by airplane performance.

(15) Tank Thermal Characteristics—as defined by airplane performance.

(16) Descent Profile Distribution—the applicant must either provide its own fleet representative distribution with substantiation or use a fixed 2500 feet per minute descent rate.

(b) The assumptions for the analysis must include—

(1) Predicted system performance;

(2) Vent losses due to crosswind effects and airplane performance;

(3) Periods when the system is operating properly but fails to inert the tank;

(4) Expected system reliability; and

(5) The MMEL/MEL dispatch inoperative period assumed in the reliability analysis. (60 flight hours must be used for a 10-day MMEL dispatch limit unless an alternative period has been approved by the FAA), including action to be taken when dispatching with the FRS inoperative (*Note:* The actual MMEL dispatch inoperative period data must be included in the engineering reporting requirement of paragraph III(c)(1) of these special conditions);

(6) Possible periods of system inoperability due to latent or known failures, including airplane system shut-downs and failures that could cause the FRS to shut down or become inoperative; and

(7) Affects of failures of the FRS that could increase the flammability of the fuel tank.

(c) The variation assumed in the analysis on each of the parameters (as identified under paragraph (a) of this appendix) that affect flammability must be stated and substantiating data must be included.

Appendix 2

I. Monte Carlo Model

The FAA has developed a Monte Carlo model that can be used to calculate fleet average flammability exposure for a fuel tank in an airplane. The program requires the user to enter the airplane performance data specific to the airplane model being evaluated, such as maximum range, cruise mach number, typical step climb altitudes,