Air Transport Association of America, Inc.

Briefing for

Susan E. Dudley, Administrator,

Office of Information and Regulatory Affairs

April 28, 2008

Flammability Reduction (FR) Proposed Rule

- **Objective: Prevent fuel tank explosions.**
- **Two methods for accomplishing**
  - **Eliminate ignition sources; or**
  - **Eliminate flammable vapors**
- **The proposed rule would reduce the amount of time tanks contain flammable vapors**
  - **Only heated center wing tanks (HCWTs) would require the reduction**

Reduction of Fuel Tank Flammability in Transport Category Airplanes
RIN: 2120-AI23

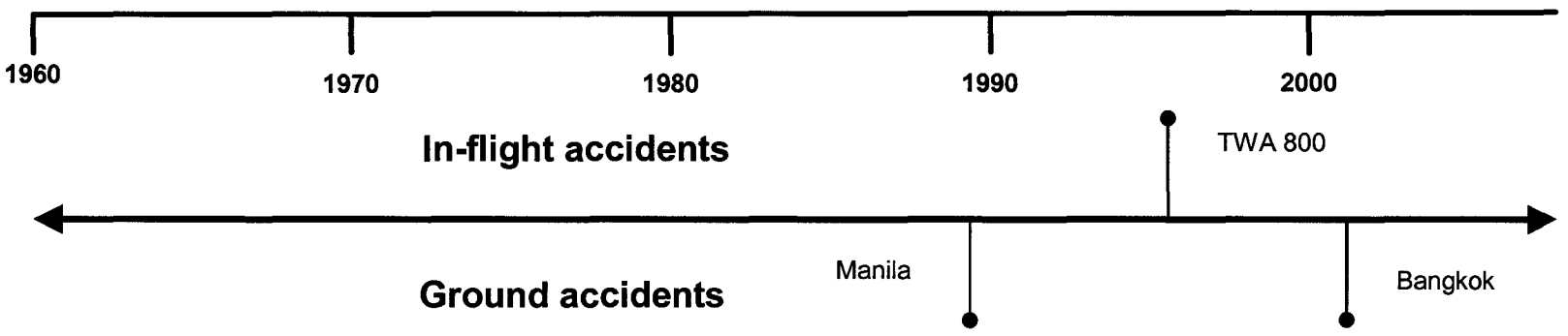
- ATA shares the FAA's goal of improving flight safety, but we cannot support this proposal as written. Existing and planned Ignition Prevention Improvements will reduce the risk of a catastrophic fuel tank explosion to less than one occurrence in one billion flight-hours, which is the FAA's goal.
- Ignition Prevention Improvements alone reduce the risk of a catastrophic fuel tank explosion to the point that it is unlikely one will occur during the operational life of any given airplane type.
- The FAA's safety analysis and benefit-cost analysis are flawed and do not justify this rule. The same errors that invalidate FAA's safety analysis also infect its benefits - cost analysis: even the FAA's own Initial Regulatory Analysis determines the benefits of this rule do not justify the costs.
- OMB should require the FAA to withdraw the proposal because it has not made a "reasoned determination" that the proposal's benefits outweigh its costs.

BCA Key Issues and Variables

- **Proposal is not cost-effective at FAA-assumed accident rate**
- **Not cost-effective after downgrading originally assumed effectiveness of ignition prevention (eg, SFAR 88 - 90% effective)**
- **Not cost-effective assuming any accident is catastrophic**

					B/C Ratios		
Description	Accident Rate (Flight Hours)	Discount Rate	Value of Fatality ($m)	SFAR Effectiveness	Retrofitted	Production	All Aircraft
FAA Base Case	1/60M	7%	$3	50%	59%	66%	62%
Actual rate + one more accident	1/105M	7%	$3	50%	40%	25%	35%
Actual accident rate through 2005	1/140M	7%	$3	50%	34%	12%	26%
Small Aircraft	1/60M	7%	$3	50%	48%	63%	54%
Medium Aircraft	1/60M	7%	$3	50%	89%	0%	89%
Large Aircraft	1/60M	7%	$3	50%	93%	85%	90%
92% in the air	1/60M	7%	$3	50%	55%	61%	57%
84% in the air	1/60M	7%	$3	50%	50%	56%	52%
78% in the air	1/60M	7%	$3	50%	46%	53%	48%
33% in the air	1/60M	7%	$3	50%	24%	26%	25%
200% retrofit costs	1/60M	7%	$3	50%	38%	66%	45%
SFAR 75% Effective	1/60M	7%	$3	75%	29%	33%	31%

Timeline for Heated Center Wing Tank explosions



May 11, 1990, Manila, Philippines Airlines Boeing 737 (on-ground)
July 17, 1996, New York, TWA Boeing 747-100 (in-flight)
March 3, 2001, Bangkok, Thai Airlines Boeing 737 (on-ground)

Fuel pump was dry running in both ground accidents, and may have been in the in-flight loss.

As FAA determined, other documented fuel tank accidents are irrelevant to the proposal – different fuel, other tanks, open tank maintenance, engine separations, etc.

Our estimate of the mean explosion rate without SFAR 88 implementation

- 420 MFH (MFH) for airplanes with HCWTs through 2005.
- Divided by 3 HCWT explosions, this gives 1 in 140 MFH flown; (1 in 420 MFH for "catastrophic" losses).
- Notice of Proposed Rule Making estimate (NPRM) is 1 in 60 MFH which means on the average that 7 in-flight losses would have already occurred.
- 7% chance that the true time between losses is less than 60 MFH (a statistical outlier).
- 93% chance that the estimate is greater than 60 MFH.
- Reportedly revised loss rate is 1 in 100 MFH, which means on the average that 4 in-flight explosions would have already occurred, or up to 5 if current flight data is used.

Assessment of SFAR 88 Effectiveness

- **FAA tasked Sandia with developing a quantitative assessment to:**
  1. **Evaluate the overall and individual effectiveness of ADs associated with SFAR 88;**
  2. **Estimate residual risks after applying these ADs;**
  3. **Compare and evaluate independent safety assessment efforts of original equipment manufacturers (OEMs)**

- **Using quantitative fault tree analysis, Sandia concluded that SFAR 88 ignition source ADs reduced risk of an event by a factor of ten (Sandia 10.0; FAA 1.5)**

Technical Conclusions

- Best estimate for HCWT explosion rate without SFAR 88 implementation is 1:140 MFH.
- Initial NPRM estimate of 1:60 MFH is not realistic – 1:100 MFH more realistic, but still understated
- We agree with Sandia analysis of a factor of 10 reduction in ignition source probability with SFAR 88 implementation.
- Current AD's adequately address dry running fuel pump – tankering and interlocks to shut off pumps.
- Fire Science believes Sandia's analysis is conservative – physics regarding ignition is conservative.
- FAA risk criteria of 1 explosion in 1 billion flight hours is achieved with SFAR 88 implementation and negates the need, expense and potential unknown risk factors for retrofitting fuel tank atmosphere inerting devices in operating commercial aircraft.

Monte Carlo BCA Runs

- Adopting all FAA base case assumptions, the probability that the rule will be cost effective is between 21 and 26%
- At more realistic accident rates, the probability is very low

Case	Accident Rate (Flight Hours)	Probability that B/C Ratio > 1		
		Retrofitted	Production	All Aircraft
1	1/60M	21%	26%	23%
1	1/105M	8%	16%	11%
1	1/140M	5%	12%	8%

Disaggregating the Fleet

- In FAA's Base Case, most of the costs of the rule fall on small aircraft (narrow-bodies) but these aircraft exhibit the lowest return to society

				BENEFITS			COSTS			NET BENEFITS			B/C RATIOS		
Case	Aircraft Size	Accident Rate (Flight Hours)	% in Air	Retrofit	Product.	All Aircraft	Retrofit	Product.	All Aircraft	Retrofit	Product.	All Aircraft	Retrofit	Product.	All Aircraft
1	All	1/60M	100%	320	186	507	531	283	814	(211)	(97)	(307)	60%	66%	62%
1	Small	1/60M	100%	191	148	340	391	238	629	(200)	(90)	(289)	49%	62%	54%
1	Medium	1/60M	100%	60	-	60	67	-	67	(7)	-	(7)	90%	-	90%
1	Large	1/60M	100%	69	38	107	73	45	118	(4)	(7)	(11)	95%	84%	91%

Monte Carlo Runs

- Small aircraft exhibit the lowest probability of payoff to society

Case	Accident Rate (Flight Hours)	Aircraft Size	Probability that B/C Ratio>=1		
			Retrofitted	Production	All Aircraft
1	1/60M	All	21%	26%	23%
1	1/60M	Small	20%	23%	22%
1	1/60M	Medium	21%	0%	21%
1	1/60M	Large	36%	24%	34%

Case	Accident Rate (Flight Hours)	Aircraft Size	Probability that B/C Ratio>=1		
			Retrofitted	Production	All Aircraft
1	1/105M	All	8%	16%	11%
1	1/105M	Small	11%	14%	12%
1	1/105M	Medium	12%	0%	12%
1	1/105M	Large	21%	15%	20%

Case	Accident Rate (Flight Hours)	Aircraft Size	Probability that B/C Ratio>=1		
			Retrofitted	Production	All Aircraft
1	1/140M	All	5%	12%	8%
1	1/140M	Small	8%	10%	8%
1	1/140M	Medium	10%	0%	10%
1	1/140M	Large	16%	12%	15%

Retrofitting New Concepts

- FAA committed to the flammability elimination concept before completing technical and cost studies and before completing SFAR 88
  - ARAC II Report showed inerting clearly not cost-effective
  - FAA adopted SFAR 88
  - FAA also pursued a performance compromise that *reduces* the time the most vulnerable tank is flammable -- effectively a point-design for an isolated event
  - EASA also stated revised inerting still is not cost-effective
- New concepts often are far less effective in retrofit than in production airplanes

Summary

- GRA study showed original proposal not B-C effective: changed projections are in doubt
- Fire Science study indicates ignition prevention measures including SFAR 88 will provide an acceptable level of safety
- Changes to fuel pumps and fuel quantity indicating systems, alone, should provide an acceptable level of safety

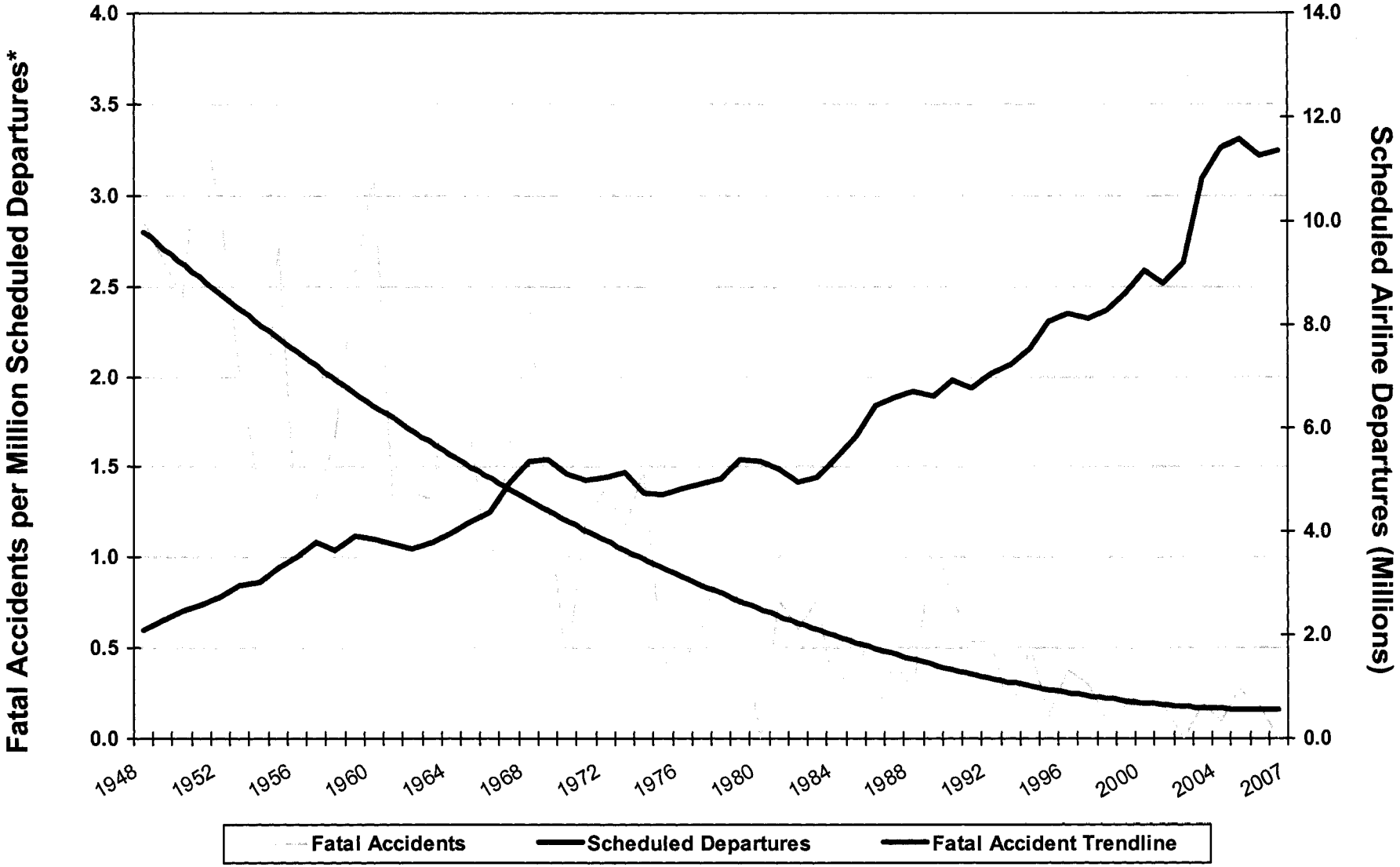
Conclusions

Executive Order (E.O.) 12,866 sets out a number of regulatory principles, to which the FAA has not adhered in this rulemaking.

- **First, "[f]ederal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need...."**
  - **FAA has not established that the NPRM is necessary to improve safety. Existing IPIs have reduced the risk of a catastrophic explosion consistent with FAA's standards.**
- **Second, "[e]ach agency shall assess both the costs and the benefits of the intended regulation and ... propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs."**
  - **The FAA's assessment of the costs and benefits of the NPRM is flawed, and the NPRM does not represent a "reasoned determination" that the proposal's benefits outweigh its costs.**
- **Finally, "[e]ach agency shall base its decision on the best reasonably obtainable scientific, technical, economic, and other information concerning the need for, and consequences of, the intended regulation."**

Neither ATA nor its outside safety and economics experts could reproduce or validate the FAA's Preliminary Regulatory Evaluation. Moreover, the FAA's analysis is inconsistent with the reports of the ARAC Working Groups, which represent some of the best available information concerning the need for the NPRM. For these reasons, the NPRM does not meet E.O. 12886's standards, and it should be withdrawn.

With Each Decade, U.S. Airline Safety Has Improved



* Scheduled passenger and cargo operations of U.S. air carriers operating under 14 CFR 121; NTSB accident rates exclude incidents resulting from illegal acts

Source: National Transportation Safety Board (NTSB)