SFAR 88/Related Operating Rules Special Maintenance Requirements & Compliance Planning Briefing

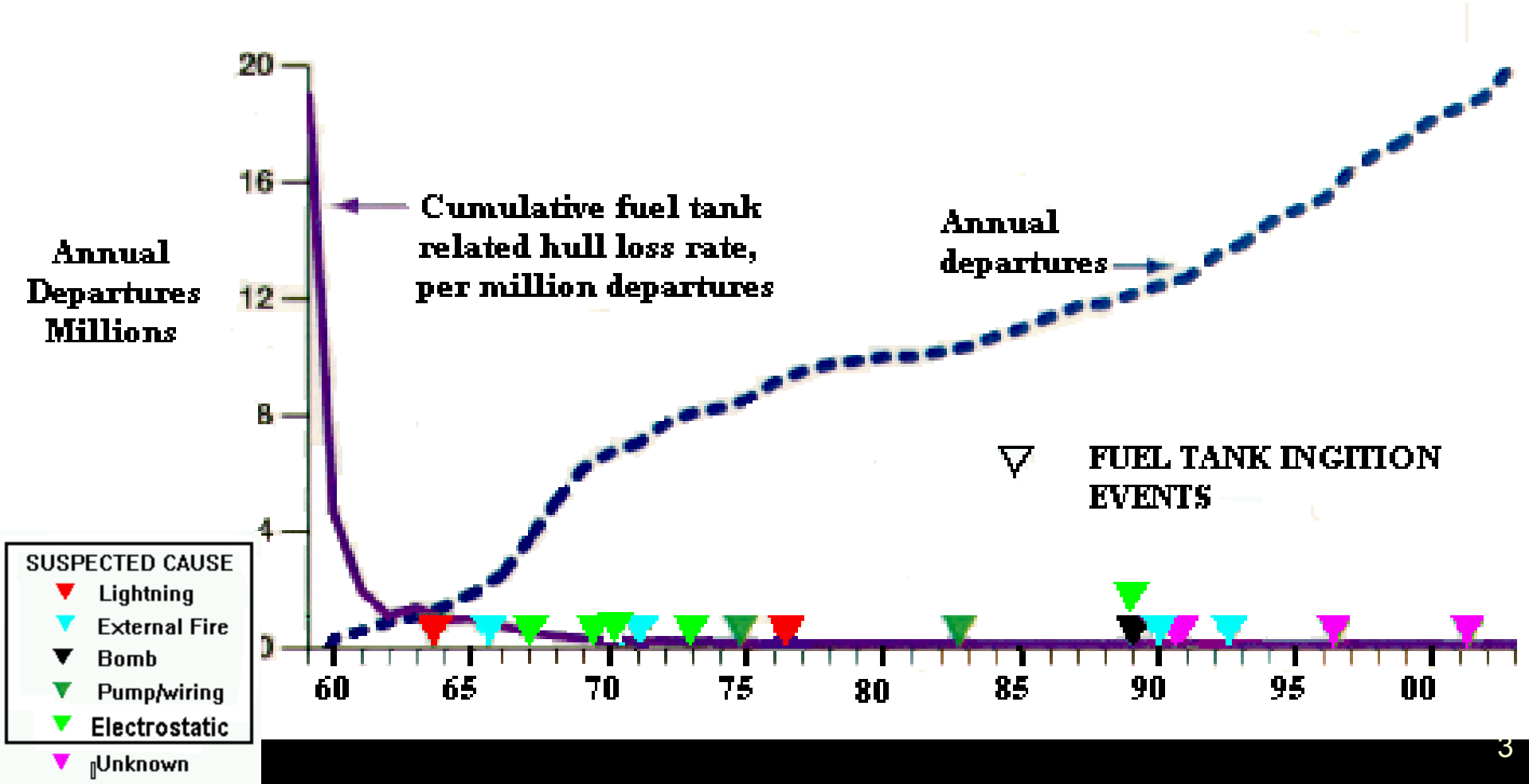
Operators, FAA Inspectors and Engineers

March 13, 2002

Service History Summary (ARAC)

- Since 1959 there have been 17 fuel tank ignition events, resulting in:
  - 542 fatalities,
  - 11 hull losses
  - 3 others with substantial damage
- Causes:
  - 3 unknown
  - 4 caused by external wing fires
  - 4 electrostatics
  - 2 lightning
  - 2 pumps or wiring suspected
  - 1 by small bomb
  - 1 maintenance action.

Chronology of Ignition Events Since 1959



Historical review

- **MILITARY -** 12 hull loss accidents on military version of B-707 and B52 airplanes
  - All tanks fueled with higher volatility JP-4 fuel
    - Military has converted to low volatility JP-8
  - 10 of 12 occurred in body or center wing tanks
  - 7 occurred on ground during refueling or maintenance
  - 5 in flight - specific cause not identified in many incidents- pumps and fuel quantity indicating system (FQIS) wiring suspected
  - Military has imposed new dry run requirements on pumps

KEY COMMERCIAL ACCIDENT SPECIFICS

- **1963 - B-707 Elkton Maryland**
  - 3 year old airplane
  - Empty wing tank explosion
  - JP-4 fuel, approx. 95 degree F ambient temp.
  - 81 fatalities
  - Lightning strike during decent

- **1970 - DC-8 Toronto Canada**
  - Less than 5 year old airplane
  - JP-4 fuel
  - 106 fatalities
  - External fuel fire caused tank explosion

KEY COMMERCIAL ACCIDENT SPECIFICS

- **1974 - B-747-100 Spain- Iranian Air Force**
  - 3 year old airplane
  - Empty wing tank explosion
  - Lightning strike during decent
  - 8 fatalities
  - JP-4 fuel, approx. 95 degree F ambient temp.
  - NO IGNITION SOURCE IDENTIFIED - Three airworthiness directives (AD) issued

- **1989 - B-727-Bogata Columbia**
  - Empty CWT explosion during climb
  - Small bomb placed in carry on in passenger cabin causes tank explosion
  - 107 fatalities
  - Jet-A fuel, approx. 95 degree F ambient temp.

KEY COMMERCIAL ACCIDENT SPECIFICS

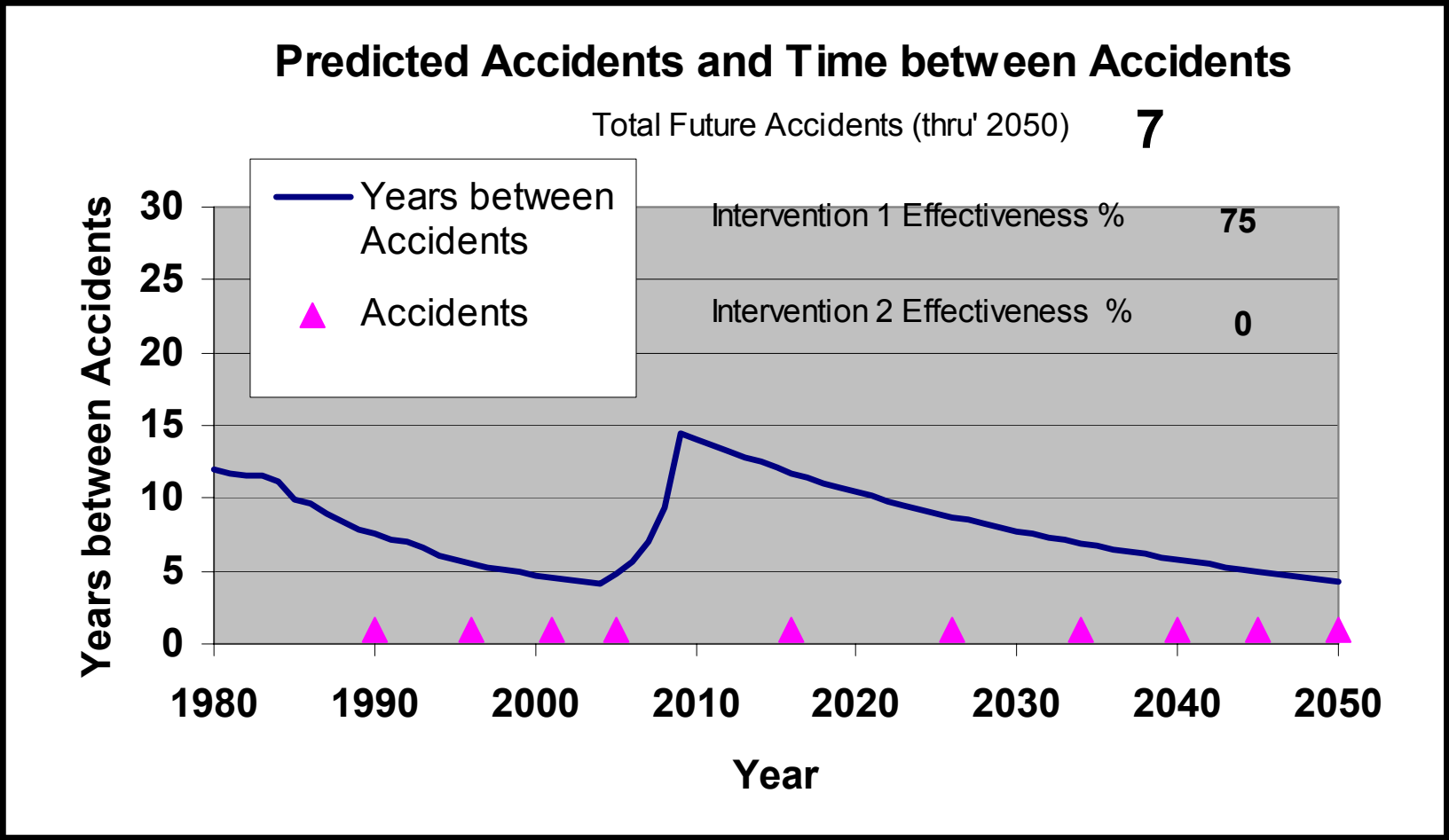
- **1990 - B-737-300 Manila, Philippine**
  - Almost new airplane
  - Empty CWT explosion during pushback from gate
  - CWT pumps operating at time of explosion
  - 8 fatalities
  - Jet-A fuel, approx. 95 degree F ambient temp.
  - NO IGNITION SOURCE IDENTIFIED

- **1996 - B-747, TWA 800, JFK**
  - 25 year old airplane
  - Empty CWT explosion during climb
  - 230 fatalities
  - Jet-A fuel, approx. 120 degree F tank temp.
  - NO IGNITION SOURCE IDENTIFIED

KEY COMMERCIAL ACCIDENT SPECIFICS

- **2001 - B-737-400 Bangkok Thailand**
  - 10 year old airplane
  - Empty CWT explosion minutes after refueling
  - CWT pumps operating at time of explosion
  - 1 fatality
  - Jet-A1 fuel, approx. 97 degree F ambient temp.
  - NO IGNITION SOURCE IDENTIFIED

SFAR Alone (Highest Effectiveness)



FUEL SYSTEM SAFETY COMPLIANCE DATA

Phase One SFAR Rule Implementation

June 6, 2001
SFAR 88 Rule became effective. Applicable TC, STC holders have compliance date of Dec 6, 2002

Phase Two FAR Rule Implementation

June 6, 2001
FAR Parts 25, 91, 121, 125, 129 amended to require instructions for maint and inspection of the fuel tank system be incorporated into the operators maint program and be FAA approved by June 7, 2004

PART 21

-"Certification Procedures for Products and Parts"

Summary

- **Part 21 - Certification Procedures**
  - **New Special Federal Aviation Regulation (SFAR)**
    - **Applies to "the holders of type certificates, and STCs that may affect the fuel tank system of turbine powered transport category airplanes"**
    - **30 passengers or more or**
      - **7500 lbs payload or more, certified after 1/1/58**
    - **Requires fleet review of fuel tank system designs**
      - **Addresses lessons learned**
      - **Demonstrate design precludes ignition sources**
      - **Develop all design changes necessary to meet requirements**
      - **Develop all necessary maintenance and inspection instructions**
      - **Submit a report to ACO**
    - **Compliance time is 18 months after the effective date of the final rule**
      - **For existing certification projects, 18 months after certification date or 18 months after SFAR effective date, whichever is later**

SOME AFFECTED MODELS

A300

A310

A320

A330,340

ATR72, ATR42

B707

B727

B737-100/200,

737-300/400

B737-500,600,700,800

B747-100,-200,/300

DC8

DC9

DC10

MD11

MD80 series

MD90,

B717

B777

B757

B767-200/300ER, -400

F 27

F 28

F50

F100

BAE ATP

BAE 41

BAE 146

747-400

B767-200

EMB 145

Shorts 360

Dornier 328

Brad CRJ

SAAB 340, 2000

Lockheed Electra

L 1011

DHC 7,-8

Part 25 - Airworthiness Standards Amendment 25-102

- Amended § 25.981 Ignition Prevention Requirements
  - New § 25.981(a) & (b) apply to SFAR 88
    - Maintains existing Autoignition Requirements
    - Adds explicit requirements for analysis to demonstrate the design precludes failures that can cause ignition sources
    - Includes a design review (system safety analysis) requirement
      - Maintains powerplant regulation philosophy of considering latent failures
    - Requirement for Instructions for Continued Airworthiness

Amendment 25-102
(Continued)

- New § 25.981(c) Flammability Requirement
  - Minimize development of flammable vapors, OR
  - Mitigate effects of ignition of flammable vapors
    - Based on ARAC recommendation
    - Applies to new designs changes
  - Does **NOT** apply to SFAR 88 design reviews

Amendment 25-102
(Continued)

- Part 25, Appendix H (H25.4) Airworthiness Limitations section.
  - Requires including fuel tank safety limitations in the Instructions for Continued Airworthiness.
  - Revised Appendix H applies to new type design changes through the existing § 21.50, "Instructions for continued airworthiness and manufacturer's maintenance manuals having airworthiness limitations sections."

ICAs

- Revised Appendix H to Part 25 - Instructions for Continued Airworthiness
  - (a) The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth--
  - (1) Each mandatory replacement time, structural inspection interval, and related structural inspection procedures approved under Sec. 25.571; and
  - (2) Each mandatory replacement time, inspection interval, related inspection procedure, and all critical design configuration control limitations approved under Sec. 25.981 for the fuel tank system.

Related Advisory Circulars

- AC's available on the web
  - http://www.faa.gov/avr/air/acs/achome.htm
- AC 25.981-1B: Fuel Tank Ignition Source Prevention Guidelines
  - Acceptable method for demonstrating compliance with ignition prevention requirements
  - Including demonstrating compliance with the SFAR design review
  - Includes a listing of lessons learned
- AC 25.981-2: Fuel Tank Flammability Minimization
  - Acceptable method for the demonstrating compliance with fuel tank flammability requirements

Special Maintenance Program Requirements

- Rules Amended
  - 91.410, 121.370, 125.248 and 129.32
- Applicability
  - turbine-powered transport category airplanes
  - type certificate issued after January 1, 1958,
  - either a maximum type certificated passenger capacity of 30 or more, or a maximum type certificated payload capacity of 7,500 pounds or more

Special Maintenance Requirements

- Instructions for maintenance and inspection (a.k.a. instructions for continued airworthiness (ICA)) of the fuel tank system are required to be incorporated in operator maintenance program by June 7, 2004.
- ICA determination based on design review of the fuel tank system
- ICAs approved by ACO
  - Possible design changes
  - Mandatory inspection/maintenance tasks

Special Maintenance Requirements Driven by the Design Review

- The design review is a failure modes and effects analysis that considers "multiple failures"
  - **Excerpt from § 25.981 Fuel tank ignition prevention Amendment 102**
    - Demonstrating that an ignition source could not result from each single failure, from each single failure in combination with each latent failure condition not shown to be extremely remote, and from all combinations of failures not shown to be extremely improbable.

Vs.

  - MRB use of MSG-3
    - Considers only hidden plus one
  - MRB use of MSG-2
    - Considers only single failures

Special Maintenance Requirements ACO Approved

- Why?
  - Because of the required design review
    - FAA engineering expertise required to review and approve acceptability of analysis
      - Type Certificate (TC) and Supplemental Type Certificate Holders (STC) Holders
  - Interaction of Multiple Configurations
    - 35 transport category models affected
    - 600 plus STCs highly likely to be impacted
    - 20,000 plus STCs less likely to be impacted
    - Operator and/or Airplane specific “actual configuration”

Compliance Planning

- TC and STC Holders' Responsibilities
- Operators' Responsibilities
- Principal Inspectors' Overview and Responsibilities

Compliance Planning
TC/STC Holders

- Provide design review report by 12/6/2002 to ACO that includes:
  - Design changes necessary to comply with SFAR
  - Identification of fuel tank system design features critical to safety.
  - Identification of the appropriate marking for those features so future maintenance actions do not degrade the intended level of safety.
  - All maintenance and inspection instructions necessary to maintain the design features required to preclude the existence or development of an ignition source within the fuel tank system throughout the operational life of the airplane
  - Compatibility of design review required inspection and maintenance
  - Communicate with operators regarding progress of the design review and probable outcomes

Design Review

- The level of evaluation that is intended depends upon the basic design and type of modification. In most cases a simple qualitative evaluation of the design/modification in relation to fuel tank system safety, and a statement to the cognizant ACO that the change has no effect on the fuel tank system safety, would be all that is necessary. In other cases where the initial qualitative assessment shows that there may be an affect on fuel tank system safety, a more detailed design review would be required to substantiation that the airplane fuel tank system design/modifications, including all necessary design changes, meets the requirements of §§ 25.901 and 25.981(a) and (b).

Analysis Considerations

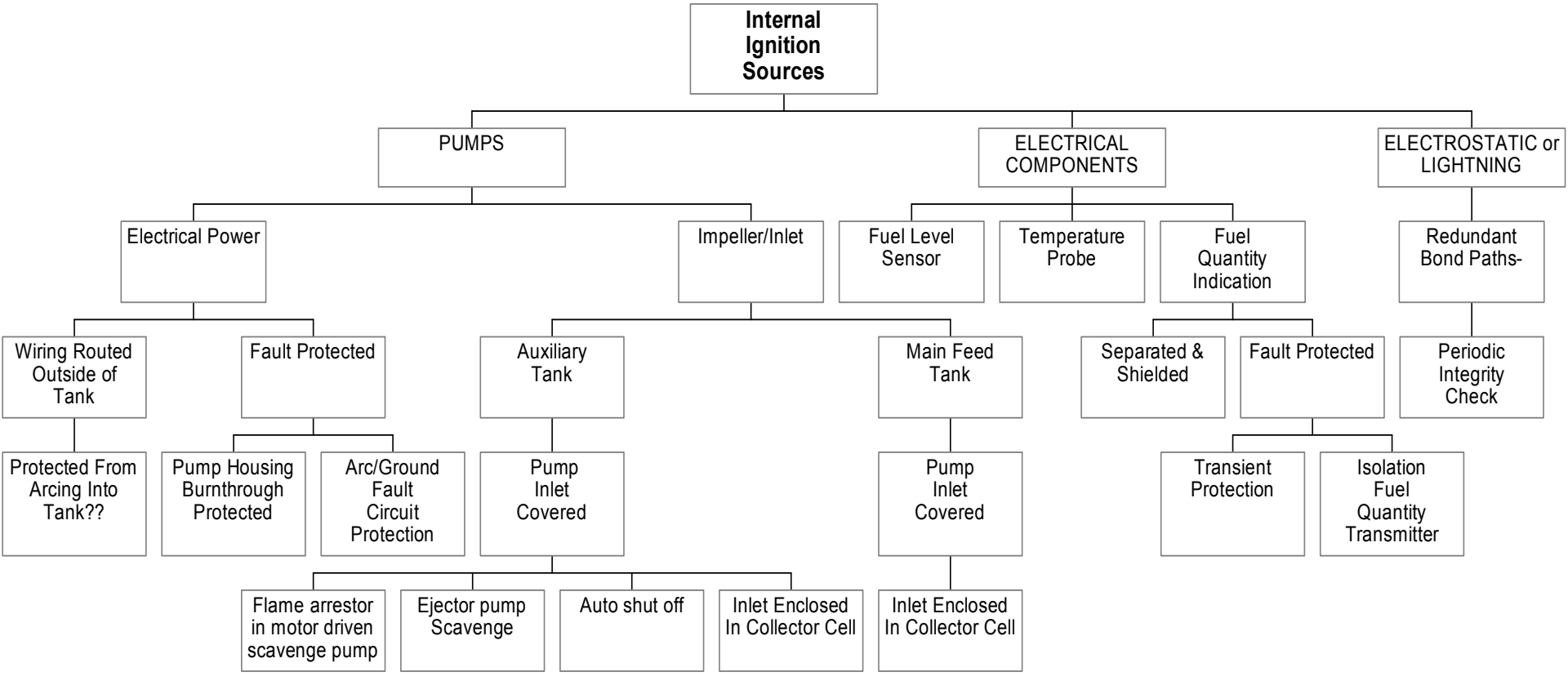
- Qualitative Analysis - Analytical processes that assess system and airplane safety in a subjective non-numerical manner, e.g., development of flightcrew procedures to mitigate inflight failure conditions

- Quantitative Analysis - Analytical processes that apply mathematical methods to assess system and airplane safety, e.g., using failure rate probabilities to determine safety risk

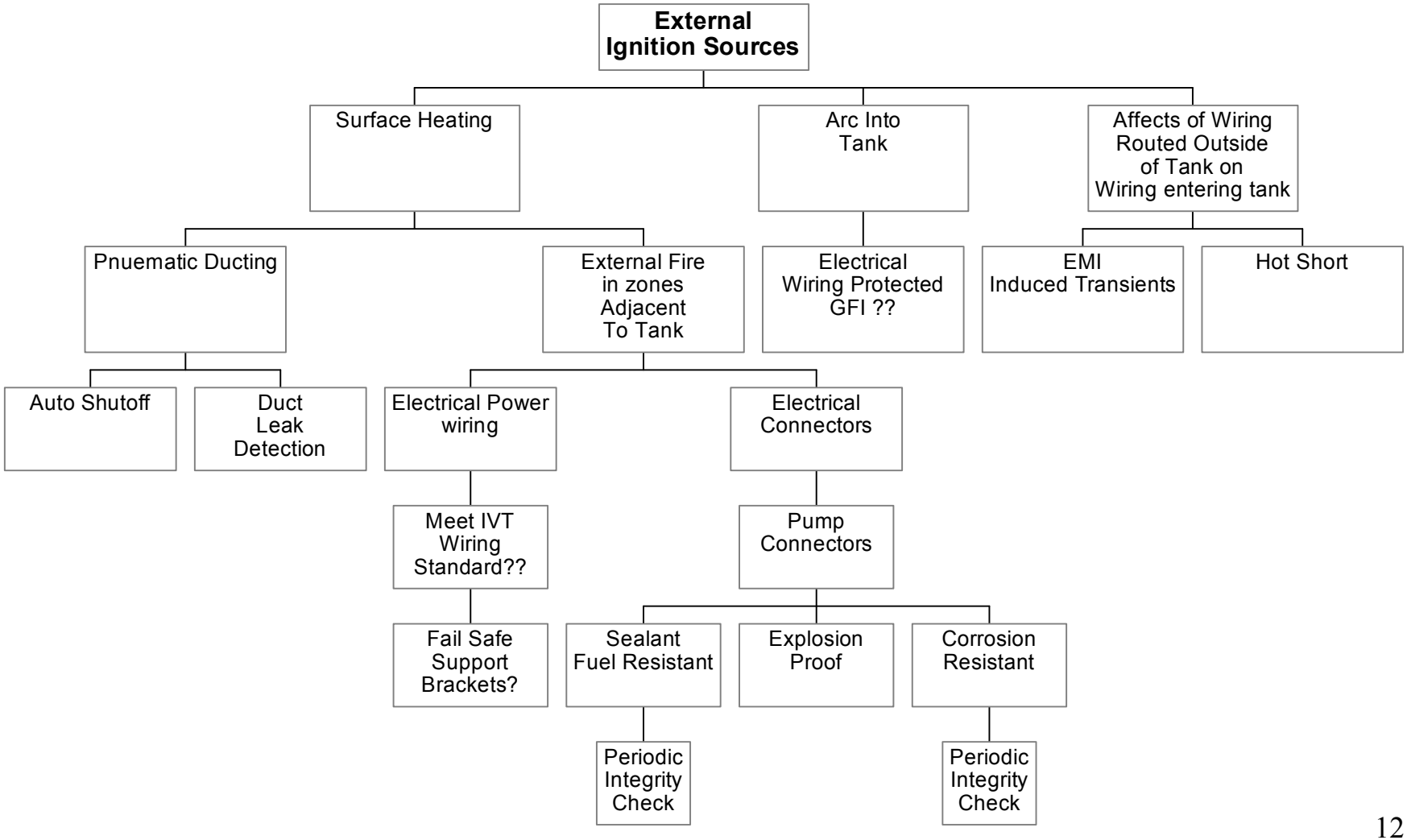
STC Holder Design Review Issue

- STC holder review may be dependent on OEM analysis
  - In some cases information, such as, wire separation standards, utilization of transient suppression devices, identification of critical wiring like FQIS, etc. from OEM is necessary to complete the design review.
  - The STC holder's submittal may include a statement that the STC wiring exceeds intrinsically safe energy levels, describes the voltage and current levels in the wiring during normal and failure conditions and that the wiring was installed per standard wiring practices and may not be separated from fuel tank system wiring. Further, the STC holder would state that the subject wiring must be installed and maintained in accordance with the design standards specified by the OEM. The FAA would find this submittal acceptable for addressing wiring that may be next to or adjacent to the OEM critical wiring.

Fuel Tank Ignition Source Consideration



Fuel Tank Ignition Source Consideration



Modifications that May Affect the Fuel Tank System

- Examples include:
  - Installation of auxiliary fuel tanks
  - Installation of, or modification to, other systems such as the
    - fuel quantity indication system,
    - the fuel pump system (including electrical power supply),
    - airplane refueling system,
    - any electrical wiring routed within or adjacent to the fuel tank, and
    - fuel level sensors or float switches.
  - Modifications to systems or components located outside the fuel tank system may also affect fuel tank safety, e.g.,
    - installation of electrical wiring for other systems that was inappropriately routed with FQIS wiring could violate the wiring separation requirements of the type design

Design Review - Items That May Be Missed

- Not a 25.1309 analysis
- Latent failures must be combined with single failures unless the latent failure probability, considering exposure time and failure rate, is extremely remote (10^{-7}).
- Assumptions:
  - Environmental conditions must be considered to be present (P=1 on a per flight basis). These include lightning, HIRF, etc.
  - Fuel tank and adjacent spaces (e.g. leading and trailing edge, wheel well, pack bays etc.) contain flammable vapor,
  - Foreign object debris (FOD) exists in rotating parts of pumps
  - Undetected FOD exists on fuel tank electrical sensors and circuits (e.g., FQIS probes, etc.)
  - Analysis must consider the operational life of the airplane models, and not just the design life. This was discussed in the preamble to the final rule. (e.g., Long range airplane typically have a life in excess of 100,000 flight hours)

Other Considerations

- The effects of manufacturing variability, aging, wear, corrosion, and likely damage must be considered.
- OEM is responsible for validating vendor analyses.
- Any safety claims for LRUs must be substantiated.
- Consider hazards of sulfur deposits.
- All fuel tank components should be evaluated for silver content.
- Assumptions should be based on overall Lessons Learned by the transport airplane fleet, as stated in the preamble. Lessons Learned should include information from all transport airplane manufacturers experience that is available (e.g., fuel pump). Available sources of Lessons Learned include AC 25.981-1B, the preamble to SFAR 88 and Airplane Fuel System Safety Program report.

Other Considerations - (cont'd)

- Separation and Shielding Approach:
  - Protecting internal fuel tank wiring by separating and shielding wires and circuits outside the fuel tank would require a one time inspection/replacement of fleet wire configuration and condition (all airplanes).
  - Routing some fuel tank wires together with 115v and/or 28v wires is not acceptable for a separation and shielding approach.
  - Visible means should be applied to identify wire separation requirements on airplanes (critical design configuration control limitations).
  - Separation must also be substantiated and maintained in all components parts of the system, including Line Replaceable Units (e.g. FQIS processor etc).
  - Means to assure maintenance errors, such as omission of a bonding strap must be addressed.
  - Consider use of transient suppression devices at or near the fuel tank connections that would eliminate need for one time inspection and rerouting of airplane wires.

Other Considerations - (cont'd)

- Electrical:
  - The FAA believes a redundant bond path will likely be required to address the requirements of the SFAR. OEMs should provide a failsafe bonding design.
  - In some cases electrical bonding jumpers can fail due to corrosion.
  - For electrical or electronic systems that introduce electrical energy into fuel tanks, such as fuel quantity indicating systems, the energy introduced into any fuel tank should be less than 200 microjoules during either normal operation or operation with failures. To ensure that the design has adequate reliability and acceptable maintenance intervals, a factor of safety should be applied to this value when establishing a design limit. For example, a maximum energy of 20 microjoules is considered an intrinsically safe design limit for fuel quantity indicating systems.

Other Considerations - (cont'd)

- Fuel Pumps
  - Dry Running: The existing design, including collector boxes and auto-shutoff features on some airplane models provides some protection from mechanical spark ignition; however, some designs still permit dry running of pumps which does not meet the requirements of the SFAR.
  - Based upon past experience of fuel pump power supply and internal arcing events, the FAA believes protective means will likely be needed on all fuel pumps to satisfy the requirements of the SFAR.

Listing of Deficiencies

- Basis:
  - The following list summarizes fuel tank system design deficiencies, malfunctions, failures, and maintenance-related actions that have been determined through **service experience** to result in a degradation of the safety features of airplane fuel tank systems. This list was developed from service difficulty reports and incident and accident reports. These anomalies occurred on in-service transport category airplanes despite regulations and policies in place to preclude the development of ignition sources within airplane fuel tank systems.

Listing of Deficiencies - cont'd

- Pumps:
  - Ingestion of the pump inducer into the pump impeller and generation of debris into the fuel tank.
  - Pump inlet case degradation, allowing the pump inlet check valve to contact the impeller.
  - Stator winding failures during operation of the fuel pump. Subsequent failure of a second phase of the pump resulting in arcing through the fuel pump housing.
  - Deactivation of thermal protective features incorporated into the windings of pumps due to inappropriate wrapping of the windings.
  - Omission of cooling port tubes between the pump assembly and the pump motor assembly during fuel pump overhaul.
  - Extended dry running of fuel pumps in empty fuel tanks, which was contrary to the manufacturer's recommended procedures.

Listing of Deficiencies - (cont'd)

- Pumps: cont'd
  - Use of steel impellers that may produce sparks if debris enters the pump.
  - Debris lodged inside pumps.
  - Arcing due to the exposure of electrical connections within the pump housing that have been designed with inadequate clearance to the pump cover.
  - Thermal switches resetting over time to a higher trip temperature.
  - Flame arrestors falling out of their respective mounting.
  - Internal wires coming in contact with the pump rotating group, energizing the rotor and arcing at the impeller/adapter interface.
  - Poor bonding across component interfaces.
  - Insufficient' ground fault current protection capability.
  - Poor bonding of components to structure.

Listing of Deficiencies - (cont'd)

- Wiring to pumps in conduits located inside fuel tanks:
  - Wear of Teflon sleeving and wiring insulation allowing arcing from wire through metallic conduits into fuel tanks.
- Fuel pump connectors:
  - Electrical arcing at connections within electrical connectors due to bent pins or corrosion.
  - Fuel leakage and subsequent fuel fire outside of the fuel tank caused by corrosion of electrical connectors inside the pump motor which led to electrical arcing through the connector housing (connector was located outside the fuel tank)
  - Selection of improper materials in connector design.
- FQIS wiring:
  - Degradation of wire insulation (cracking), corrosion and sulfide deposits at electrical connectors
  - Unshielded FQIS wires routed in wire bundles with high voltage wires.

Listing of Deficiencies - (cont'd)

- FQIS Probes:
  - Corrosion and sulfide deposits causing reduced breakdown voltage in FQIS wiring.
  - Terminal block wiring clamp (strain relief) features at electrical connections on fuel probes causing damage to wiring insulation.
  - Contamination in the fuel tanks causing a reduced arc path between FQIS probe walls (steel wool, lock wire, nuts, rivets, bolts; or mechanical impact damage to probes) .

Listing of Deficiencies - (cont'd)

- Bonding straps:
  - Corrosion to bonding straps.
  - Loose or improperly grounded attachment points.
  - Static bonds on fuel tank system plumbing connections inside the fuel tank worn due to mechanical wear of the plumbing from wing movement and corrosion.
  - Electrostatic charge:
  - Use of non-conductive reticulated polyurethane foam that holds electrostatic charge buildup.
  - Spraying of fuel into fuel tanks through inappropriately designed refueling nozzles or pump cooling flow return methods.

Operators' Responsibilities

- Need to identify the TC/STC in the operator's fleet that are impacted by the SFAR
- Contact the applicable certificate holders regarding their progress:
  - In the conduct of the design review
  - Required design modifications and associated maintenance and inspection tasks
- In the event the operator's STC holder(s) is unable or unwilling to provide the required design review, the operator(s), by June 7, 2004, is responsible to conduct the review and determine associated maintenance and inspection tasks for approval and incorporation into its maintenance program.
- Determine Actual Aircraft Configuration:
  - Type design and supplemental type designs including applicable SBs
  - Field approvals, major alterations and repairs

Operators' Responsibilities (cont'd)

- Conduct design review of actual configuration
  - Develop document to substantiate compliance with the SFAR.
  - Identify required maintenance task and inspection intervals for recommendation to FAA for actual configuration of the fuel tank systems of each airplane.
  - Submit the operator's proposed program through the appropriate FAA PMI for review and comments, and routing to the appropriate Transport Airplane Directorate/Aircraft Certification Office (TAD/ACO).
  - Obtain FAA TAD/ACO approval for the operator's program.
  - Incorporate FAA approved maintenance program into the existing operator's program by June 7, 2004.

Operators' Responsibilities (cont'd)

- Conduct design review of actual configuration
  - Develop document to substantiate compliance with the SFAR
  - Identify required maintenance task and inspection intervals for recommendation to FAA
  - Obtain FAA (Transport Airplane Directorate/Aircraft Certification Office) approval for recommendations
  - Obtain PIs' approval for incorporation of required tasks and ICAs into maintenance program
  - Incorporate maintenance program changes by June 7, 2004

Principal Inspector (PI) Overview

- SFAR 88 and related rule amendment oversight by the FAA will require coordination and cooperation by FAA personnel (Flight Standards and Aircraft Certification) as well as the operators.
- The fuel system design review and resulting FAA approved maintenance and inspection program transcends traditional FAA practices by involving FAA engineering specialists in the approval of maintenance programs.
- The PIs must collaborate with their respective operator(s) to maximize the industry's ability to understand this new process and succeed in achieving compliance.

PI Overview (cont'd)

- The complexity of this issue mandates comprehensive surveillance of every facet of the aircraft fuel system:

  Storage

  Distribution

  Indication

  Adjacent Systems

- Consequently, there is no pride of ownership within FAA Flight Standards on this topic.
- The PMI's and PAI's ***must*** collaborate on this issue.

PI Responsibilities

- Contact your operator(s) as soon as practical to discuss SFAR 88 and related rule amendments with them.
- “Encourage” your operator(s) to include the PI’s in all ongoing facets of SFAR 88 and related rule planning and compliance.
- “Encourage” your operator(s) to identify which TC and STC holders may have involvement with their specific aircraft.

PI Responsibilities (cont'd)

- "Encourage" your operator(s) to make contact with those TC and STC holders as soon as practical.
  - Improves awareness of possible design changes
  - Improves awareness of possible maintenance and inspections requirements and their impact
  - Helps early determination of the benefit of design changes on maintenance programs

PI Responsibilities (cont'd)

- Reaffirm to your operator(s) that in the event their STC holder(s) is unable or unwilling to provide the required design review, the operator(s), by June 7, 2004, is responsible to conduct the review and determine associated maintenance and inspection tasks for approval and incorporation into its maintenance program.
- "Encourage" your operator(s) to begin an "Actual Configuration" check of their aircraft as soon as practical.
- Explain to your operator(s) that this check consists of a **records check** to ascertain specific configuration **if the operator(s) records are comprehensive.**

PI Responsibilities (cont'd)

- "Encourage" your operator(s) to "think out of the box" regarding ***any repairs or alterations*** performed via service bulletins, Campaign Fleet Directives, Engineering Orders, etc., that could effect fuel system safety considering SFAR 88, and FAR Part 25 amendments.
- PIs and staff are encouraged to conduct a review of operator's existing maintenance program (operator task cards compared to manufacturer task cards). The review could include onsite surveillance of ongoing heavy maintenance checks.
- Encourage the operator to participate in this review in collaboration with the FAA.

PI Responsibilities (cont'd)

- "Encourage" your operator(s) to develop an enhanced inspection checklist of all fuel tanks and associated plumbing and wiring to be used during "opportunity inspections." Consider "*AC 25.981-1B*" and the transport category airplane "List of Deficiencies".
- "Encourage" your operator(s) to develop a recordkeeping system containing the enhanced in situ inspections and to share the data with the PI's.

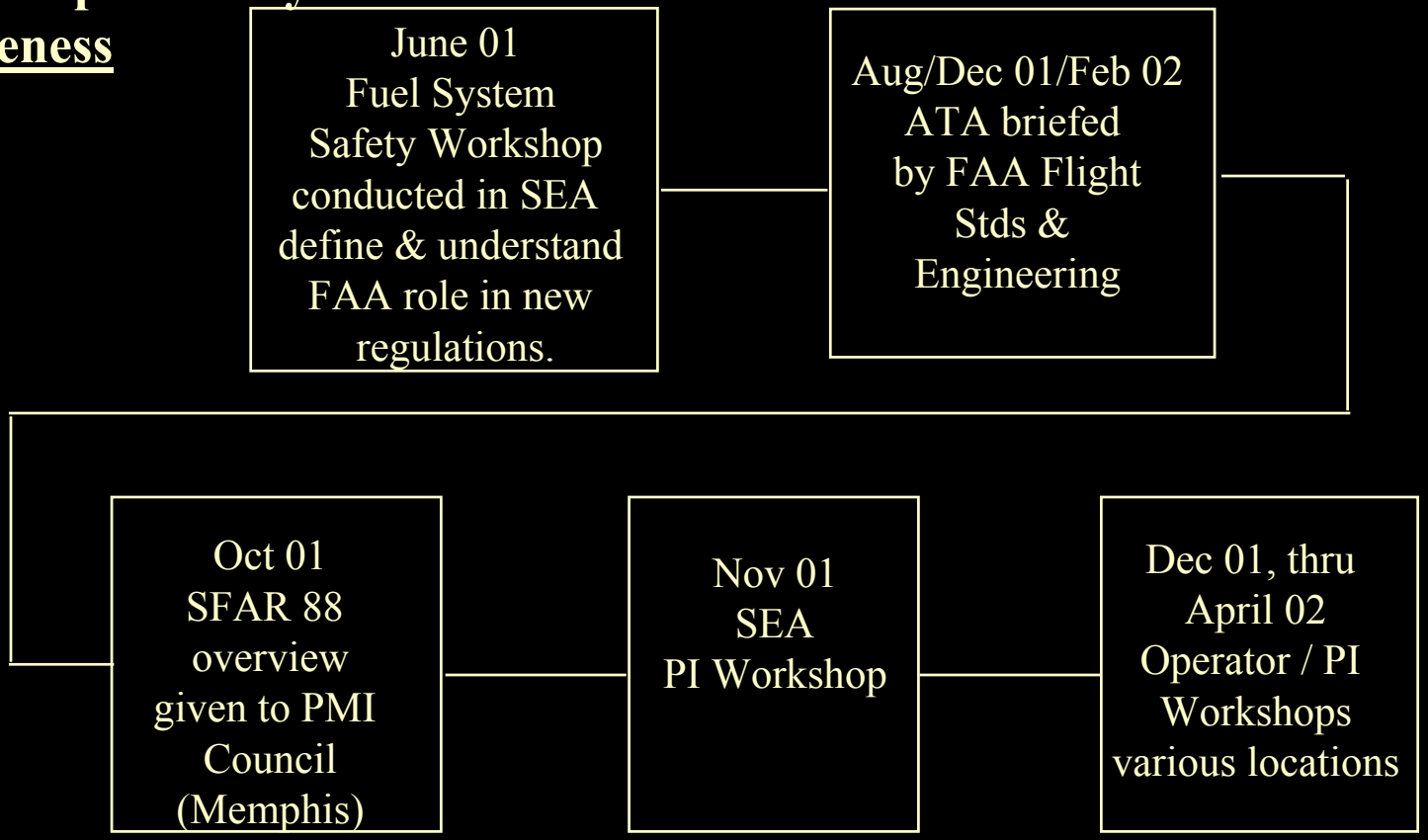
PI Responsibilities (cont'd)

- PIs are encouraged to follow-up operator actions:
  - Determination of Actual Configuration
  - Design Review of the Actual configuration
  - Determination of the Actual configuration required maintenance/inspections
  - Plan for preparation of a report containing the design review analysis and recommendations for maintenance program changes for Aircraft Certification approval
  - Tracking of operator Plan and potential for timely compliance

FUEL SYSTEM SAFETY COMPLIANCE OBJECTIVES

FAA Responsibility

Awareness



OBJECTIVES
cont'd

TC/STC Holders Responsibility
Manufacturer Design Review

TC and STC holders must :
* Continue design reviews
* Contact and coordinate with affected operators of their products
* Communicate with applicable TAD's/ ACO's.
* Provide applicable TAD's/ACO's with completed design reviews by Dec 6, 2002.

Operators Responsibility
Aircraft Configuration Review

Operators must :
* Perform an a/c configuration check to determine which T/C's , STC's are applicable.
* Communicate with applicable T/C/STC holders to develop a plan to incorporate the maint & insp instructions into their maint program.
* Perform their own design review where applicable.
* Communicate with PI's, TAD, ACO's, AEG's.
* Submit their plan through the PI's to the TAD/ACO for approval prior to June 7, 2004

OBJECTIVES
cont'd

FAA
Principal Inspector Responsibility

PI's must:

* Contact operator ASAP to discuss SFAR 88 and FAR amendments
* Provide letter (as follows) to operator detailing PI expectations of compliance planning
* Encourage operator to begin a fleet Aircraft Configuration Check ASAP
* Encourage operator to contact applicable T/C, STC holders ASAP
* Encourage operator to perform enhanced opportunity inspections
* Perform ongoing follow-up surveillance of operator actions

SAMPLE LETTER to OPERATOR

Mr. John Doe
FAA Liaison
ABC Airlines
P.O. Box 123
Anywhere,USA 11552

Dear Mr. Doe:

At the conclusion of a major industry study regarding Fuel System Safety, the FAA has issued amendments to certain transport airplane certification and operating rules that requires affected airplane manufacturers and operators to possibly change how airplane fuel tanks are designed, maintained, and operated. These regulations affect certain airplane models in ABC Airline's current fleet and will have significant impact on ABC Airline's maintenance programs in the future.

This office requests that you review the FAA Federal Register Final Rule Vol. 66, No. 88 dated May 7, 2001, as well as SFAR 88, 14 CFR parts 21,25, 91,121,125, and 129 as applicable. These FAA rules, the most comprehensive fuel tank safety initiative ever put forward demands a **proactive approach** by the Airplane Type Certificate (TC) Holders, Supplemental Type Certificate (STC) holders, the Airplane Operators, and the FAA, both Flight Standards and Aircraft Certification Service.

SAMPLE LETTER to OPERATOR - cont'd

In brief, the applicable TC/STC holders must conduct a one-time design review of the fuel tank system for each transport airplane model in the current fleet to ensure no ignition source may be present at each point in the fuel tank or fuel tank system where catastrophic failure could occur due to ignition of fuel or vapors. These TC/STC holders must then design modifications and specific programs for the maintenance and inspection of the tanks to ensure the continued safety of fuel tank systems. These certificate holders must then submit a report for approval to the cognizant FAA Aircraft Certification Office (ACO), or Transport Airplane Directorate (TAD) by December 6, 2002.

Based on the information provided by the TC/STC holders under the SFAR 88 requirements, **you the operator,** must then develop and implement an FAA approved fuel tank maintenance and inspection program tailored to ABC Airlines specific aircraft. In order for ABC Airline's to develop such programs, an **Actual Aircraft Configuration Check, (includes original equipment manufacturers delivered configuration and subsequent modifications, repairs and field approvals)** must be accomplished on all affected aircraft to determine what specific tasks will be required to ensure the enhanced fuel system safety objectives are met. This configuration check may consist of a records check if records are comprehensive, but must include a system safety analysis of all areas that could adversely affect fuel tank system safety.

SAMPLE LETTER to OPERATOR - cont'd

Examples of possible areas of concern are identified in SFAR 88, its preamble, and FAA Advisory Circulars 25.981-1B and 25.981-2. A specific area that may merit analysis on the part of an operator is: Logo Light STC installations that may have wiring routed alongside FQIS wire bundles, or FQIS wiring harnesses with multiple splices. As detailed in the applicable regulations, ABC Airline's may not operate their affected aircraft after June 7. 2004 without an FAA approved program.

As stated in the applicable § 121.370(b) the operator must submit their proposed maintenance and inspection program through an "appropriate FAA Principal Maintenance Inspector" (PMI) to the cognizant ACO, or TAD office. Due to the fact that this fuel tank safety initiative encompasses storage, distribution, indication, and adjacent systems, avionics oversight by the operator, as well as the FAA is prudent. Consequently, the Principal Avionics Inspector (PAI) in collaboration with the PMI will provide ongoing input, oversight, and final review of ABC Airline's proposed program(s) prior to the ACO, or TAD review, and approval. To meet this deadline, ABC Airline's should submit their program(s) to this office no later than February 7, 2004.

SAMPLE LETTER to OPERATOR - cont'd

We encourage ABC Airlines to contact the affected original and supplemental type certificate holders regarding their determination of modifications and/or maintenance and inspection requirements that result from their safety assessments. This information will be critical to ABC Airline's development of acceptable instructions for continued airworthiness.

We would like to meet with you at your earliest convenience to discuss your present fuel tank system maintenance program(s), as well as the compliance planning measures you anticipate implementing. Additionally, we would like to share with you the expectations this office has regarding status report content and frequency, as mutually agreed upon.

Open communication between ABC Airlines and this office, as always, is of vital importance.

Sincerely,

John Brown
Principal Maintenance Inspector

Jane Jones
Principal Avionics Inspector

QUESTIONS?