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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 121

[Docket No.: FAA–2009–0675; Amendment No. 121–356]

RIN 2120–AJ43

Activation of Ice Protection

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This action revises the operating rules for flight in icing conditions. For certain airplanes certificated for flight in icing, the new standards require either installation of ice detection equipment or changes to the airplane flight manual to ensure timely activation of the airframe ice protection system. This action is the result of information gathered from icing accidents and incidents. It is intended to increase the level of safety when airplanes fly in icing conditions.

DATES: This amendment becomes effective October 21, 2011.

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SUPPLEMENTARY INFORMATION:

Authority for This Rulemaking

The FAA's authority to issue rules on aviation safety is found in Title 49 of the United States Code. Subtitle I, Section 106 describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the agency's authority.

This rulemaking is promulgated under the authority described in Subtitle VII, Part A, Subpart III, Section 44701. Under that section, the FAA is charged with prescribing regulations promoting safe flight of civil aircraft in air commerce by prescribing minimum standards required in the interest of safety for the design and performance of aircraft; regulations and minimum standards of safety for inspecting, servicing, and overhauling aircraft; and regulations for other practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it prescribes new safety standards for the operation of certain airplanes used in air carrier service.

I. Summary of the Final Action

The FAA is creating new regulations in Title 14, Code of Federal Regulations (14 CFR) part 121 (Operating Requirements: Domestic, Flag, and Supplemental Operations) related to the operation of certain transport category airplanes in icing conditions. To improve the safety of these airplanes operating in icing conditions, the new regulations require either installation of ice detection equipment and procedures for its use, or changes to the airplane flight manual (AFM) to ensure timely activation of the airframe ice protection system.

The economic evaluation for the final rule shows that the benefits exceed the costs for the nominal, seven, and three percent present value rates. The estimated benefits are $27.2 million ($16.2 million present value). The total estimated costs are $12.7 million ($6.7 million present value). The following table shows these results.

Part 121 Activation of Ice Protection Adjusted Benefits and Costs ($M)			
		Present Value	
	Total	7%	3%
Benefits	$27.2	$16.2	$21.3
Costs	$12.7	$6.7	$9.4

II. Background

On October 31, 1994, an accident involving an Avions de Transport Regional ATR 72 series airplane occurred in icing conditions. This prompted the FAA to initiate a review of aircraft safety in icing conditions and determine what changes could be made to increase the level of safety. In May 1996, we sponsored the International Conference on Aircraft Inflight Icing, where icing specialists made recommendations for increasing safety. We reviewed these recommendations and developed a comprehensive, multi-year icing plan. The FAA Inflight Aircraft Icing Plan, dated April 1997,[1] described various activities we were considering for improving aircraft safety in icing conditions. In accordance with this plan, we tasked the Aviation Rulemaking Advisory Committee (ARAC) to consider the need for ice detectors or other means to give flightcrews early indication about action required for ice accumulating on critical surfaces of the airplane.[2] The work was carried out by ARAC's Ice Protection Harmonization Working Group (IPHWG). Its recommendations may be found in the docket for this rulemaking (FAA–2009–0675).

A. Summary of the NPRM

On November 23, 2009, the FAA published a notice of proposed rulemaking (NPRM) based on ARAC's recommendations to the FAA (74 FR

[1] FAA Inflight Aircraft Icing Plan, dated April 1997, is available in the Docket.

[2] Published in the **Federal Register** on December 8, 1997 (62 FR 64621).

61055). That NPRM proposed changes to the regulations for operators of certain airplanes certificated for flight in icing conditions that are operated under 14 CFR part 121. It proposed requirements for installation of ice detection equipment and/or changes to the AFM to ensure timely activation of the airframe ice protection system. The comment period for that NPRM closed on February 22, 2010.

B. Definitions

An appendix to the preamble of this rule gives definitions of the terms used here.

C. Related Activity

The FAA is currently engaged in rulemaking that would require operators of airplanes to exit icing conditions for which the airplane has not been certified. Supercooled large droplet icing conditions may be an example of such conditions.

D. Summary of Comments

The FAA received 56 comment documents in response to the NPRM. Some commenters submitted multiple comments.

- Twenty-two commenters (Boeing, Airbus, the Regional Airline Association (RAA), Air Line Pilots Association International (ALPA), and 16 private citizens) expressed support for the proposal in the NPRM.
- Twenty-nine private citizens offered general comments on icing and ice protection that did not specifically address the proposal in the NPRM. These commenters stated that the FAA had not done enough, early enough, to solve the safety problems of flight in icing conditions. Because these comments were beyond the scope of the NPRM's proposal, we are not responding to them in this preamble.
- BAE Systems, XCEL Jet Management, the National Transportation Safety Board (NTSB), and two private citizens provided critical or non-supportive comments to the proposal in the NPRM.

III. Discussion of the Final Rule

This final rule is identical to the rule proposed in the NPRM. Its goal is to ensure that ice protection systems are activated in a timely way. It does this by relieving the flightcrew of the need for judging when to activate the ice protection system. It gives the flightcrew—

- Primary ice detectors that will alert them to icing,
- Specific visual cues to indicate icing, supplemented by advisory ice detectors, or
- Specific air temperatures to check for which, in the presence of visible moisture, will indicate conditions conducive to icing and the need to follow icing procedures.

This rule applies to airplanes operating under part 121 rules with a certified maximum takeoff weight (MTOW) of less than 60,000 pounds. It requires—

a. A primary ice detection system and appropriate activation equipment and procedures to ensure timely activation of the ice protection system,

b. An advisory ice detection system plus substantiated visual cues and procedures to ensure timely activation and, if necessary, repeated operation of the ice protection system, or

c. If the airplane is not equipped to comply with either a or b above, that flightcrews activate and continuously or cyclically operate the ice protection system when in icing conditions during—

- The takeoff climb after second segment,
- En route climb,
- Holding,
- Maneuvering for approach and landing, and
- Any other operation at approach or holding airspeeds.

Icing conditions will be indicated by a specific air temperature and the presence of visible moisture. The flightcrew must operate the ice protection at the first sign of ice accumulation for any other phases of flight until after exiting the icing conditions. When the ice protection system is activated, the flightcrew must also initiate any additional procedures for operation in conditions conducive to icing specified in the AFM or the manual required by § 121.133. This third option of the rule permits compliance without additional equipment. It supports part 121 operations of existing airplanes that are not equipped with ice detectors and new airplanes designed in accordance with § 25.1419(e)(3). However, if the AFM prohibits these procedures, then compliance must be demonstrated with either of the first two options.

To eliminate any guesswork for the flightcrew in identifying icing conditions, this rule defines icing conditions as the presence of visible moisture in temperatures of 5° C or less static air temperature or 10° C or less total air temperature, unless the AFM defines it differently.

The rule requires that ice protection procedures be established in the AFM or the manual required by § 121.133, and that they address—

- Initial activation of the ice protection system,
- Operation of the ice protection system after initial activation, and
- Deactivation of the ice protection system.

These procedures must address whether, after initial activation, the ice protection system must be operated continuously or cycled automatically or manually. The rule also specifies that if an operator elects to install an ice detection system, it must be approved through an amended or supplemental type certificate in accordance with part 21.

The FAA considers this rule to be a necessary increase in the standard of safety because there have been accidents and incidents in which the flightcrew did not start the airframe ice protection system soon enough. In some cases, crews were completely unaware of ice accumulation on the airframe. In other cases, they knew that ice was accumulating, but thought it not significant enough to require activating the ice protection system. This rule is meant to prevent that from happening again by giving flightcrews a clear means of knowing when to activate the airframe ice protection system. Following are the comments requesting changes to the rule.

A. Training

XCEL Jet Management commented that poor training and airmanship in relation to operating in icing conditions were responsible for both the Colgan Air [3] and ATR accidents and that better pilot training was the solution. An individual commenter suggested that improved and more complete pilot training were the real solutions for reducing icing accidents and suggested that pilots should obtain a license endorsement for flight in icing. Neither of these commenters felt that this additional operating rule was warranted.

While icing conditions were present at the time of the Colgan accident, the NTSB did not find that these conditions either caused or contributed to the accident. Rather, the NTSB found that Colgan Air's inadequate procedures for airspeed selection and management during approaches in icing condition contributed to the accident. The Colgan Air flightcrew was operating the ice protection system properly, and the airplane stall occurred very close to the clean wing stall speed. The Bombardier

[3] The Colgan Air accident occurred on February 12, 2009, when a Bombardier Model DHC–8–400 series airplane flying in icing conditions crashed outside of Buffalo, NY, killing 50 people.

Model DHC–8–400 series airplane that those pilots were flying has an advisory ice detection system that helped them know when to activate the ice protection system. Pilots may fail to activate an ice protection system for any number of reasons that could include inattention, a heavy workload that causes ice monitoring vigilance to be reduced, or failure to detect the ice because of environmental conditions. Additional training may not effectively address any of those issues. Thus, we proposed a rule that will require either actively alerting the pilot to icing conditions or causing the pilot to activate the ice protection system when a certain temperature exists in conditions of visible moisture. The exception to this would be during the cruise phase, when activation of the ice protection system at the first sign of icing will be required. This will ensure safe flight in icing conditions independent of icing flight training. Therefore, the proposed rule is not changed based on these comments.

Note that many new training materials developed by National Aeronautics and Space Administration (NASA) have been released in order to ensure that pilots have access to information that will give them the knowledge and skills to safely and strategically fly in icing conditions.

B. Require Automatic Detection and Activation

An individual commenter indicated that the ice protection system should be turned on automatically but in a ''sequence that would allow the crew to turn it off both before it activated and after it completed a cycle.''

We understand from this that the commenter thinks automatic activation should be mandatory, but with features that allow the pilot to intercede. While automatic activation has advantages, we have not determined it should be mandatory. The FAA does not dictate design of aircraft systems. Instead we provide performance-based rules. We believe it should be up to the operator/applicant to choose the best design for its aircraft. Under this approach, an automatic activation design would be acceptable. Examples of other safe and acceptable options include—

- Primary ice detection with manual ice protection system activation,
- Advisory ice detection and pilot monitoring with manual ice protection system activation, and
- Manual ice protection system activation based on temperature and visible moisture for non-cruise flight phases, as well as manual ice protection system activation during cruise at the first sign of icing.

We have not changed the rule based on this comment.

C. Does the rule include withdrawn airworthiness directives (ADs)?

BAE stated that it is not clear whether the rule applies to airplanes for which previously proposed ADs were withdrawn. It is the FAA's intent that this new rule will apply to all airplanes with a certified MTOW less than 60,000 pounds, whether or not original ADs requiring ice protection system activation at the first sign of icing have been withdrawn. As discussed in the NPRM, the purpose of the ADs was to require that the ice protection system be activated at the first sign of icing. This assumes the flightcrew detects the icing. The fact that we concluded there was no need to prevent delayed activation on certain airplanes, and therefore withdrew those ADs, is irrelevant to the purpose of this rule. The purpose of this rulemaking is to ensure detection and activation or, if operating without an ice detection system, timely activation in non-cruise flight. The FAA also finds that, for airplanes not equipped with ice detectors, it is acceptable to activate the ice protection system at the first sign of icing for any phase not identified in § 121.321(a)(3)(i) (for example, cruise).

D. Existing Procedures Are Safe Enough

BAE stated that original certification of their airplanes for flight in icing was based on the most adverse accretions determined from Appendix C to part 25, and that the procedures established during this certification, including activation after accumulating one-half inch of ice on the airframe, do not result in an unsafe condition.

We agree that following the established procedures does not result in an unsafe condition, as long as the flightcrew detects the icing and activates the ice protection system in accordance with those procedures. But several accidents and incidents have occurred because of failure to activate the ice protection system in a timely fashion. In some of those cases, critical ice formed before the crew activated the ice protection system. Other cases have occurred when, for any number of reasons, there was a delay in activating the ice protection system. This rule is intended to ensure timely detection of icing on the airframe and activation of the ice protection system. It helps ensure that ice protection system activation procedures are followed. Therefore, the proposed rule is not changed based on this comment.

E. Residual and Intercycle Ice

BAE suggested that the larger ice accretions assessed during certification might be safer than ice accumulated when operating the ice protection system in conditions conducive to icing, at the first sign of icing, and at regular intervals thereafter. BAE also expressed concern that aircraft handling qualities and performance have not been demonstrated with these new procedures. BAE does not recommend acceptance of this rule in its current form unless we can provide further justification for its adoption.

We believe there is ample justification for this rule. In the initial stages of the IPHWG's examination of the problems of flight in icing, there was great concern about activating boot ice protection systems at the first sign of icing because of a phenomenon known as ice bridging.[4] We infer this is the reason BAE suggested larger ice accretions may be safer than those that would be formed under this rule. No one has reported ice bridging nor has it been seen during testing on modern deicing boots. Classical ice bridging was associated with older designs that had slow inflation and deflation rates; on the order of ten seconds. Modern systems, with their small-diameter inflation chambers and high inflation rates, ensure that bridging is not a concern. We also infer from this comment a concern that residual and intercycle ice might be more critical than allowing a certain depth of ice to accrete before ice protection system activation. This concern is limited to booted ice protection systems.

Persistent ice accretions occur in icing conditions even when pneumatic deicing boots are operating. Whether one-quarter or one-half inch of ice is allowed to accumulate before activation, or the icing boots are activated at the first sign of ice accumulation, or they are activated at annunciation by an ice detector system and periodically afterwards, residual and intercycle ice will exist. The procedure will minimize residual and intercycle ice accretions because the ice will shed when the minimum thickness or mass required for shedding is reached. Adverse airplane flying qualities resulting from ice accretions typically are affected by the thickness, shape, texture, and location of the ice. The thickness of the residual and intercycle ice resulting from this

[4] Ice bridging is a phenomenon that may have occurred on some obsolete de-icing boot systems. In theory, ice could form around the outside of a fully inflated boot, forming a ''bridge,'' which then could not be removed by subsequent inflation cycles of the boot.

procedure is less than what is typically allowed to accumulate before deicing boot operation when the manufacturer has recommended delayed activation.

The FAA has written many ADs requiring airplane operators to include in their AFM procedures to activate deicing boots at the first sign of ice accumulation. The airplane models to which these ADs were directed have many different wing and stabilizer design characteristics and different deicing boot configurations. In addition, they represent a large proportion of the airplane fleet that is equipped with pneumatic deicing boots. We have not received any reports of these airplanes suffering adverse effects of ice from early activation of the deicing boots.

In addition, a number of airplane models are equipped with deicing boot systems with automatic operating modes. These systems automatically cycle at specific time intervals after being initially activated. Such automatic cycling has certainly resulted in operation of the boots with less than the recommended thickness of ice accretion originally included in the AFMs. We have received no reports indicating any adverse effects from use of the automatic mode. Boot ice protection systems operated early and often to remove ice, including intercycle and residual ice, have performed safely and effectively. We have not changed the rule based on this comment.

F. Additional Certification Will Be Necessary

BAE noted that crews operating under § 121.321(a)(3) (without ice detectors) need to activate the ice protection system in conditions conducive to icing irrespective of whether ice is actually accreting. For aircraft that do not have an automatic mode to cycle the ice protection system, the continuous manual cycling of the system would result in an increased workload for the flightcrew. Section 121.321(d)(iv) requires that, for airplanes without automatic cycling modes, procedures will be needed for a specific time interval for repeated cycling of the ice protection system. BAE said that validation of this procedure could require further icing certification testing, and that this issue had not been raised in the NPRM.

With respect to increasing workload, currently pilots have to monitor for ice. Sometimes in these conditions it may be difficult to determine whether activation of the ice protection system is needed. This final rule requires that, after initial activation of the ice protection system, the pilot periodically activate the ice protection system. To do this, the pilot only has to monitor time, not ice accretion thickness. Therefore, we do not believe there will be any significant increase in workload, and that the workload may decrease in some circumstances.

With respect to BAE's comment that validating ice protection system cycling procedures and the potential for icing certification testing was not raised in the NPRM, every airplane that uses a manual deicing system has established procedures for its operation until the airplane has exited icing conditions. Models with periodic cycling procedures should require no incremental certification testing because they already have an approved periodic cycling procedure. For airplanes in which flightcrews have in the past activated boots based on ice accretion thickness, calculating a conservative cycling interval based on Appendix C to part 25 is a relatively straightforward process. It should not require flight testing. In addition, AC 121.321–X provides guidance recommending that intervals should not exceed three minutes. Thus, we do not believe that validation of this procedure should require additional certification testing.

G. Include All Airplanes

The NTSB expressed support for the proposed rule. However, the NTSB stated that the rule should apply to all deicing-boot-equipped airplanes currently in service. This would include airplanes weighing more than 60,000 pounds. The NTSB also suggested that the Bombardier Model DHC–8–400 series airplane (which has a MTOW of slightly more than 60,000 pounds and was involved in the Colgan Air accident) might have been better protected if this rule had been applied to it.

The FAA appreciates the NTSB's support for the proposed rule. We do not believe, however, that it is necessary to expand the rule to cover airplanes with higher weights. The IPHWG data and analysis showed that only airplanes falling below the weight level in the rule have had problems associated with delayed activation of the ice protection system.

As for the Bombardier Model DHC–8–400 series airplane, while icing conditions were present at the time of the Colgan accident, the NTSB did not find that these conditions either caused or contributed to the accident. Rather, the NTSB found that Colgan Air's inadequate procedures for airspeed selection and management during approaches in icing condition contributed to the accident. In fact, the accident airplane had an ice detector and would have been in compliance with this rule through the majority of its flight profile. Therefore, increasing the maximum applicable weight to capture the Bombardier Model DHC–8–400 series airplane would have very little, if any, safety benefit. Increasing the rule's weight applicability to encompass other airplanes of this size and larger is not justified by available data. We have not changed the rule as a result of this comment.

Another reason the NTSB suggested that the rule should encompass heavier airplanes is that it believes such procedures would also help protect these airplanes in conditions that fall outside of Appendix C to part 25. This rule does not address conditions outside of Appendix C. In supercooled large droplet (SLD) conditions (which are not included in Appendix C), ice may form aft of the ice protection system equipment. To suggest that this rule may help address the SLD issue is not correct. The most significant item to consider, however, is that data show that these heavier airplanes have not had any safety problems associated with delayed activation of the ice protection system. Therefore, the rule is not changed as a result of this comment.

H. Include Parts 91 and 135 Operations

The NTSB supported applying the proposed rule to airplanes operated under part 121, but stated that a similar rule should also be levied on all airplanes operated under 14 CFR parts 91 and 135. The NTSB stated that on parts 91 and 135 airplanes with ADs directing flightcrews to activate the ice protection system at the first sign of icing, it can be difficult for crews to identify icing on the airplanes. The NTSB noted that a Circuit City Citation Model 560 series airplane involved in an icing accident was operated under part 91 and had an AD for activation of deicing boots at the first sign of icing, which had been withdrawn. This left the flightcrew to observe a prescribed amount of ice before activation. The NTSB believed that similar accidents may occur if parts 91 and 135 airplanes are not included in this rule.

We considered including parts 91 and 135 operations during deliberations of the IPHWG and during drafting of the NPRM. We determined, however, that the increased flexibility afforded by unscheduled operations (the types of operations governed by parts 91 and 135), coupled with appropriate direction on when pilots should activate the ice protection systems (usually at the first sign of icing or in conditions of visible moisture and specific temperatures), provides an adequate

level of safety for ice protection system activation. Pilots flying scheduled operations, on the other hand, may not have the flexibility to avoid flying into weather that would otherwise be avoided. This rule ensures that part 121 operators of applicable airplanes will be directed to operate the ice protection systems appropriately.

Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. According to the 1995 amendments to the Paperwork Reduction Act (5 CFR 1320.8(b)(2)(vi)), an agency may not collect or sponsor the collection of information, nor may it impose an information collection requirement unless it displays a currently valid Office of Management and Budget (OMB) control number.

This final rule will impose the following new information collection requirements. As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), the FAA has submitted these proposed information collection amendments to OMB for its review.

This final rule requires—

a. A primary ice detection system and appropriate activation equipment and procedures to ensure timely activation of the ice protection system,

b. An advisory ice detection system plus substantiated visual cues and procedures to ensure timely activation and, if necessary, repeated operation of the ice protection system, or

c. If the airplane is not equipped to comply with either a or b above, that flightcrews activate and continuously or cyclically operate the ice protection system when in icing conditions during—

- The takeoff climb after second segment,
- En route climb,
- Holding,
- Maneuvering for approach and landing, and
- Any other operation at approach or holding airspeeds.

This rule may require operators to revise their airplane flight manuals or the manual required by § 121.133. Adding these new procedures may require the addition of a page or two to those manuals. This is classified as a record keeping item and no data will be collected.

We have received no comments about the recordkeeping burden of this rule. The OMB control number for this information collection will be published in the **Federal Register** after the Office of Management and Budget approves it.

International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has determined that there are no ICAO Standards and Recommended Practices that correspond to these regulations.

IV. Regulatory Evaluation, Regulatory Flexibility Determination, International Trade Impact Assessment, and Unfunded Mandates Assessment

Changes to Federal regulations must undergo several economic analyses. First, Executive Order 12866 directs that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96–354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Pub. L. 96–39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, this Trade Agreements Act requires agencies to consider international standards and, where appropriate, that they be the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or Tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation with base year of 1995). This portion of the preamble summarizes the FAA's analysis of the economic impacts of this final rule. Readers seeking greater detail should read the full regulatory evaluation, a copy of which we have placed in the docket for this rulemaking.

In conducting these analyses, FAA has determined that this final rule: (1) Has benefits that justify its costs; (2) is not an economically ''significant regulatory action'' as defined in section 3(f) of Executive Order 12866; (3) has been designated as a ''significant regulatory action'' by the Office of Management and Budget, and is therefore ''significant'' under DOT's Regulatory Policies and Procedures; (4) will not have a significant economic impact on a substantial number of small entities; (5) will not create unnecessary obstacles to the foreign commerce of the United States; and (6) will not impose an unfunded mandate on State, local, or Tribal governments, or on the private sector by exceeding the threshold identified above. These analyses are summarized below.

Total Benefits and Costs of This Rule

The estimated cost of this final rule is about $12.7 million in nominal dollars ($6.7 million in seven percent present value terms). The estimated potential benefits of averting one accident and five fatalities are about $22.1 million in nominal dollars ($11.4 million in seven percent present value terms). Table 1 shows these results.

Table 1
Part 121 Activation of Ice Protection
Adjusted Benefits and Costs ($M)

		Present Value	
	Total	7%	3%
Benefits	$22.1	$11.4	$16.3
Costs	$12.7	$6.7	$9.4

Who is potentially affected by this rule?

Operators of transport category airplanes with a certified MTOW under 60,000 pounds operating under 14 CFR part 121.

Assumptions

(1) The base year is 2010.

(2) This final rule will be effective in 2011.

(3) The compliance date of the rule is 24 months from the effective date of the final rule.

(4) The analysis period extends for 20 years from 2013 through 2032. We believe this analysis period captures nearly all of the expected benefits and costs.

(5) All monetary values are expressed in constant 2010 dollars. The present value of the potential 10-year benefit stream was calculated by discounting the monetary values using three and seven percent present value rates over the 2013 to 2032 analysis period.

(6) The value of an averted fatality is $6.0 million.[5]

(7) The FAA used a $104.99 hourly rate for a mechanic/technician working for an airplane manufacturer or modifier and an $86.48 hourly rate for an engineer working for an airplane manufacturer or modifier. These hourly rates include overhead costs.[6]

Benefits of This Rule

The benefits of this final rule consist of the value of averted fatalities, airplane loss, and investigation cost from avoiding accidents involving transport category airplanes with a certified MTOW under 60,000 pounds operating under 14 CFR part 121. We estimate that one accident and five fatalities could potentially be avoided, over the analysis period, by adopting the final rule. The value of an averted fatality is assumed to be $6.0 million. A series of Airworthiness Directives (ADs) were issued for airplanes with pneumatic de-icing boots to activate the systems at the first sign of ice accretion. Due to the similarity of requirements between the ADs and this proposal, we accounted for the effects of the ADs by reducing the estimated benefits. Over the analysis period, the potential benefits of the final rule will be $22.1 million in nominal dollars ($11.4 million in seven percent present value terms).

Estimated Costs of This Rule

We estimate the total cost of the final rule, over the analysis period, to be about $12.7 million in nominal dollars using airplane compliance costs developed by the IPHWG. The seven percent present value cost of this final rule over the analysis period is about $6.7 million. We estimate the initial costs for a new certification program for operating the deicing boots based on visible moisture and temperature are about $400,000. We estimate the operating and training costs are about $12.3 million.

Alternatives Considered

Alternative One

Maintain the status quo: Simply maintaining the status quo for flight in icing procedures would not be a practice that is responsive to NTSB recommendations and the FAA Inflight Aircraft Icing Plan. The FAA has rejected this alternative because the final rule will enhance passenger safety and prevent ice-related accidents for airplanes with a certified MTOW less than 60,000 pounds. As it stands, the final rule is the reasoned result of the FAA Administrator carrying out the FAA Inflight Aircraft Icing Plan.

Alternative Two

Issue more ADs requiring a means to know when to activate the icing protection system: The FAA has already issued ADs to address activation of icing protection systems. An evaluation of accidents and incidents led to the conclusion that the ADs do not provide adequate assurance that the flightcrew will be made aware of when to activate the icing protection system. Because this problem is not unique to particular airplane designs, but exists for all airplanes susceptible to the icing hazards described previously, it is appropriate to address this problem through an operational rule, rather than by ADs.

Alternative Three

Issue new standards: The third alternative is this final rule. The FAA's judgment is that this is the most viable option because the final rule will increase the safety of the flying public by reducing icing-related accidents in the future in the least costly way.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (Pub. L. 96–354) (RFA) establishes ''as a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration.'' The RFA covers a wide-range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions.

Agencies must perform a review to determine whether a rule will have a significant economic impact on a substantial number of small entities. If the agency determines that it will, the agency must prepare a regulatory flexibility analysis as described in the RFA.

The FAA has determined that this final rule will not have a significant economic impact on a substantial number of small entities. The FAA made the same determination in the NPRM. There were no comments regarding small entities for the NPRM.

The following briefly describes the history leading up to this rulemaking and the methodology used to determine that this final rule will not have a significant economic impact on a substantial number of small entities.

On October 31, 1994, at 1559 Central Standard Time, an Avions de Transport Regional model ATR 72, operated by Simmons Airlines, Incorporated, and doing business as American Eagle flight 4184, crashed during a rapid descent after an uncommanded roll excursion. The FAA, Aerospatiale, the French Direction Générale de l'Aviation Civile, Bureau Enquete Accident, NASA, NTSB, and others conducted an extensive investigation of this accident.

This accident and the investigation prompted the FAA to initiate a review of aircraft inflight icing safety and determine changes that could be made to increase the level of safety. The final rule is responsive to NTSB recommendation A–07–14. The final rule is also one of the items listed in the FAA Inflight Aircraft Icing Plan, dated April 1997. The Inflight Aircraft Icing Plan details the FAA's plans for improving the safety of airplanes when they are operated in icing conditions.

This final rule specifically applies to part 121 operators of airplanes that have a certified MTOW of less than 60,000 pounds. We have determined which small entities could be affected by associating airplanes with a certified MTOW of less than 60,000 pounds with part 121 operators. For this section of the analysis, only those operators meeting the above criteria that have

[5] ''Treatment of the Economic Value of a Statistical Life in Departmental Analysis,'' March 18, 2009, U.S. Department of Transportation Memorandum.

[6] Department of Labor, Bureau of Labor Statistics. Occupational Employment and Wages.

1,500 or fewer employees are considered.

To estimate the number of affected airplanes, the FAA analyzed the current active fleet of airplanes, a forecast of airplanes affected by the final rule entering the fleet, and a forecast of the retired affected airplanes exiting the fleet during the analysis period.

A list of all U.S. operated civilian airplanes operating under part 121 was generated by the FAA Flight Standards Service. Each airplane group was matched with its current (as of May 2010) MTOW and average age through the use of the OAG FleetPC™ database. All airplanes with a MTOW greater than 60,000 pounds were eliminated.

Using industry sources, the FAA determined which airplanes currently had primary or advisory icing detection systems. Airplanes equipped with either a primary or advisory ice detection system are in compliance, and this final rule will impose no costs to operators of those airplanes. All turbojets affected by this proposal are in compliance because those airplanes are equipped with either a certificated primary or advisory ice detection systems.

The FAA used the OAG FleetPC™ database and determined that turboprops are retired from U.S. certificated service at an average age (mean) of 25.9 years. Thus, we assume that each of the small operators' airplanes is retired when their airplanes reach the average retirement age of 25.9 years.

Using information provided by the World Aviation Directory, SEC filings, and the Internet, scheduled and non-scheduled commercial operators that are subsidiary businesses of larger businesses were eliminated from the database. An example of a subsidiary business is Continental Express, Inc., which is a subsidiary of Continental Airlines. Using information provided by the U.S. Department of Transportation Form 41 filings, the World Aviation Directory Winter 2009, and the Internet, all businesses with more than 1,500 employees were eliminated. The FAA obtained company revenue from the remaining businesses. Following this approach, five small entities operate airplanes that will be affected by this proposal.

The FAA estimated the cost of compliance per airplane and multiplied this cost by the total fleet of affected airplanes per operator, over the analysis period, to obtain the total compliance cost for each small entity. The non-recurring costs, for updating the airplane flight manual for each major airplane group, were distributed equally among the airplanes in each major airplane group. These non-recurring costs occurred in year four of the analysis period. Note that the more airplanes in a major airplane group, the less expensive, per airplane, the non-recurring costs are to the operators of those airplanes. In addition to the airplane flight manual cost, the additional incremental recurring costs include boot maintenance, replacement and installation labor. These recurring costs started in 2013 and continued either until the airplane retired or through the end of the analysis period.

The degree to which small air operator entities can ''afford'' the cost of compliance is determined by the availability of financial resources. The initial implementation costs of the final rule may be financed, paid for using existing company assets, or borrowed. A proxy for the firm's ability to afford the cost of compliance is the ratio of the total annualized cost of the final rule as a percentage of annual revenue. No small business operator potentially affected by this final rule incurred costs greater than one percent of its annual revenue. On that basis, we believe firms can afford the compliance costs of this final rule. We used a similar metric for the initial regulatory flexibility analysis and received no comments. Table 2 shows the economic impact on the small entity air operators affected by this final rule.

TABLE 2

YEAR	SMALL OPERATOR A	SMALL OPERATOR B	SMALL OPERATOR C	SMALL OPERATOR D	SMALL OPERATOR E
2010	$0	$0	$0	$0	$0
2011	$0	$0	$0	$0	$0
2012	$0	$0	$0	$0	$0
2013	$61,730	$303,073	$194,993	$189,502	$32,873
2014	$55,690	$297,220	$189,140	$189,344	$27,020
2015	$55,690	$297,220	$189,140	$189,344	$0
2016	$55,690	$297,220	$189,140	$189,344	$0
2017	$55,690	$297,220	$189,140	$189,344	$0
2018	$55,690	$297,220	$189,140	$0	$0
2019	$0	$297,220	$189,140	$0	$0
2020	$0	$297,220	$189,140	$0	$0
2021	$0	$297,220	$189,140	$0	$0
2022	$0	$0	$0	$0	$0
2023	$0	$0	$0	$0	$0
2024	$0	$0	$0	$0	$0
2025	$0	$0	$0	$0	$0
2026	$0	$0	$0	$0	$0
2027	$0	$0	$0	$0	$0
2028	$0	$0	$0	$0	$0
2029	$0	$0	$0	$0	$0
2030	$0	$0	$0	$0	$0
2031	$0	$0	$0	$0	$0
2032	$0	$0	$0	$0	$0
Total	$340,178	$2,680,831	$1,708,112	$946,880	$59,893
Annualized Costs	$32,109	$253,044	$161,229	$89,376	$5,653
Annual Revenue	$50,000,000	$76,348,000	$100,000,000	$227,570,728	$1,000,000
Percentage	**0.06%**	**0.33%**	**0.16%**	**0.04%**	**0.57%**

Note: Some EXCEL Round-off error may occur

Therefore as the FAA Administrator, I certify that this rule will not have a significant economic impact on a substantial number of small entities.

International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465), prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the

establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such the protection of safety, and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards. The FAA has assessed the potential effect of this final rule and determined that the proposed standards are necessary for aviation safety and will not create unnecessary obstacles to the foreign commerce of the United States.

Unfunded Mandates Assessment

Title II of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4) requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed or final agency rule that may result in an expenditure of $100 million or more (in 1995 dollars) in any one year by State, local, and Tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a ''significant regulatory action.'' The FAA currently uses an inflation-adjusted value of $143.1 million in lieu of $100 million. This final rule does not contain such a mandate; therefore, the requirements of Title II of the Act do not apply.

Executive Order 13132, Federalism

The FAA has analyzed this final rule under the principles and criteria of Executive Order 13132, Federalism. We have determined that this action will not have a substantial direct effect on the States, or the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, does not have federalism implications.

Regulations Affecting Intrastate Aviation in Alaska

Section 1205 of the FAA Reauthorization Act of 1996 (110 Stat. 3213) requires the FAA, when modifying its regulations in a manner affecting intrastate aviation in Alaska, to consider the extent to which Alaska is not served by transportation modes other than aviation, and to establish appropriate regulatory distinctions. In the NPRM, we requested comments on whether the proposed rule should apply differently to intrastate operations in Alaska. We did not receive any comments, and we have determined, based on the administrative record of this rulemaking, that there is no need to make any regulatory distinctions applicable to intrastate aviation in Alaska.

Environmental Analysis

FAA Order 1050.1E identifies FAA actions that are categorically excluded from preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act in the absence of extraordinary circumstances. The FAA has determined this rulemaking action qualifies for the categorical exclusion identified in paragraph 312f and involves no extraordinary circumstances.

Regulations That Significantly Affect Energy Supply, Distribution, or Use

The FAA has analyzed this final rule under Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). We have determined that it is not a ''significant energy action'' under the executive order because, while it is considered a ''significant regulatory action'' under DOT's Regulatory Policies and Procedures, it is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

Availability of Rulemaking Documents

You can get an electronic copy of rulemaking documents using the Internet by—

1. Searching the Federal eRulemaking Portal (*http://www.regulations.gov*);

2. Visiting the FAA's Regulations and Policies Web page at *http://www.faa.gov/regulations_policies/* or

3. Accessing the Government Printing Office's Web page at *http://www.gpoaccess.gov/fr/index.html*.

You can also get a copy by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM–1, 800 Independence Avenue, SW., Washington, DC 20591, or by calling (202) 267–9680. Make sure to identify the notice, amendment, or docket number of this rulemaking.

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, *etc.*). You may review DOT's complete Privacy Act statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you may visit *http://DocketsInfo.dot.gov*.

Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. If you are a small entity and you have a question regarding this document, you may contact your local FAA official, or the person listed under the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. You can find out more about SBREFA on the Internet at *http://www.faa.gov/regulations_policies/rulemaking/sbre_act/*.

Appendix—Definition of Terms Used in This Rule

For purposes of this final rule, the following definitions are applicable. Note that some of these definitions are common to those used in the preamble to the final rule for § 25.1419 Ice protection, and that rule's accompanying guidance material.

a. Advisory ice detection system—A system that advises the flightcrew of the presence of ice accretion or icing conditions. Both primary ice detection systems and advisory ice detection systems can either direct the pilot to manually activate the ice protection system or provide a signal that automatically activates the ice protection system. However, because it has lower reliability than a primary system, an advisory ice detection system can only be used in conjunction with other means (most commonly, visual observation by the flightcrew) to determine the need for, or timing of, activating the anti-icing or deicing system. With an advisory ice detection system, the flightcrew is responsible for monitoring icing conditions or ice accretion as defined in the airplane flight manual (AFM), typically using total air temperature and visible moisture criteria or visible ice accretion. With an advisory ice detection system, the flightcrew is responsible for activating the anti-icing or deicing system(s).

b. Airframe icing—Ice accretion on the airplane, except for on the propulsion system.

c. Anti-icing—Prevention of ice accretions on a protected surface, either by:

- Evaporating the impinging water, or
- Allowing the impinging water to run back and off the protected surface or freeze on non-critical areas.

d. Automatic cycling mode—A mode of operation of the airframe de-icing system that provides repetitive cycles of the system without the need for the pilot to select each cycle. This is generally done with a timer, and there may be more than one timing mode.

e. Conditions conducive to airframe icing—Visible moisture at or below a static air temperature of 5°C or total air temperature of 10°C, unless otherwise substantiated.

f. Deicing—The removal or the process of removal of an ice accretion after it has formed on a surface.

g. Ice protection system (IPS)—A system that protects certain critical aircraft parts from ice accretion. To be an approved system, it must satisfy the requirements of § 23.1419 or § 25.1419 and other applicable requirements.

h. Primary ice detection system—A detection system used to determine when the IPS must be activated. This system announces the presence of ice accretion or icing conditions, and it may also provide information to other aircraft systems. A primary automatic system automatically activates the anti-icing or deicing IPS. A primary manual system requires the flightcrew to activate the anti-icing or deicing IPS upon indication from the primary ice detection system.

i. Reference surface—The observed surface used as a reference for the presence of ice on the monitored surface. The reference surface may be observed directly or indirectly. Ice must occur on the reference surface before—or at the same time as—it appears on the monitored surface. Examples of reference surfaces include windshield wiper blades or bolts, windshield posts, ice evidence probes, the propeller spinner, and the surface of ice detectors. The reference surface may also be the monitored surface.

j. Static air temperature—The air temperature that would be measured by a temperature sensor that is not in motion in relation to that air. This temperature is also referred to in other documents as ''outside air temperature,'' ''true outside temperature,'' or ''ambient temperature.''

k. Total air temperature—The static air temperature plus the rise in temperature due to the air being brought to rest relative to the airplane.

l. Visual cues—Ice accretion on a reference surface that the flightcrew observes. The visual cue is used to detect the first sign of airframe ice accretion.

List of Subjects in 14 CFR Part 121

Aircraft, Air carriers, Aviation safety, Safety, Reporting and recordkeeping requirements.

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends part 121 of title 14, Code of Federal Regulations as follows:

PART 121—OPERATING REQUIREMENTS: DOMESTIC, FLAG, AND SUPPLEMENTAL OPERATIONS

■ 1. The authority citation for part 121 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 40119, 44101, 44701–44702, 44705, 44709–44711, 44713, 44716–44717, 44722, 44901, 44903–44904, 44912, 46105.

■ 2. Revise § 121.321 to read as follows:

§ 121.321 Operations in Icing.

After October 21, 2013 no person may operate an airplane with a certificated maximum takeoff weight less than 60,000 pounds in conditions conducive to airframe icing unless it complies with this section. As used in this section, the phrase ''conditions conducive to airframe icing'' means visible moisture at or below a static air temperature of 5°C or a total air temperature of 10°C, unless the approved Airplane Flight Manual provides another definition.

(a) When operating in conditions conducive to airframe icing, compliance must be shown with paragraph (a)(1), or (2), or (3) of this section.

(1) The airplane must be equipped with a certificated primary airframe ice detection system.

(i) The airframe ice protection system must be activated automatically, or manually by the flightcrew, when the primary ice detection system indicates activation is necessary.

(ii) When the airframe ice protection system is activated, any other procedures in the Airplane Flight Manual for operating in icing conditions must be initiated.

(2) Visual cues of the first sign of ice formation anywhere on the airplane and a certificated advisory airframe ice detection system must be provided.

(i) The airframe ice protection system must be activated when any of the visual cues are observed or when the advisory airframe ice detection system indicates activation is necessary; whichever occurs first.

(ii) When the airframe ice protection system is activated, any other procedures in the Airplane Flight Manual for operating in icing conditions must be initiated.

(3) If the airplane is not equipped to comply with the provisions of paragraph (a)(1) or (2) of this section, then the following apply:

(i) When operating in conditions conducive to airframe icing, the airframe ice protection system must be activated prior to, and operated during, the following phases of flight:

(A) Takeoff climb after second segment,

(B) En route climb,

(C) Go-around climb,

(D) Holding,

(E) Maneuvering for approach and landing, and

(F) Any other operation at approach or holding airspeeds.

(ii) During any other phase of flight, the airframe ice protection system must be activated and operated at the first sign of ice formation anywhere on the airplane, unless the Airplane Flight Manual specifies that the airframe ice protection system should not be used or provides other operational instructions.

(iii) Any additional procedures for operation in conditions conducive to icing specified in the Airplane Flight Manual or in the manual required by § 121.133 must be initiated.

(b) If the procedures specified in paragraph (a)(3)(i) of this section are specifically prohibited in the Airplane Flight Manual, compliance must be shown with the requirements of paragraph (a)(1) or (2) of this section.

(c) Procedures necessary for safe operation of the airframe ice protection system must be established and documented in:

(1) The Airplane Flight Manual for airplanes that comply with § 121.321(a)(1) or (2), or

(2) The Airplane Flight Manual or in the manual required by § 121.133 for airplanes that comply with § 121.321(a)(3).

(d) Procedures for operation of the airframe ice protection system must include initial activation, operation after initial activation, and deactivation. Procedures for operation after initial activation of the ice protection system must address—

(1) Continuous operation,

(2) Automatic cycling,

(3) Manual cycling if the airplane is equipped with an ice detection system that alerts the flightcrew each time the ice protection system must be cycled, or

(4) Manual cycling based on a time interval if the airplane type is not equipped with features necessary to implement (d)(i)–(iii) of this section.

(e) System installations used to comply with § 121.321(a)(1) or (2) must be approved through an amended or supplemental type certificate in accordance with part 21 of this chapter.

Issued in Washington, DC, on August 11, 2011.

J. Randolph Babbitt,

Administrator.

[FR Doc. 2011–21247 Filed 8–19–11; 8:45 am]

BILLING CODE 4910–13–P

FEDERAL TRADE COMMISSION

16 CFR Parts 3 and 4

Rules of Practice

AGENCY: Federal Trade Commission (''Commission'' or ''FTC'').

ACTION: Final rule amendments.

SUMMARY: The FTC is amending its Rules of Practice for its adjudicative process, including those regarding the initiation of discovery, limitations on discovery, the Standard Protective Order, the admission of certain hearsay evidence, the video recording of proceedings, the designation of confidentiality on documents, the timing for oral argument on appeal, and