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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2006-23803; Directorate Identifier 2005-NM-238-AD; Amendment 39-15108; AD 2007-13-04]

RIN 2120-AA64

Airworthiness Directives; Boeing Model 747-400, 747-400D, and 747-400F Series Airplanes

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: The FAA is superseding an existing airworthiness directive (AD), which applies to all Boeing Model 747-400, -400D, and -400F series airplanes. That AD currently requires revising the airplane flight manual (AFM) to require the flightcrew to maintain certain minimum fuel levels in the center fuel tanks, and to prohibit the use of the horizontal stabilizer fuel tank. This new AD requires installing new integrated display system (IDS) software; and also requires revising the AFM to include procedures to prevent dry operation of the center wing and horizontal stabilizer fuel tanks, for maintaining minimum fuel levels, and for de-fueling fuel tanks. For certain airplanes, this new AD also requires removing certain program pin ground wires of the IDS. This AD results from fuel system reviews conducted by the manufacturer. We are issuing this AD to reduce the potential for ignition sources inside fuel tanks, which, in combination with flammable fuel vapors, could result in fuel tank explosions and consequent loss of the airplane.

DATES: This AD becomes effective July 25, 2007.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in the AD as of July 25, 2007.

ADDRESSES: You may examine the AD docket on the Internet at http://dms.dot.gov or in person at the U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC.

Contact Boeing Commercial Airplanes, P.O. Box 3707, Seattle, Washington 98124-2207, for service information identified in this AD.

FOR FURTHER INFORMATION CONTACT: Sulmo Mariano, Aerospace Engineer, Propulsion Branch, ANM-140S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW., Renton, Washington 98057-3356; telephone (425) 917-6501; fax (425) 917-6590.

SUPPLEMENTARY INFORMATION:

Examining the Docket

You may examine the AD docket on the Internet at http://dms.dot.gov or in person at the Docket Management Facility office between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The Docket Operations office (telephone (800) 647-5527) is located on the ground floor of the West Building at the DOT street address stated in the ADDRESSES section.

Discussion

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 to include an AD that supersedes AD 2002-24-52, amendment 39-12993 (68 FR 14, January 2, 2003). The existing AD applies to certain Boeing Model 747-400, 747-400D, and 747-400F series airplanes. That NPRM was published in the Federal Register on February 8, 2006 (71 FR 6404). That NPRM proposed to continue to require revising the airplane flight manual (AFM) to require the flightcrew to maintain certain minimum fuel levels in the center fuel tanks, and to prohibit the use of the horizontal stabilizer fuel tank. That NPRM also proposed to require installing new integrated display software (IDS) in the integrated display units and electronic flight instrument system/engine indication and crew alerting system (EICAS) interface units (EIUs) of the flight deck. In addition, that NPRM proposed to require revising the AFM to include procedures to prevent dry operation of the center wing and horizontal stabilizer fuel tanks; for maintaining minimum fuel levels; and for de-fueling fuel tanks. For certain airplanes, that NPRM also proposed to require removing G13 pin ground wires of a certain wire integration unit of the EIUs at certain connector locations.

Comments

We have considered the following comments on the NPRM.

Request To Supersede Another AD

Japan Airlines requests that paragraph (b) of the NPRM be revised to supersede AD 2002-24-51, amendment 39-12992 (68 FR 10, January 2, 2003), in addition to AD 2002-24-52. Japan Airlines believes that Boeing Model 747-400 series airplanes are still subject to the requirements of AD 2002-24-51.

We do not agree. This AD supersedes AD 2002-24-52 and affects Boeing Model 747-400, -400D, and -400F airplanes identified in paragraph (c) of this AD. AD 2002-24-52 superseded (cancelled) the requirements of only paragraph (d) of AD 2002-24-51, as indicated in paragraph (a) of AD 2002-24-52 (paragraph (f) of this AD). Operators of affected airplanes identified in AD 2002-24-51 must comply with the remaining applicable requirements of that AD. This new AD retains all requirements of AD 2002-24-52. As a result, certain paragraph identifiers of AD 2002-24-51 have been changed in this AD. We have made no change to the AD in this regard.

Requests To Explain Why Earlier Software Version Is Not Acceptable for Compliance

The Air Transport Association (ATA), on behalf of one of its members, Northwest Airlines (NWA), and Japan Airlines request that we explain why installation of IDS-504 software is

mandatory whereas installation of IDS-503 software has not been mandated by any AD. Japan Airlines and NWA believe that IDS-503 software is the same as IDS-504 software for EICAS messaging logic for operating fuel pumps.

We agree with the commenters' requests to explain why installation of IDS-504 software is mandatory. IDS-503 software provides redundant indication of impending dry operation of a fuel pump for the center wing tank (CWT), but provides indication of fuel pump low pressure for only the horizontal stabilizer tank (HST). IDS-504 software provides redundant indication to the flightcrew of impending dry operation of a fuel pump for both the CWT and HST. As discussed in the NPRM, the preamble to AD 2002-24-52 explains that we consider the requirements in that AD "interim action," and that we were considering further rulemaking. We now have determined that further rulemaking is necessary to require installation of IDS-504 software (final action) to address the identified unsafe condition, and this AD follows from that determination.

Requests To Allow Other IDS Software Versions

Boeing, Japan Airlines, NWA, and United Airlines request that certain IDS software versions (and related service information) other than IDS-504 software be acceptable for compliance with the requirements of paragraph (h) of the NPRM. The commenters provide the following justifications for their requests.

1. United Airlines, and ATA, on behalf of NWA, state that the FAA has previously approved alternative method of compliance (AMOC) 140S-03-173 to AD 2002-24-52 (reference Boeing Alert Service Bulletin 747-31A2341, Revision 1, dated November 20, 2003), which installed IDS-503 software. United and NWA believe the requirements in the NPRM are met by incorporating that AMOC. United Airlines and NWA note that Boeing Alert Service Bulletins 747-31A2341, Revision 1, and 747-31A2352, Revision 1, dated March 17, 2005, state, "The baseline installation of this IDS-504 software (no program pin changes) will provide messaging associated with fuel pump operation that is identical to the IDS-503 messaging." Boeing states that the results of a software logic review indicate that the alert messaging of the IDS-503 software for the HST and CWT is identical to that of the IDS-504 software. Boeing notes that it has issued service information for installing IDS-503 software.

We partially agree. We do not agree with the commenters that IDS-503 software messages are identical to those of IDS-504 software. We have confirmed with Boeing that IDS-504 software contains different EICAS messages related to fuel pump operation depending on which hardware program pin is connected to an electrical ground. Only one of those available configurations provides fuel pump messages identical to those of IDS-503 software. In AMOC 140S-03-173, we approved that particular configuration as an AMOC to AD 2002-24-52 for active monitoring of the fuel quantity for both the CWT and HST, because it provided an improvement to the shutoff procedure required by that AD. However, we did not consider that AMOC to be acceptable as a final configuration. As explained in the "Requests To Explain Why Earlier Software Version Is Not Acceptable for Compliance" section of this AD, we consider the requirements of AD 2002-24-52 to be interim action. Installation of IDS-504 software will provide a higher level of safety than the interim requirements of AD 2002-24-52, because the flightcrew will no longer be required to actively monitor fuel tank quantity to determine the appropriate time to shut off the fuel pumps.

We do agree with the commenters that IDS-503 software should be considered acceptable for compliance with the requirements in paragraph (h), but only for affected airplanes not equipped with an HST. Therefore, we have added new paragraph (j) to this AD (and redesignated subsequent paragraphs) to include that provision. In addition, we have revised "new IDS software" to "new IDS-504 software" in paragraphs (h) and (i) of this AD to clarify which software version those paragraphs are referring to and to distinguish that software version from the other software version specified in new paragraph (j).

2. Boeing and United Airlines state that the alert messaging of IDS-505 (delivered in production only) and IDS-506 software for the HST and CWT is identical to that of IDS-504 software. Boeing notes that no service information is available for installation of IDS-505 software, and that the service bulletins for installing IDS-506 software have not yet been released. Japan Airlines notes that IDS-505 and -506 software have been already released, and that it would need to request an AMOC to the requirements of the NPRM.

We agree with the commenters that IDS-505 software installed during production of the airplane and IDS-506 software installed either during production of the airplane or in service are acceptable substitutes for IDS-504 software. As noted by Boeing, there is no service information for installation of IDS-505 software (IDS-505 software is being installed only during production). Since Boeing submitted its NPRM comments, it has issued and we have approved the service bulletins in the following table for installing IDS-506 software as an acceptable method of compliance with the requirements of paragraph (h) of this AD:

Table – Acceptable Service Bulletins for Installation of IDS-506 Software

Boeing Service Bulletin –	For Model –
747-31-2376, dated September 5, 2006	747-400, -400D, and -400F series airplanes
747-31-2377, dated September 5, 2006	747-400 and -400F series airplanes
747-31-2378, dated September 5, 2006	747-400 and -400F series airplanes

Each of these service bulletins refers to Rockwell Collins Service Bulletins IDS-7000-31-52, IDS-7000-31-53, and IDS-7000-31-54, as applicable; all dated August 30, 2006; as applicable; as an additional source of service information for installing the IDS-506 software. Therefore, we have added new paragraph (k) to this AD (and redesignated subsequent paragraphs) that allows either installing IDS-505 in production or IDS-506 software in production or in service as an acceptable method of compliance with the requirements of paragraph (h). We also have included new Note 3, which provides information about the Rockwell Collins service bulletins identified previously. In addition, we have revised paragraph (i) of this AD to allow installing IDS-504 software "during production of the airplane" as an acceptable method of compliance with the requirements of paragraph (h).

Request To Revise Compliance Time for Installing New IDS Software

Boeing requests that the compliance time in paragraph (h) of the NPRM for installing new IDS software be revised from 6 months to 12 months. Boeing cites several reasons for their request (develop internal engineering, acquire necessary parts, accomplish the change without creating flight schedule interruptions, etc.).

We do not agree. In developing an appropriate compliance time for installing new IDS software, we considered the safety implications and the practical aspect of accomplishing the installation within a period of time that corresponds to the normal scheduled maintenance for most affected operators. In addition, we considered the facts that the installation takes three work hours, parts (software diskettes) are readily available and easily transportable, and many of the approximately 520 affected airplanes worldwide have already been modified. Furthermore, during development of the NPRM, we had several meetings with Boeing to determine the appropriate compliance time. In consideration of these items, we have determined that a 6-month compliance time will ensure an acceptable level of safety and allow the installation to be done during scheduled maintenance intervals for most affected operators. We have made no change to the AD in this regard.

Request To Revise Requirements for Removing Pin Ground Wires of the FR-HiTemp Fuel Pumps

Boeing requests that the fourth paragraph of the "FAA's Determination and Requirements of the Proposed AD" section of the NPRM be revised for clarification purposes. Boeing suggests removing the wording that parallels the procedures specified in Boeing Service Bulletin 747-28-2258, Revision 1, dated August 11, 2005, for identification and location of the ground wire, and in Boeing Standard Wiring Practices Manual (SWPM) 20-72-18 for removal of the ground wires. (Boeing Service Bulletin 747-28-2258 describes procedures for installing FR-HiTemp fuel pumps.)

We partially agree. We do not agree with Boeing's suggestion to refer to Boeing Service Bulletin 747-28-2258, Revision 1, and Boeing SWPM 20-72-18, as appropriate sources of service information for accomplishing the wire removal specified in paragraph (l) of this AD (paragraph (j) of the NPRM). We acknowledge that Boeing Service Bulletin 747-28-2258 contains procedures for identification and location of the ground wire to be removed; however, it does not contain procedures for removing the ground wires. SWPMs are not FAA-approved, and the procedures specified in the SWPMs vary from operator to operator. There is no assurance that each operator's SWPM contains the identical actions specified in paragraph (l).

In addition, it is essential that we have feedback as to the type of removals being made. Given that possible new relevant issues might be revealed during this process, it is imperative that we have such feedback. Only by reviewing removal approvals can we be assured of this feedback and of the adequacy of the removal methods. Since the Manager of the Seattle Aircraft Certification Office (ACO) is accountable for the primary oversight of the actions regarding this AD, it is appropriate that he be this single point of approval. His involvement, therefore, is warranted in the development and approval of removing pin ground wires.

We do agree with Boeing that the actions related to removing pin ground wires in the preamble and in paragraph (l) need to be clarified. We have revised paragraph (l) accordingly. The "FAA's Determination and Requirements of the Proposed AD" section of the NPRM does not reappear in the AD.

As a result of this change to paragraph (l), we also have revised paragraph (m) of this AD and added a new paragraph (n) to the AD. These changes clarify that, for airplanes equipped with FR-HiTemp fuel pumps, the concurrent AFM revision requirements of paragraph (m) must be done only after removing the pin ground wires in accordance with paragraph (l).

In addition, we have determined that the compliance time of "before further flight after installing the new IDS software required by paragraph (h) of this AD" specified in paragraph (j) of the NPRM (paragraph (l) of the final rule) can be extended somewhat. We intended to require the removal of pin ground wires at a time that would coincide with regularly scheduled maintenance visits for the majority of the affected fleet, when the airplanes would be located at a base where special equipment and trained personnel would be readily available, if necessary. We now recognize that a compliance time of "after installing the new IDS-504 software required by paragraph (h) of this AD and within 6 months after the effective date of this AD" corresponds more closely to the interval representative of most of the affected operators' normal maintenance schedules. We have revised paragraph (l) accordingly. We do not consider that this extension will adversely affect safety.

Request To Refer to a Later Revision of Referenced Service Bulletin

Japan Airlines requests that the NPRM be revised to refer to Revision 2 of Boeing Alert Service Bulletin 747-31A2351 when Boeing issues it. Japan Airlines notes that the NPRM refers to Boeing Alert Service Bulletin 747-31A2351, Revision 1, dated March 17, 2005, as an appropriate source of service information for installing new IDS-504 software. Japan Airlines states that Revision 1 of the service bulletin contains a typographical error, and that Boeing is planning to revise it.

We acknowledge that there is a typographical error in Revision 1 of the service bulletin. However, the error does not compromise the actions described in the service bulletin. In addition, Boeing has informed us that the release date of Revision 2 of the service bulletin is unknown. We do not consider that delaying this action until after the release of the manufacturer's planned service bulletin is warranted. Therefore, we have made no change to the AD in this regard.

Request To Allow Previously Approved AMOCs

British Airways (BA) requests that AMOCs 140S-03-319 (which allows installation of FR-HiTEMP fuel pumps) and 140S-04-31 (which allows installation of FR-HiTEMP fuel pumps in accordance with Boeing Service Bulletin 747-28-2258), previously approved in accordance with certain ADs, continue to be approved as AMOCs for the proposed requirements of the NPRM. BA states that the NPRM just consolidates the various existing ADs into one AD and does not address any new unsafe condition. Therefore, BA contends that the existing AMOCs still fully mitigate the NPRM.

BA states that the only new safety feature of the NPRM is the integrated display flight deck messages, which are triggered by low fuel pressure signals from existing pressure switches. BA also states that the pressure switch indication can flicker for minutes before a stable condition occurs, which could cause a flight deck indication delay before a latched message is set for the flightcrew to act on. BA adds that a fuel pump will have numerous re-prime (wet/vapor) cycles before it is shut down during low-pressure instability, possibly causing a fuel pump to run dry. BA states that there are other single failures, such as software errors, fuel pressure switches not operating properly, and flightcrew delays responding to flight deck messages, that add to the possibility of the fuel pump running dry for unknown periods of time. Finally, BA asserts that the continued safe operation of an airplane equipped with FR-HiTEMP fuel pumps does not depend on the knowledge of low-pressure messages or the accuracy of those messages.

We do not agree with BA's conclusion that the installation of FR-HiTEMP fuel pumps satisfies the requirements of this AD. We have determined that installing FR-HiTEMP fuel pumps alone does not make the pumping system compliant with the requirements of 14 CFR part 25 and does not adequately address the unsafe conditions identified from the SFAR 88 review. More work is necessary for airplanes equipped with FR-HiTEMP fuel pumps. As specified in paragraph (l) of the AD, for airplanes on which FR-HiTEMP fuel pumps have been incorporated in accordance with Boeing Service Bulletin 747-28-2258, dated December 19, 2003, or Revision 1, dated August 11, 2005, G13 pin ground wires must be removed after installing the new IDS-504 software in accordance with paragraph (h) of this AD. This will correctly configure the EIU for wet shutoff messaging.

We find that BA might misunderstand the operation of the fuel pump indications specified in this AD, and that clarification is necessary. The primary indication to the flightcrew that the fuel pumps should be shut off is the low-fuel advisory message, which is driven by the fuel quantity indication system (FQIS). The flightcrew is trained to shut off the pump when that message appears. If the flightcrew fails to shut off the pump at that time, approximately 30 seconds to 2 minutes later (depending on the pump position, fuel flow, and the airplane attitude), a caution level pump low pressure message and aural warning are triggered. This second message is driven by a pump outlet low pressure switch. We have determined that this redundant message scheme and the associated flightcrew procedures provide an acceptable level of safety by ensuring that dry operation of fuel pumps for a period long enough to create a fuel tank ignition risk will not occur.

In addition, we recognize that fuel pressure switch failures are possible. We have determined there is adequate redundancy in the FQIS and adequate procedures and flightcrew training to ensure that dry operation of fuel pumps for a period long enough to create a fuel tank ignition risk will not occur. We also recognize that there is always some potential for error in the software development

process, but we have determined that the industry standard for software development and certification process, which is used by Boeing and its suppliers, provides an appropriate level of software design assurance for these display functions.

Request To Add Airplanes to Paragraph (j) of the NPRM

Japan Airlines requests that we revise the first sentence in paragraph (j) of the NPRM (redesignated as paragraph (l) in the AD) to include airplanes on which FR-HiTEMP fuel pumps were incorporated in production. Japan Airlines states that some of their airplanes had FR-HiTEMP fuel pumps installed in production, and that Boeing Service Bulletin 747-28-2258, dated December 19, 2003; or Revision 1, dated August 11, 2005; does not apply to those airplanes. The commenter contends that the G13 pin ground wires can be removed in accordance with Part 10 through Part 28 of Boeing Service Bulletin 747-28-2258, Revision 1, when EICAS messaging logic for fuel pump operation is desired due to low pressure indication (i.e., when the operator decides to do the removal).

We partially agree. We agree with Japan Airlines that the removal specified in paragraph (l) of this AD must be done on airplanes on which FR-HiTEMP fuel pumps were incorporated in production. However, we do not agree with Japan Airlines that the removal specified in paragraph (l) can be done at a time convenient to operators. We have determined that installing FR-HiTEMP fuel pumps alone does not make the pumping system compliant with the requirements of 14 CFR part 25 and does not adequately address the unsafe conditions identified from the SFAR 88 review. Further, as discussed previously, we acknowledge that Boeing Service Bulletin 747-28-2258, Revision 1, contains procedures for identification and location of the ground wire to be removed; however, it does not contain procedures for removing the ground wires. Therefore, we have revised paragraph (l) to include airplanes on which FR-HiTEMP fuel pumps have been incorporated in production.

Requests To Revise Certification Limitations

Boeing requests that the following Certification Limitations of paragraph (k) of the NPRM (redesignated as paragraph (m) in the AD) be deleted:

1. "The CWT must contain a minimum of 17,000 pounds (7,700 kilograms) prior to engine start, if the CWT override/jettison pumps are to be selected ON during takeoff." Boeing states that installing the new IDS software in accordance with the NPRM provides the appropriate messaging for this operation. Boeing also states that this operation (i.e., managing the fuel quantity of each tank to ensure that the fuel pumps are not running dry) is now part of the basic flightcrew training. In addition, Boeing states that the IDS logic provides for a higher wet shut-off level (7,000 pounds) if that fuel quantity is reached and climb attitude is detected (greater than 5 degrees).

We agree. We have determined that incorporating the new IDS software provides messaging to the flightcrew indicating that the fuel pumps must be OFF at takeoff if the fuel quantity is less than 17,000 pounds and if the fuel pumps are selected ON. Therefore, the limitation "The CWT must contain a minimum of 17,000 pounds (7,700 kilograms) prior to engine start, if the CWT override/jettison pumps are to be selected ON during takeoff" specified in paragraph (k) of the NPRM is no longer necessary. We have revised paragraph (m) of this AD accordingly.

2. "Center Wing Tank (CWT): The CWT fuel quantity indication system must be operative to dispatch with CWT mission fuel," and "The HST fuel quantity indication system must be operative to dispatch with HST mission fuel." Boeing states that the Master Minimum Equipment List (MMEL) addresses operations with inoperative equipment, and that it was revised in 2003 to address this issue.

We do not agree. The results of the system safety analysis performed during the SFAR 88 review to show compliance with 14 CFR part 25 requirements concluded that the indications driven by the FQIS signals are required for safe operation. Operation with the FQIS inoperative would revert the fuel pump indications to a configuration similar to the existing configuration, which has been found

non-compliant with 14 CFR part 25 requirements. The existing MMEL will be revised to delete the FQIS relief for the CWT and HST. Until that revision occurs, the requirements of this AD would apply and prevail over the MMEL. We have made no change to the AD in this regard.

Japan Airlines requests that the Certification Limitations of paragraph (k) of the NPRM (redesignated as paragraph (m) in the AD) be revised as follows:

1. Either add a statement that there is no minimum requirement for the fuel quantity in the CWT, if the CWT override/jettison fuel pumps are OFF at takeoff, or clarify paragraph (k) in this regard. Japan Airlines notes that the Certification Limitations, in part, states, "The [CWT] must contain a minimum of 17,000 pounds prior to engine start, if the CWT override/jettison pumps are to be selected ON during takeoff."

We partially agree. We agree with Japan Airlines's understanding of the intent of the Certification Limitations of paragraph (m) of this AD. As discussed previously, we have determined that the limitation "The CWT must contain a minimum of 17,000 pounds (7,700 kilograms) prior to engine start, if the CWT override/jettison pumps are to be selected ON during takeoff" specified in paragraph (k) of the NPRM is no longer necessary and have revised paragraph (m) of this AD accordingly.

2. Add the following:

- "Note: In a low fuel situation, both CWT override/jettison pumps may be selected ON and all CWT fuel may be used"; and
- "Note: In a low fuel situation, both HST transfer pumps may be selected ON and all HST fuel may be used."

Japan Airlines notes that according to AMOC 140S-03-173, these notes have been established.

We agree and have revised paragraph (m) of this AD accordingly.

3. Revise a typographical error from "FUEL LOW STAB L OR R" to "FUEL LO STAB L OR R."

We agree and have revised paragraph (m) of this AD accordingly.

4. Add the following: "Warning: Do not cycle CWT and HST pump switches from ON to OFF to ON with any continuous low pressure indication present." Japan Airlines states that according to AMOC 140S-03-173, this warning has been established.

We agree and have revised paragraph (m) of this AD accordingly.

5. Revise the phrase "defueling any fuels tanks" to "defueling any fuel tanks or transferring between tanks." Japan Airlines states that according to AMOC 140S-03-173, the defueling requirements in AD 2002-24-52 apply for defueling or transferring between tanks.

We partially agree. We agree with Japan Airlines that paragraph (m) needs to be revised to address any fuel pump that might run dry during fuel transfer. However, we have revised paragraph (m) in a different manner than suggested by Japan Airlines. We added a sentence at the end of the Certification Limitations in paragraph (m) that reads, "The above requirements apply for defueling or transferring between tanks."

Request To Require Prior or Concurrent Requirements

NWA believes that we may be mandating a prerequisite modification for the anticipated modification of the fuel system auto shutoff. NWA requests that this be done by requiring the service bulletins identified in Table 2 of the NPRM as prior or concurrent requirements to an AD that also mandates the auto shutoff modification.

We do not agree. We have no plans at this time to mandate a modification of the auto shutoff for either the CWT or HST. We have made no change to this AD in this regard.

Request To Change Paragraph Identifiers

NWA states that the table in the "Change to Existing AD" section of the NPRM contains incorrect paragraph references. NWA states that the requirement of AD 2002-24-52 paragraph (a)

corresponds to paragraph (f) in the NPRM, not paragraph (g). NWA also states that the requirement in AD 2002-24-52 paragraph (b) corresponds to paragraph (g) in the NPRM, not paragraph (h).

We infer that NWA is requesting that the "Change to Existing AD" section be corrected. We partially agree. We agree that there is an error in that section. However, that section does not reappear in this AD. Therefore, we have made no change to this AD in this regard.

Explanation of Change to Costs of Compliance

After the NPRM was issued, we reviewed the figures we have used over the past several years to calculate AD costs to operators. To account for various inflationary costs in the airline industry, we find it necessary to increase the labor rate used in these calculations from $65 per work hour to $80 per work hour. The cost impact information, below, reflects this increase in the specified hourly labor rate.

Conclusion

We have carefully reviewed the available data, including the comments that have been received, and determined that air safety and the public interest require adopting the AD with the changes described previously. We have determined that these changes will neither increase the economic burden on any operator nor increase the scope of the AD.

Costs of Compliance

There are about 520 airplanes of the affected design in the worldwide fleet. The following table provides the estimated costs for U.S. operators to comply with this AD.

Estimated Costs

Action	Work hours	Average labor rate per hour	Parts	Cost per airplane	Number of U.S.-registered airplanes	Fleet cost
AFM revision (required by AD 2002-24-52)	1	$80	None	$80	101	$8,080
Installation of new IDS software (new action)	3	$80	$100	$340	101	$34,340
Removal of G-13 pin ground wires (new action)	1	$80	None	$80 if an affected airplane is imported and placed on the U.S. Register in the future	0	$0
AFM revision (new action)	1	$80	None	$80	101	$8,080

Authority for This Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. 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.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

We have determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

(1) Is not a "significant regulatory action" under Executive Order 12866;

(2) Is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and

(3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

We prepared a regulatory evaluation of the estimated costs to comply with this AD and placed it in the AD docket. See the ADDRESSES section for a location to examine the regulatory evaluation.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39–AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The Federal Aviation Administration (FAA) amends § 39.13 by removing amendment 39-12993 (68 FR 14, January 2, 2003) and by adding the following new airworthiness directive (AD):

2007-13-04 Boeing: Amendment 39-15108. Docket No. FAA-2006-23803; Directorate Identifier 2005-NM-238-AD.

Effective Date

(a) This AD becomes effective July 25, 2007.

Affected ADs

(b) This AD supersedes AD 2002-24-52. In addition, after accomplishing the requirements of paragraphs (h) and (m) of this AD, the airplane flight manual (AFM) requirements specified in Table 1 of this AD may be removed.

Table 1 – Affected ADs

AFM requirements of –	Of –
(1) Paragraph (a)	AD 2001-12-21, amendment 39-12277
(2) Paragraph (a)	AD 2001-21-07, amendment 39-12478
(3) Paragraph (c)	AD 2002-19-52, amendment 39-12900
(4) Paragraphs (f) and (g)	This AD

Applicability

(c) This AD applies to airplanes identified in Table 2 of this AD, certificated in any category.

Table 2 – Applicability

Boeing Model –	As identified in Boeing Alert Service Bulletin –
(1) 747-400, 747-400D, and 747-400F series airplanes	747-31A2351, Revision 1, dated March 17, 2005
(2) 747-400 and 747-400F series airplanes	747-31A2350, Revision 1, dated March 17, 2005
(3) 747-400 and 747-400F series airplanes	747-31A2352, Revision 1, dated March 17, 2005

Unsafe Condition

(d) This AD results from fuel system reviews conducted by the manufacturer. We are issuing this AD to reduce the potential for ignition sources inside fuel tanks, which, in combination with flammable fuel vapors, could result in fuel tank explosions and consequent loss of the airplane.

Compliance

(e) You are responsible for having the actions required by this AD performed within the compliance times specified, unless the actions have already been done.

Restatement of Requirements of AD 2002-24-52

Airplane Flight Manual (AFM) Revision

(f) Within 4 days after receipt of emergency AD 2002-24-51, instead of complying with the requirements of paragraph (d) of AD 2002-24-51, revise the Limitations section of the AFM to include the following (this may be accomplished by inserting a copy of this AD into the AFM):

"CERTIFICATE LIMITATIONS

Fueling and use of the horizontal stabilizer tank (if installed) is prohibited.

The center wing tank (CWT) must contain a minimum of 17,000 pounds (7,700 kilograms) prior to engine start, if the CWT override/jettison pumps are to be selected ON during flight.

The CWT fuel quantity indication system must be operative to dispatch with CWT mission fuel.

Both CWT override/jettison pump switches must be selected OFF at or before CWT fuel quantity reaches 7,000 pounds (3,200 kilograms), if CWT fuel quantity is less than 50,000 pounds (22,700 kilograms) prior to engine start. The CWT override pumps may be selected ON during stabilized cruise conditions. Both CWT override/jettison pump switches must be selected OFF at or before the CWT fuel quantity reaches 3,000 pounds (1,400 kilograms).

Note

With CWT override/jettison pumps selected OFF and CWT fuel quantity greater than 6,000 pounds (2,800 kilograms), the FUEL OVRD CTR L & R EICAS messages will be displayed. Do not accomplish the associated non-normal procedure.

Both CWT override/jettison pump switches must be selected OFF at or before CWT fuel quantity reaches 3,000 pounds (1,400 kilograms), if CWT fuel quantity is greater than or equal to 50,000 pounds (22,700 kilograms) prior to engine start.

Both CWT override/jettison pumps must be selected OFF when either CWT override/jettison fuel pump low pressure light illuminates.

Warning

Do not reset a tripped fuel pump circuit breaker.

Warning

Do not cycle CWT override/jettison pump switches from ON to OFF to ON with any continuous low pressure indication present.

Note

The center wing tank may be emptied normally during an emergency fuel jettison.

Note

In a low fuel situation, both CWT override/jettison pumps may be selected ON and all CWT fuel may be used.

If a center wing tank pump fails with fuel in the center tank, accomplish the FUEL OVRD CTR L, R non-normal procedure.

If the main tanks are not full, the zero fuel gross weight of the airplane plus the weight of CWT tank fuel may exceed the maximum zero fuel gross weight by up to 7,000 pounds (3,200 kilograms) for takeoff, climb, cruise, descent, and landing, provided that the effects of balance (CG) have been considered.

When defueling any fuel tanks, the Fuel Pump Low Pressure indication lights must be monitored and the fuel pumps positioned to OFF at the first indication of fuel pump low pressure. Defueling with passengers on board is prohibited.

The limitations contained in this AD supersede any conflicting basic airplane flight manual limitations."

(g) If an operator has already complied with AD 2002-24-51, it can comply with paragraph (f) of this AD by deleting the phrase "if a placard prohibiting its use is installed" from the first paragraph of the AFM revision required by paragraph (d) of AD 2002-24-51.

New Actions Required by This AD

Installation of New Integrated Display System (IDS) Software

(h) Within 6 months after the effective date of this AD, install new IDS-504 software in the integrated display units and electronic flight instrument system/engine indication and crew alerting system interface units of the flight deck, in accordance with the Accomplishment Instructions of the applicable service bulletin identified in Table 3 of this AD.

Table 3 – Revision 1 of Service Bulletins

For Model –	Boeing Alert Service Bulletin –
(1) 747-400, 747-400D, and 747-400F series airplanes	747-31A2351, Revision 1, dated March 17, 2005

(2) 747-400 and 747-400F series airplanes	747-31A2350, Revision 1, dated March 17, 2005
(3) 747-400 and 747-400F series airplanes	747-31A2352, Revision 1, dated March 17, 2005

Note 1: Each service bulletin identified in Table 3 of this AD refers to Rockwell Collins Service Bulletin IDS-7000-31-49, IDS-7000-31-50, or IDS-7000-31-51; all dated June 28, 2004; as applicable; as an additional source of service information for installing the new IDS software.

(i) Installing new IDS-504 software before the effective date of this AD, in accordance with the applicable service bulletin identified in Table 4 of this AD or during production of the airplane, is acceptable for compliance with the requirements of paragraph (h) of this AD.

Table 4 – Original Service Bulletins for Installing IDS-504 Software

For Model –	Boeing Alert Service Bulletin –
(1) 747-400, 747-400D, and 747-400F series airplanes	747-31A2351, dated September 3, 2004
(2) 747-400 and 747-400F series airplanes	747-31A2350, dated September 3, 2004
(3) 747-400 and 747-400F series airplanes	747-31A2352, dated September 3, 2004

(j) For airplanes not equipped with an HST: Installing IDS-503 software before the effective date of this AD, in accordance with the applicable service bulletin identified in Table 5 of this AD, is acceptable for compliance with the requirements of paragraph (h) of this AD.

Table 5 – Acceptable Service Bulletins for Installation of IDS-503 Software

For Model –	Boeing Alert Service Bulletin –
(1) 747-400, -400D, and -400F series airplanes	747-31A2340, Revision 1, dated November 20, 2003
(2) 747-400 and -400F series airplanes	747-31A2341, Revision 1, dated November 20, 2003
(3) 747-400 and -400F series airplanes	747-31A2342, Revision 1, dated November 20, 2003

Note 2: Each service bulletin identified in Table 5 of this AD refers to Rockwell Collins Service Bulletin IDS-7000-31-46, IDS-7000-31-47, or IDS-7000-31-48; all dated April 22, 2003; as applicable; as an additional source of service information for installing the IDS-503 software.

(k) Installing IDS-505 or IDS-506 software during production of the airplane is acceptable for compliance with the requirements of paragraph (h) of this AD. Also, installing IDS-506 software as a retrofit in accordance with the applicable service bulletin identified in Table 6 of this AD, is acceptable for compliance with the requirements of paragraph (h) of this AD.

Table 6 – Acceptable Service Bulletins for Installation of IDS-506 Software

For Model –	Boeing Service Bulletin –
(1) 747-400, -400D, and -400F series airplanes	747-31-2376, dated September 5, 2006
(2) 747-400 and-400F series airplanes	747-31-2377, dated September 5, 2006
(3) 747-400 and -400F series airplanes	747-31-2378, dated September 5, 2006

Note 3: Each service bulletin identified in Table 6 of this AD refers to Rockwell Collins Service Bulletin IDS-7000-31-52, IDS-7000-31-53, or IDS-7000-31-54; all dated August 30, 2006; as applicable; as an additional source of service information for installing the IDS-506 software.

Removal of Pin Ground Wires

(l) For airplanes on which FR-HiTEMP fuel pumps have been installed in accordance with Boeing Service Bulletin 747-28-2258, dated December 19, 2003, or Revision 1, dated August 11, 2005; or in production: After installing the new IDS-504 software required by paragraph (h) of this AD and within 6 months after the effective date of this AD, remove the ground wire of the wire integration unit that corresponds to the connector and pin locations in Table 7 of this AD, in accordance with a method approved by the Manager, Seattle Aircraft Certification Office (ACO), FAA. Chapter 20-41-03 of the Boeing 747-400 Aircraft Maintenance Manual is one approved method.

Table 7 – Connector Location

Connector	Pin
L-EIU DM7353CA	G13
C-EIU DM7352CA	G13
R-EIU DM7351CA	G13

AFM Revision

(m) Except as specified in paragraph (n) of this AD, concurrently with the requirements of paragraph (h) of this AD, revise the Limitations section of the AFM to include the following (this may be done by inserting a copy of this AD into the AFM):

"Certification Limitations

Center Wing Tank (CWT):

The CWT fuel quantity indication system must be operative to dispatch with CWT mission fuel.

If the FUEL LO CTR L or R message is displayed both CWT override/jettison pumps must be selected OFF.

If the FUEL PRESS CTR L or R message is displayed, the corresponding CWT override/jettison pump must be selected OFF.

Note: In a low fuel situation, both CWT override/jettison pumps may be selected ON and all CWT fuel may be used.

Horizontal Stabilizer Tank (HST):

The following additional limitations must be followed if the HST is fueled and used:

The HST fuel quantity indication system must be operative to dispatch with HST mission fuel.

If the FUEL PMP STB L or R message is displayed while on the ground both HST pumps must be selected OFF.

If the FUEL LO STAB L or R message is displayed in flight the corresponding HST pump must be selected OFF.

If the FUEL PRESS STAB L or R message is displayed the corresponding HST pump must be selected OFF.

The remaining fuel in the HST must be considered unusable, and the effects of that unusable fuel on balance (CG) must be considered.

Note: In a low fuel situation, both HST transfer pumps may be selected ON and all HST fuel may be used.

Warning

Do not cycle CWT and HST pump switches from ON to OFF to ON with any continuous low pressure indication present.

Do not reset a tripped fuel pump circuit breaker.

Defueling:

Prior to defueling any fuel tanks, perform a lamp test of the respective Fuel Pump Low Pressure indication lights. When defueling, the Fuel Pump Low Pressure indication lights must be monitored and the fuel pumps positioned to OFF at the first indication of fuel pump low pressure. When defueling with passengers on board, fuel pump switches must be selected OFF at or above approximately 7,000 pounds (3,200 kilograms) for the CWT, 3,000 pounds (1,400 kilograms) for main tanks, and 2,100 pounds (1,000 kilograms) for the HST.

The above requirements apply for defueling or transferring between tanks."

(n) For airplanes on which FR-HiTEMP fuel pumps have been installed in accordance with Boeing Service Bulletin 747-28-2258, dated December 19, 2003, or Revision 1, dated August 11, 2005; or in production: Concurrently with the requirements of paragraph (l) of this AD, revise the Limitations section of the AFM in accordance with paragraph (m) of this AD.

Alternative Methods of Compliance (AMOCs)

(o)(1) The Manager, Seattle ACO, FAA, has the authority to approve AMOCs for this AD, if requested in accordance with the procedures found in 14 CFR 39.19.

(2) To request a different method of compliance or a different compliance time for this AD, follow the procedures in 14 CFR 39.19. Before using any approved AMOC on any airplane to which the AMOC applies, notify your appropriate principal inspector (PI) in the FAA Flight Standards District Office (FSDO), or lacking a PI, your local FSDO.

Material Incorporated by Reference

(p) You must use the applicable service bulletins specified in Table 8 of this AD to perform the actions that are required by this AD, unless the AD specifies otherwise. The Director of the Federal Register approved the incorporation by reference of these documents in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Contact Boeing Commercial Airplanes, P.O. Box 3707, Seattle, Washington 98124-2207, for a copy of this service information. You may review copies at the FAA, Transport Airplane Directorate, 1601 Lind Avenue, SW., Renton, Washington; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal-register/cfr/ibr-locations.html.

Table 8 – Material Incorporated by Reference

Service Bulletin	Revision Level	Date
(1) Boeing Alert Service Bulletin 747-31A2350	1	March 17, 2005
(2) Boeing Alert Service Bulletin 747-31A2351	1	March 17, 2005
(3) Boeing Alert Service Bulletin 747-31A2352	1	March 17, 2005

Issued in Renton, Washington, on June 8, 2007.
Stephen P. Boyd,
Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.
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