DOCKET NO.: SA-515

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

MAINTENANCE GROUP CHAIRMAN'S FACTURAL REPORT

ATTACHMENT 5

PRATT & WHITNEY LETTER/STATEMENT ADDRESSING THEIR INVOLVEMENT WITH VOLVO JULY 19, 1996

(4 PAGES)

UNITED TECHNOLOGIES PRATT&WHITNEY

400 Main St.
East Hartford, Connecticut 06108

July 19, 1996

Mr. Gordon J. Hookey
NTSB AS-40
490 L'Enfant Plaza, South West
Washington, D.C. 20594

Subject: NTSB Request For Information - P&W Procedures With Volvo Flygmotor
Regarding The Manufacture of JT8D-219 Hub-Front Compressor, Front PN 5000501-01

Reference: NTSB Letter, G. J. Hookey to M. L. Young, Dated 7/12/96

Dear Mr. Hookey,

The intent of this letter is to address the National Transportation Safety Board's (NTSB) request for information, as stated in the referenced letter, regarding Pratt & Whitney's (P&W) Quality Assurance System with particular regard to Volvo Flygmotor and the manufacture of the JT8D-219 Hub-Front Compressor, Front (Hub), PN 5000501-01, SN R32971, which was involved in the Delta Airlines engine uncontainment on July 6, 1996.

The information to address your (11) questions and request for manufacturing and inspection records follows:

Question 1: How long has Volvo Flygmotor been a vendor for P&W?

Response 1: Volvo was originally approved as a vendor for P&W in 1966, 30 years ago.

Question 2: How long has Volvo Flygmotor been manufacturing JT8D-200 series, Front Compressor, Front Hubs for P&W?

Response 2: Volvo Flygmotor has been manufacturing JT8D-200 Series, Hub, PN 5000501-01 for P&W since their P&W Engineering Source Approval was granted on 12/12/84.

Question 3: How many JT8D-200 series hubs has Volvo Flygmotor produced for P&W? Where, numerically, was the fractured hub in the production run of front compressor front hubs at Volvo Flygmotor?

Response 3: Volvo Flygmotor has produced a total of 2,329, PN 5000501-01 Hubs for P&W since 12/12/84. The failed Delta airlines hub identified as SN R32971, heat code LCC, suffix 4019, was the 1,100 to 1,105 part produced by Volvo.

Question 4: Have JT8D-200 series front compressor front hubs been manufactured at other facilities besides Volvo Flygmotor? If so, what were the other manufacturing facilities, what was the time frame when JT8D-200 front compressor front hubs were manufactured at these other facilities, and what was the reason for changing to Volvo Flygmotor or another vendor?

Response 4: P&W records show that PN 5000501-01, hubs were produced and supplied by two other sources in addition to Volvo. Atlantic Machine supplied parts to P&W in 1979, and again in 1981 through 1987. P&W's North Haven facility produced and supplied parts from 1980 through 1981. Volvo was brought on board as a vendor of these hubs in 1984, at which time they became a partner with P&W in the JT8D Program based on a P&W business decision to expand the company's global position in the international market.

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Question 5: Does P&W have a certification process in which vendors such as Volvo Flygmotor must qualify to manufacture components such as the JT8D-200 front compressor front hub? If so, how is that certification process accomplished? If P&W certifies a vendor, is that certification a permanent approval or are the vendors subject to recurring inspections and recertification? If the vendors are required to be recertified, what is the duration of the certification process?

Response 5: Each vendor manufacturing and supplying engine parts for P&W production engines is subjected to a pre-award survey that they must successfully pass to be placed on the P&W Qualified Supplier List. The approval process includes an on-site review of the quality system, review and approval of all special processes, e.g. nondestructive testing, plating, coatings, etc. In addition certain parts are subject to Engineering Source Approval by part number or family. In the case of the JT8D-200 Hub, Volvo Flygmotor was Engineering Source Approved to manufacture this hub. There is no expiration to the approval. However, if significant changes, as defined by P&W documents, take place in either the system or processes, P&W approval is required. Vendors are subject to audits and surveillance to maintain their approval.

Question 6: Does Volvo Flygmotor have a quality inspection program to identify manufacturing deviations and nonconformances? Was that quality inspection program in place or operational at the time of the subject hub's manufacture? What oversight does P&W provide to the quality inspection program at Volvo Flygmotor?

Response 6: Volvo Flygmotor has an approved quality inspection system which is documented in Volvo Flygmotor's Quality Manual and procedures. This system has provisions for the inspection and detection of deviations and nonconformances, as well as procedures to document and submit for disposition any deviations and nonconformances. The approved quality inspection system was in place and operational at the time of the subject hub's manufacture. P&W's Supplier Quality Assurance (SQA), Materials Control Laboratory (MCL), and MCL Nondestructive Test Groups provide periodic on-site surveillance.

Question 7: Does P&W conduct audits of vendor manufacturing facilities? Who conducts these audits, how often are they accomplished, and what is covered or inspected during an audit? Has Volvo Flygmotor ever been subject to a P&W audit? If so, what were the findings?

Response 7: P&W Quality Assurance Core Audit and Product Center Quality Groups conduct periodic audits of the approved quality system and special processes at the vendor's facilities. The Quality Assurance Core Group conducts a full systems audit on the average of every four years. The vendor's quality system, manufacturing and processes, gage calibration, processing of nonconforming material, nondestructive testing, product, etc. are audited. Volvo was audited in 1992 and 1996. In both audits, no significant items were found. There were some minor discrepancies and system improvements suggestions discussed with the supplier.

Question 8: On parts manufactured by vendors, what inspections does P&W accomplish prior to installation in an engine or being shipped as spare parts?

Response 8: Vendor parts are checked for identification and damage.

Question 9: What authority does P&W extend to Volvo Flygmotor to evaluate and determine that required actions for any deviation or nonconformances? Does P&W ever review a vendor's evaluation and recommended actions for deviations or nonconformances?

Response 9: In accordance with the specification, QA-6088, that is flowed down to Volvo Flygmotor by P&W purchase order, Volvo has the authority to perform preliminary review dispositions. These include rework, scrap and return to supplier. In addition, in 1992 Volvo personnel were trained and certified as Quality Members of the Material Review Board, which authorized them to review and recommend dispositions of accept and repair of nonconformances to the P&W Engineering member of the Material Review Board. All accept and repair dispositions are reviewed and APPROVED by the P&W Engineering member of the Material Review Board.

Question 10: What inspections would Volvo Flygmotor have to accomplish to a front compressor front hub? Does P&W specify any required inspections or are the inspections left to the option of the vendor? Are there any instructions related specifically to holes, including the tiebolt holes, machined into the hub?

Response 10: Volvo Flygmotor performs various dimensional and nondestructive test conformity inspections to ensure PN 5000501-01, hubs, meet P&W design specifications prior to delivery of a final product. P&W has flowed down dimensional and nondestructive standards and methods of inspection that are contained within the Quality Assurance Data sheet as part of the P&W Engineering design package and Requirements Control Card as part of the Purchase Order to the vendor. Volvo and P&W require dimensional inspection for both hole size and hole locations. P&W Visual Inspection Standard 454 applies to holes, including the tie bolt hole, as well as other areas of the part, in providing acceptance criteria for surface imperfections on major rotating parts. In addition, holes receive the necessary nondestructive testing as specified on the Quality Assurance Data sheet.

Question 11: Does P&W have specific guidelines or instructions for vendors to follow in the event of damage that occurs to a part during manufacturing? If so, what are those instructions?

Response 11: P&W, through its purchase order, engineering drawing and quality assurance data sheet, flow down to the vendor all of the requirements to manufacture and inspect a part. Any deviations beyond the limit of those requirements would be treated as a nonconformance, this includes any damage. Per P&W- requirements, nonconformances must be documented and submitted to preliminary review and/or Material Review Board for disposition.

Request 1: In addition to the listed questions, P&W was requested to provide the NTSB with Volvo Flygmotor's manufacturing and inspection records for front compressor front hub PN 5000501-01, SN R32791.

Response Request 1: See Attachment 1 for the Volvo manufacturing records and Attachment 2 for the Volvo inspection records.

Thank you for your cooperation in this matter. If any additional information regarding P&W's Quality Assurance System is required, please feel free to contact me, (Roger Chericoni) or Andrew Brindisi, FAA Liaison Manufacturing through Mike Young at ([redacted]

Sincerely,

[redacted]

Roger Chericoni
VP Product Integrity,
Quality Assurance
Pratt & Whitney

[redacted]

Michael L. Young
Accident Investigation Coordinator
Airworthiness
Pratt & Whitney

cc: Richard Gidius,
DOT/FAA, NE-MIDO 41

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ATTACHMENT 1

Attachment 1 contains Volvo Flygmotor's Manufacturing Records. The records identified with Volvo PN 303340 are for P&W's Hub Assembly PN 5000421 and records identified with Volvo PN 303201 are for P&W Hub Detail PN 5000501.

The English translation is included in this package.