PRATT & WHITNEY CANADA

SERVICE BULLETIN

P&WC S.B. No. 1703R9

BULLETIN INDEX LOCATOR

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

MODEL APPLICATION

PT6A-114, PT6A-114A

Compliance: Refer to Para. 1.E. in the Service Bulletin

Summary: This Service Bulletin (SB) provides a recommended basic operating Time Between Overhaul (TBO) and specifies a recommended initial Hot Section Inspection (HSI) frequency. P&WC turbine engines are required to undergo periodic inspection in accordance with a pre-established schedule in order to ensure serviceability. The TBO and HSI intervals represent the two major scheduled inspections, and are defined in this SB. This SB also provides TBO extension procedures for operators with an average utilization higher than 300 hours/year. The technical content of this service bulletin has been reviewed by and is acceptable to Transport Canada.

Oct 29/2001
Revision No. 9: Sep 04/2013

PT6A-72-1703
Cover Sheet

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	Canadian ECL(s)*	
	ECCN(s)*	
	P-ECCN(s)**	9E991
	USML (ITAR)*	
	P-USML**	

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A United Technologies Company

04 September 2013

P&WC S.B. No. 1703R9

REVISION TRANSMITTAL SHEET
TURBOPROP ENGINE MODEL PT6A

SUBJECT: Pratt & Whitney Canada Service Bulletin No. PT6A-72-1703, Rev. No. 9, dated Sep 04/2013 (P&WC S.B. No. 1703R9) OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

Replace your existing copy of this service bulletin with the attached revised bulletin. Destroy the superseded copy.

Please retain this Revision Transmittal Sheet with the revised bulletin.

SUMMARY: This service bulletin is revised to:

- For PT6A-114 engines, delete the gas generator limitation for Pre-SB1445 of 30,000 hours.

EFFECT OF REVISION ON PRIOR ACCOMPLISHMENT:

None.

NOTE: A black bar in the left margin indicates a change in that line of text or figure.

REVISION HISTORY:

Original Issue: Oct 29/2001
Revision No. 1: Nov 13/2001
Revision No. 2: Jun 21/2004
Revision No. 3: Oct 31/2006
Revision No. 4: Mar 15/2007
Revision No. 5: Nov 14/2007
Revision No. 6: Jan 29/2010
Revision No. 7: May 09/2013
Revision No. 8: Aug 16/2013
Revision No. 9: Sep 04/2013

SERVICE BULLETIN

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

1. Planning Information

A. Effectivity

PT6A-114 Engines.
PT6A-114A Engines.

NOTE: This service bulletin supersedes P&WC S.B. No. 1003 for the models listed.

B. Concurrent Requirements

None.

C. Reason

This service bulletin:

- Provides a recommended basic operating TBO;
- Specifies a recommended initial HSI frequency; and
- Describes the TBO extension/evaluation process.

D. Description

(1) Definitions:

- The Basic Industry TBO is the P&WC recommended TBO per this service bulletin which is applicable to all operators.
- The Fleet TBO is the TBO level which individual operators have attained for engines of the same model in their possession only.
- The Engine TBO is the TBO applicable to a specific engine per the Industry TBO or Fleet TBO or a recommended TBO by P&WC for a particular set of conditions.
- The term “hours” in this document is the Engine Flight Hours (EFH).

(2) TBO recommendations take into consideration the average effect of the many variables affecting overhaul life, such as:

- Average flight duration;
- Percentage of time at any given power level;
- Climatic conditions and environment;
- Maintenance practices;
- Utilization; and
- Engine modification standards.

1. Planning Information (Cont'd)

(3) Under extreme conditions of very low utilization coupled with continuous operation in skydiving, fire fighting, agricultural spraying, salt water atmosphere or heavy sand and dust environments, periodic inspections in accordance with the applicable maintenance instructions may indicate maintenance action prior to the recommended overhaul life.

(4) The TBO interval may be extended with the approval of the operator's Airworthiness Authority. The minimum requirements for engine TBO extension or for fleet TBO extension are described in the Appendix Para. 4.

E. Compliance

The inspection intervals and overhaul periods provided in this bulletin are the manufacturer's recommendations. These periods are based on operation that is per the Airframer's POH (Pilot Operating Handbook). Extended operation at power settings above normal Takeoff/Climb/Cruise may require a reduction in the intervals stated. The use of Maximum Continuous is unrestricted for the duration required by the crew to address an emergency situation. Repetitive use of Maximum Continuous, and/or extended operation at high speeds and/or ITT (Inter-Turbine Temperature) will necessitate a significant reduction in HSI (Hot Section Inspection) interval. Airworthiness authorities normally require operators to follow these recommendations unless alternative arrangements have been made between the operator and the manufacturer, and approved by the operator's airworthiness.

F. Approval

Transport Canada has reviewed and approved the technical contents of this Service Bulletin.

NOTE: The service life values quoted herein are determined by the limiting values stated on the Pratt & Whitney Canada (P&WC) drawings which form part of the Department of Transport Aircraft Engine Type Approval for the applicable engine model. These limiting values are based on the use of P&WC approved components installed on/in the engine. Use of other than P&WC approved components may reduce the life limits.

G. Manpower

Not applicable.

H. Weight and Balance

None.

I. Electrical Load Data

Not changed.

1. Planning Information (Cont'd)

J. Software Accomplishment Summary

Not applicable.

K. References

Applicable PT6A instructions for Continued Airworthiness (ICA)
P&WC S.B. No. 1002, 1505, 1510 and 1669
Service Information Letter No. PT6A-107
Service Information Letter No. PT6A-146
Service Information Letter No. GEN-055
Service Information Letter No. PT6A-041

L. Publications Affected

None.

M. Interchangeability and Intermixability of Parts

Not applicable.

2. Material Information

A. Industry Support Information

Not applicable.

B. Material - Cost and Availability

Not applicable.

C. Material Necessary for Each Engine

Not applicable.

D. Reidentified Parts

None.

E. Tooling - Price and Availability

Not applicable.

2. Material Information (Cont'd)

3. Accomplishment Instructions

A. Basic Time Between Overhaul (TBO) Recommendations:

(1) The basic industry TBO for all PT6A-114 and PT6A-114A engines is 3,600 hours.

(2) For maintenance scheduling purposes, one engine per aircraft may be operated an additional 70 calendar days or 200 flight hours, whichever comes first, conditional on the following:

(a) The engine has been maintained and operated in accordance with P&WC's Instructions for Continued Airworthiness and operated to an engine TBO interval that is recommended by P&WC;

(b) Boroscope inspection of the hot section components per the Engine Maintenance Manual must be carried out and engine found to be in serviceable condition;

(c) Only one maintenance scheduling extension per TBO interval is available;

(d) The maintenance scheduling hours do not modify the operator's base TBO interval;

(e) The engine is used in a civil application;

(f) The operator must notify their local airworthiness authority upon use of this extension.

(3) Engines that are within the basic recommended TBO and that have been maintained or stored per maintenance manual requirements have no related calendar time limits.

(4) Rotor component life limitations outlined in the latest revision of P&WC S.B. No. 1002 override TBO considerations.

(5) The Hamilton Sundstrand fuel pump may be operated to the engine TBO (basic or extended, as applicable).

NOTE: Refer to periodic inspection of Hamilton Sundstrand fuel pump, per the EMM as applicable.

3. Accomplishment Instructions (Cont'd)

(6) The engine accessories that follow may be operated to the engine TBO (basic or extended, as applicable) plus 500 hours. All other accessories may be operated to the engine TBO.

FCU
Fuel Heater
Propeller Governor
Ignition Exciter
Compressor Bleed Valve
Flow Divider/Starting Control Installation
Fuel Pump (Argo-Tech only)

NOTE: Where accessories are removed (for repair or other reason) and subsequently reinstalled, operating time since new or overhaul must be recorded on the repair tag.

(7) **For engines PRE-SB1669 configuration**
the compressor turbine disk and blade set must be sent for an inspection per the overhaul manual instructions at the intervals that follow:

NOTE: This inspection must include Non-Destructive Testing (NDT) and stretch measurement.

(a) Compressor turbine disk with full set of new blades installed at last shop visit, inspect within 5,000 hours.

(b) Compressor turbine disk with full or partial set of previously run compressor turbine blades installed, inspect within 3,000 hours since last compressor turbine blade inspection.

(8) **For engines POST-SB1669 configuration**
the compressor turbine disk and blade set must be inspected per the overhaul manual at the engine basic TBO or extended, as applicable.

NOTE: This inspection must include Non-Destructive Testing (NDT) and stretch measurement.

(a) Compressor turbine blades P/N 3072791-01 must be replaced at or before 10,000 hours.

(9) **For PT6A-114A engines Pre-SB1510 configuration**
Incorporate the third-stage compressor-stator assembly in accordance with P&WC S.B. No. 1510 at overhaul.

3. Accomplishment Instructions (Cont'd)

(10) **For PT6A-114 engines Pre-SB1445 configuration**
DELETED.

B. TBO Extension Recommendations

(1) For operators with an average utilization higher than 300 hours/year, P&WC can provide recommendations for TBO extensions by one of the two options that follow:

(a) **Option A - Fleet TBO Extension**
An operators' full fleet of similarly operated and maintained engines, covered by this SB, can have its TBO escalated in 500-hour increments based on a review of the condition of the hardware from one or two engines inducted for overhaul. The recommendation is based on one or two satisfactory overhaul samples. Refer to the Appendix Para. 4.A., 4.B., 4.C. and 4.D.

(b) **Option B - Engine-Specific TBO Extension**
The TBO of an individual engine can be increased, subject to the evaluation of the configuration, condition and method of operation of this engine. Refer to the Appendix Para. 4.A., 4.B., 4.C. and 4.E.

(2) TBO Extension recommendations that were approved prior to issue of this SB, per P&WC SB No. 1703 revisions 0 to 6, P&WC S.B. No. 1003 revisions 0 to 30, are not affected and remain valid, except that:

- P&WC No longer endorses on-condition TBO programs on the PT6A engine models
- Aircraft Gas Turbine Operating Information Letters (AGTOIL) are no longer valid.

(3) TBO extension recommendations from P&WC are subject to approval of the operator's local airworthiness authority.

(4) The TBO established by individual operators and/or for individual engines is independent of the TBO published for the industry.

C. Hot Section Inspection (HSI) Frequency Recommendations:

(1) The HSI interval does not increase, as the TBO is escalated.

(2) The recommended scheduled HSI interval is 1,800 hours.

(3) An additional 50 flight hours or 30 days is available for maintenance scheduling purposes, conditional on the following:

3. Accomplishment Instructions (Cont'd)

(a) The engine has been maintained and operated in accordance with P&WC's Instructions for Continued Airworthiness;

(b) Only one maintenance scheduling extension per HSI interval is available;

(c) The maintenance scheduling hours do not modify the engine's base HSI interval;

(4) **For engines PRE-SB1669 configuration:**

(a) P&WC further recommends that, at each HSI, operators submit a two-CT blade sample for metallurgical evaluation at an overhaul facility (Ref. Pratt & Whitney Standard Practices Manual PN 585005).

NOTE: On the basis of individual service history, P&WC can provide an exemption from this recommendation to those operators who demonstrate a maintenance program encompassing fuel nozzle refurbishment, borescope inspection and engine condition trend monitoring (ECTM®). Ref. SIL PT6A-146 for additional details.

(b) If the metallurgical evaluation is not acceptable, replace the complete set of CT blades with POST-SB1669 blades.

(c) If the metallurgical evaluation is acceptable, a maximum of 10 blades can be replaced with PRE-SB1669 blades if they are rejected for reasons other than overtemperature or creep. If more than 10 blades are rejected, the complete set of CT blades must be replaced with POST-SB1669 blades.

(5) Alternatively, the HSI frequency can be based on Engine Condition Trend Monitoring (ECTM®) in accordance with the Service Information Letter (S.I.L.) Gen-055 "Guidelines and Standards for Utilizing the Engine Condition Trend Monitoring (ECTM®)" subject to local Airworthiness Authority approval.

(6) If trend monitoring is introduced part way through engine life, a performance recovery wash and HSI must be accomplished to establish a performance base line.

4. Appendix

NOTE: This Appendix provides the procedures and requirements to obtain TBO extension recommendations from P&WC.

A. General Considerations for TBO Extension Recommendations

(1) A TBO extension recommendation from P&WC is based on both the operator's procedures and experience and on P&WC experience. P&WC experience is based on:

4. Appendix (Cont'd)

(a) Engines that incorporate only P&WC parts originally supplied by P&WC or its authorized distributors or components repaired in accordance with P&WC approved repair process.

(b) Factory built engines or engines overhauled/repaired at a P&WC service center or a P&WC Designated Overhaul Facility (DOF).

(c) As P&WC experience grows, the TBO extension requirements and limitations may be adjusted accordingly.

(2) An engine maintains its TBO extension recommendation on either program as long as it is operated within the limitations of the relevant aircraft operating manuals and is maintained in accordance with the appropriate P&WC Maintenance Manual and the terms of this S.B.

NOTE: P&WC recommendation is null and void in instances where engine abuse or non-compliance with this recommendation is reported.

(3) If the engine was put in storage or was unused since its last overhaul (or since new if not previously overhauled), there must be documented evidence that the engine has been preserved per the engine Maintenance Manual.

(4) Extension recommendations are only transferable between operators under circumstances described in option A and B. (Ref. Appendix Para. D (13) and E (10)), as applicable.

(5) Recommendations for extension are subject to limitations including the maximum numbers of years between overhauls (Ref. Appendix Para. D (2) and E (4)).

(6) TBO extension recommendations from P&WC are subject to fees per S.I.L. No. PT6A-107.

(7) TBO extensions, recommended by P&WC, do not affect the applicable Warranty and Service Policy originally supplied with the engine. P&WC will continue to use the basic industry TBO (Ref. Para. 3. A.(1)) to calculate the pro-rata credit and the benefits per the Primary Parts Service Policy and/or the Extended Engine Service policy.

B. Assembly and Component Records:
TBO extensions incorporate limitations on the life of certain components. The operator and/or the Maintenance Organization (M.O.) selected by the operator must have a system to log the total accumulated time, i.e. Time Since New (TSN), and the Time Since Overhaul (TSO) of the following assemblies and components:

(1) Engine times and cycles since new and since last overhaul;

4. Appendix (Cont'd)

(2) Accessories time since new or since last overhaul;

(3) Total cycles of life limited rotors (Ref. P&WC S.B. No. 1002);

(4) Total hours since new for the components that follow:

- The mainline ball bearings (bearings No. 1 and No. 4);
- The power turbine blades;
- The compressor turbine blades;
- The first stage sun gears; and
- The first stage planet gears.

NOTE: For non-serialized turbine blades, the total hours since new must be based on the oldest installed blade. For example, if a complete new set of blades is installed at overhaul and 18 blades are replaced at TSO = 1800 hrs, the total time on the entire blade set will still be considered 1800 hrs, even though the 18 newly installed blades have zero time. Refer to Para. 3.A.(7 and 8) for additional requirements related to compressor turbine blade inspection times.

C. Configuration Records
P&WC makes available product improvements through the issuance of Service Bulletins (S.B.). The operator and/or the maintenance organization selected by the operator must have a system to log S.B.s that are incorporated in each engine. In particular, the following are considered especially valuable for operators on extended TBO:

P&WC S.B. No. 1427	PT Containment Ring (PT6A-114)
P&WC S.B. No. 1430	Exhaust Duct and No. 3 Bearing Cover
P&WC S.B. No. 1434	Combustion Chamber & Large Exit Duct
P&WC S.B. No. 1446	External Scavenge Pump
P&WC S.B. No. 1510	Third Stage Compressor Stator (See Note 2)
P&WC S.B. No. 1669	Compressor Turbine Blades (PT6A-114A)

NOTE: 1. Refer to each service bulletin for individual engine model applicability.

NOTE: 2. P&WC S.B. No. 1510 is only required for PT6A-114A Engines with a compliance category of 5 per the SB instructions.

D. Option A - Fleet TBO Extension by Overhaul Sample Evaluation

4. Appendix (Cont'd)

(1) P&WC may provide extension recommendations for the TBO of an operator's fleet of similarly operated and maintained engines. The condition of the engines examined at overhaul is one element of validating that the specific operator is operating and maintaining the engines in a manner that warrants extending the TBO interval for the specific fleet. Other elements include but are not limited to:

(a) Accuracy of maintenance records.

(b) Reported condition of hardware at previous maintenance intervals.

(c) Local regulatory endorsement of operator adherence to OEM recommended operation and maintenance practices. This endorsement should be obtained on a yearly basis.

(2) The time limits applicable under this program are as follows:

TBO Limit:	8,000 hrs
Calendar Limit:	Engines may operate at the extended TBO for a maximum period of 12 years since new or since overhaul as applicable, or as otherwise agreed in writing by P&WC.

(3) To make sure that engine durability is maintained as the engines are operated into their subsequent extended overhaul intervals, the components listed in the Appendix, Para. 4.B.(4), that are used for engine reassembly at overhaul, must not have more than 12,000 hours since new. Also, all the service bulletins listed in the Appendix, Para. 4.C. and all applicable category 1, 2 and 3 service bulletins must be incorporated in the build of the sample engine and at the next overhaul of other engines in the fleet for which the TBO extension is applicable.

NOTE: Refer to paragraph 3.A.(7) and (8) for specific requirements related to the compressor turbine blades.

(4) Normal TBO extension recommendations are 500 hours. For TBO extension up to 5,100 hours one representative sample engine per 500 hrs increment is required. For TBO extensions above 5,100 hours two representative sample engines per 500 hrs increment are required.

(5) Requirements applicable to the sample(s):

(a) The sample must have a Time Since Overhaul (TSO) that is within 250 hours of the current TBO period. Engines that have more hours than the current P&WC recommended TBO are also acceptable but the extension will be based on the currently recommended P&WC TBO.

4. Appendix (Cont'd)

(b) The sample must have been operated by the current operator for the majority of the TBO period (i.e. for more than 50% of the current TBO interval).

(c) The sample engine must not have had a shop visit for major repairs (Overhaul Manual level) during the current TBO interval (i.e. only Maintenance Manual level tasks and repairs have been carried out).

(d) The operator must complete the fleet TBO Evaluation Sample Request Form Option A (Ref. Fig. 1) and the fleet information form (Ref. Fig. 2) and submit them to their P&WC service center or Designated Overhaul Facility for forwarding to P&WC.

(e) The sample engine must be sent to a P&WC service center or Designated Overhaul Facility (DOF) for the TBO evaluation. The evaluation consist of 2 stages, the first portion consists of a visual examination of the engines prior to cleaning to assess whether the hardware appears capable of 500 hours of further operation. Following satisfactory completion of this phase the second portion consist of detailed examination of the components to the requirements of the P&WC OHM. The P&WC DOF or P&WC Service Centre will forward the TBO Evaluation Sample Request Form (Ref. Fig. 1), the Operator's Fleet Information Form (Ref. Fig. 2) and the TBO Evaluation Hardware Report to P&WC for review and request a TBO extension. After one or two successful samples, depending on the TBO escalation threshold (Ref D,(4)) P&WC will issue a letter to the operator stating that a TBO extension is recommended, subject to the approval of the operator's Airworthiness Authority.

NOTE: 1. When shipping an engine to a P&WC service center or DOF as a sample, operators should state that it is a sample and request a TBO extension evaluation report.

NOTE: 2. Forward all documents to pt6atboevaluation@pwc.ca

NOTE: 3. Refer to P&WC SIL PT6A-041 for further information.

(6) Should a sample be rejected P&WC will not consider a TBO escalation unless the operator defines the actions taken to correct the observed conditions.

(7) The extended TBO may apply to other eligible engines in the operator's fleet covered by the same TBO P&WC S.B. No. 1703., or by P&WC P&WC S.B. No. 1403, 1803 or 12003.

(8) Extended TBO intervals for engines which were added to the fleet from another operator are subject to the pro-rating formula in Para. (13). This formula must be used again when a fleet TBO extension is granted (Ref. Para. (13), Example 2).

4. Appendix (Cont'd)

(9) The TBO extension process can be repeated when the next engine reaches the new escalated TBO interval.

(10) Certain circumstances may warrant a higher TBO increase increment. These will be reviewed on a case by case basis upon written request.

(11) P&WC reserves the right to request additional information on the sample condition, or further TBO extension samples, and this request does not herein imply that P&WC will automatically recommend the extension.

(12) TBO escalation recommendation is subject to the approval of the operators local Airworthiness Authority.

(13) Transfer of Fleet TBO Extension Recommendations
Fleet TBO extensions are valid only as long as the operator, the Maintenance Organization (M.O.), and the typical mission remain unchanged. The following conditions apply for P&WC to transfer the recommendation to a new M.O., a new operator, or a new application (typical mission):

NOTE: For changes limited to the selection by the operator of a new M.O., the change will have no effect if the maintenance plan remains unchanged and the newly selected M.O. is already supporting operators who have approval for engines covered by this SB and to the same or higher TBO.

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

TBO Evaluation Sample Request Form

REQUESTING PARTY DATA

Company name: _____(Owner of engine)
Company address: _____
_____
_____

Telephone Number: _____
Fax Number: _____

Company Contact: Mr./Mrs._____
Title: _____

Telephone Number: _____Ext_____(if other than Company number)

Maintenance Facility: _____
Contact Name: _____
Title: _____
Telephone Number: _____
Fax Number: _____

SAMPLE ENGINE DATA

- Engine Model _____ Engine Serial Number _____
- Total time since new _____ hrs Cycle since new _____ Cycles
- Total time since overhaul _____ hrs Cycle since overhaul _____ Cycles
- Current operator TBO _____ hrs
- Date of entry in service _____ or date of last Overhaul _____

- Was this sample engine operated by the requesting party for the totality of the specified TBO period? Yes___ No ___
  If not please provide the total hours accumulated by the requesting party during last TBO period _____
- Did this engine undergo major repair (requiring removal from aircraft) during this TBO period? Yes___ No ___
  If yes please provide details of repair performed:
  1. Reason for removal _____
  2. Total time (since overhaul if applicable)of sample engine at time of repair _____ hours
  3. List of parts replaced by the repair agency who performed the repair_____

If this sample does not meet minimum eligibility criteria (ref. Appendix 4 (D)), please explain why you believe that the engine should still be considered as an eligible sample for the TBO evaluation process. Include attachments as necessary.

_____
_____

I understand that the sample engine submitted for the purpose of TBO evaluation must meet the minimum eligibility criteria for it to be considered as an acceptable sample and must represent the condition of the other engines submitted in the fleet information form relative to mission type and operational environment.

I hereby attest that the information provided herein is exact to the best of my knowledge and that I may be requested to provide additional data to support the sample engine's eligibility to this program.

Completed by: _____ Date_____

C207304

TBO Evaluation Sample Request Form
Figure 1

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

List other engines in the fleet for which the TBO extension requested would be applicable (Subject to the compliance with this SB).

Engine Model	S/N	TTSN	TTSO	Time * Date	TTSO at induction into the fleet	Date of entry in service or last overhaul	Shop where the last overhaul was carried out

*** Date on which the engine times were recorded.**

C207303

Fleet Information Form
Figure 2

4. Appendix (Cont'd)

(a) For the transfer of an engine to a different fleet extended TBO, the operator can use a pro-rating formula. This formula is generally recognized by regulatory authorities. The TBO applicable to an engine in these circumstances is the fleet TBO formerly applicable and the fleet TBO established for the new operator, Maintenance Organization and mission for the same engine models. It is then weighted on the basis of the time remaining to overhaul under the original operation. The formula for this purpose is:

$$X = Y * a/b$$

where X = time remaining to overhaul on new program (buyer's TBO)

Y = time remaining to overhaul on previous program (seller's TBO)

a =TBO interval on new program (buyer's TBO)

b = TBO interval on previous program (seller's TBO)

Example 1: An aircraft is transferred (by sale or lease) between two operators. The previous operator's engine TBO is 8,000 hours and the new operator's engine TBO is 5,000 hours and the engine has a time since overhaul (TSO) of 6,000 hours

Time remaining to overhaul on the previous program:

Y = 8,000 - 6,000 = 2,000 hours.

Time remaining to overhaul on the new program:

X = Y * a/b

X = 2,000 * 5,000/8,000 = 1,250 hours

Therefore this engine may be operated to a one time TBO interval of 7,250 hours. After overhaul, the engine TBO will revert to the new owners TBO, which is 5,000 hrs. in this example.

Example 2: An operator obtains a recommendation from P&WC for a TBO extension from 5,000 to 5,500 hours, but one of the engines was purchased from an operator with a TBO of 8,000 hours and is currently running to a TBO of 7,250 hours (Ref. Example 1). The new TBO interval will be calculated using the pro-rating formula and the TSO of the engine at entry to the new operator's fleet (6,000 hours).

4. Appendix (Cont'd)

Time remaining to overhaul on the previous program:

Y = 8,000 - 6,000 = 2,000 hours.

Time remaining to overhaul on the new program:

X = Y * a/b

X = 2,000 * 5,500/8,000 = 1,375 hours

Therefore this engine may be operated to a one time TBO interval of 7,375 hours. After overhaul, the engine TBO will revert to the new owners TBO, which is 5,500 hrs. in this example.

4. Appendix (Cont'd)

E. Option B - Engine Specific Extension by Evaluation of Configuration, Condition and Operation

(1) General
TBO extensions can be recommended under this option for specific engines based on a full evaluation of their configuration, condition, and operation. Operators and engines must meet minimum eligibility criteria and the engines must be individually registered into the P&WC engine-specific TBO extension program, and maintained per specific procedures set forth hereunder. Registration is recommended as early as possible when new or after overhaul, but is not subject to a time limit other than the maximum limits of this program. Refer to the Appendix, Para. 4.E.(4).

(2) Application Procedure - To apply for a TBO recommendation for an engine per this program, complete the Option B Operator Qualification Checklist (Ref. Fig 3) and the Option B TBO Application and Engine Qualifying Checklist (Ref. Fig 4) There are two approaches to filling out these forms:

(a) The list may be completed by a qualified Part 145, Part 135, or Part 121 Inspector or equivalent, who must sign off each item.

(b) The list may be completed by other operator personnel and submitted to the local P&WC FSR for review and approval.

(3) Missions that are not Eligible:
The following missions are not considered applicable to this program

- Agricultural;
- Skydiving operations;
- Fire fighting; or
- Other missions which involve an unusually high ratio of cycles to flight hours or unusually protracted use of high power.

NOTE: For confirmation of eligibility, please refer the proposed mission to your local P&WC FSR.

(4) Time Limits

Overhaul: 6,000 hrs or 12 years, whichever comes first, since new or since overhaul as applicable.
3,000 hrs or 6 years, which ever comes first, since mid-life inspection (Ref. Appendix Para. 4.E. (7)).

4. Appendix (Cont'd)

HSI: May be part of the mid-life inspection (Ref. Appendix Para. 4.E.(7)), or per ECTM or disk/blade life expiry requirement. If per ECTM®, perform at least once in a 5,000 hour period.

(5) Eligibility - Operator and Maintenance Organization
To be eligible to request an engine TBO extension recommendation, an operator must provide evidence that the operator's Maintenance Organization (M.O.) has addressed the following maintenance procedures:

(a) The M.O. must be capable of performing all line maintenance activities, including all activities listed in the Maintenance Manual, periodic inspection table, borescopic inspection, compressor and turbine washing, etc. It must also be capable of, or have access to, other aircraft maintenance that can have an effect on the durability of the engine, such as instrumentation calibration and propeller balancing. To demonstrate capability, the M.O. must have available all the applicable tooling and must have personnel specifically trained to perform these tasks and/or must have service contracts with facilities that have such applicable tooling and trained personnel.

(b) The operator/M.O. must have a quality system that records all snags and maintenance activities related to the operation of the engine. This also applies to engine-mounted aircraft accessories such as the propeller, the overspeed governor, and the starter-generator. Records must be available for review by P&WC on request.

(c) The operator/M.O must also complete the Option B Operator Qualification Checklist (Ref. Fig 3).

(6) Eligibility - Engines:

(a) Engines must incorporate all service bulletins in the Appendix, Para. 4.C. at the first opportunity and no later than the mid-life inspection. Also, except C.T Blades (Ref.Para 3.A (7 and 8), components listed in the Appendix, Para. 4.B.(4) must have no more than 12,000 hours total time since new, at induction and through the applicability of the program.

(b) Records for engine events that required unscheduled inspections must be available for review by P&WC. This is to ensure compliance with all Maintenance Manual requirements.

(c) P&WC recommends that the aircraft is equipped with an approved exceedance and engine monitor. Engine Condition Trend Monitoring (ECTM) requirements can be found in SIL's GEN-055.

(d) The operator/M.O must also complete the Option B TBO Application and Engine Qualifying Checklist (Ref. Fig 4).

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

Option B Operator Qualification Application and Checklist

Company Name _____ Telephone _____
Company Address _____ Fax _____
_____ Email _____
_____

Company Contact _____ Title _____
Email _____ Telephone _____
Fax _____

Maintenance Facility _____ (if other than operator)
Contact Name _____ Title _____
e-mail _____ Telephone _____
Fax _____

PT6A Maintenance Experience

Current Experience:	Yes	No		Operating Certificate	
Start-up Operator	( )	( )		Part 91 or equivalent	( )
Existing Operator	( )	( )	Yrs:_____	Part 121 or equivalent	( )
P&WC Experience	( )	( )	Yrs:_____	Part 135 or equivalent	( )
PT6A Experience	( )	( )	Yrs:_____	Other: _____	
Operating Certificate	( )	( )			

Operator Mission Profile

Average hours / month _____
Average cycle-to-hour ratio _____

		In-House		Contract	
		Yes	No	Yes	No
Quality Assurance (Part 121 / 135 only)	Q.A. Program in place	( )	( )	( )	( )
Maintenance Tracking	Manual system	( )	( )	( )	( )
	Computer software	( )	( )	( )	( )
	ECTM capability	( )	( )	( )	( )
	Please provide a brief summary of the maintenance tracking system in place:				
		Yes	No	Yes	No
Facility	Maintenance hangar sufficient for applicable aircraft installation	( )	( )	( )	( )
	Segregated and secure parts area	( )	( )	( )	( )
Publications	**Illustrated Parts Catalog(s):**				
	Current Illustrated Parts Catalog	( )	( )	( )	( )
	Subscription to revisions up-to-date	( )	( )	( )	( )
	Engine Maintenance Manual(s):				
	Current Maintenance Manual	( )	( )	( )	( )
	Subscription to revisions up-to-date	( )	( )	( )	( )
	Service Bulletins (SB):				
	Complete SB set for applicable engine	( )	( )	( )	( )
	Subscription to SB's up-to-date	( )	( )	( )	( )

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Option B Operator Qualification Checklist
Figure 3 (Sheet 1 of 2)

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

		In-House		Contract		
Personnel	**Minimum Personnel:**	**Yes**	**No**	**Yes**	**No**	
	Director of Maintenance	( )	( )	( )	( )	(Attach resume)
	Chief Inspector	( )	( )	( )	( )	(Attach resume)
	Experienced PT6A Mechanic(s)	( )	( )	( )	( )	
	Chief Pilot	( )	( )	( )	( )	

		In-House		Contract		
Personnel Training	Pilot recurrent training up-to-date	( )	( )	( )	( )	
	# Mechanics with PT6A factory training					(Attach names / dates)
	# Mechanics scheduled					(Attach names / dates)

		Yes	No	Yes	No	
Tooling	Specialized engine tooling	( )	( )	( )	( )	(Attach list)
	Ground support equipment	( )	( )	( )	( )	(Attach list)
	Hot Section and mid-life inspection	( )	( )	( )	( )	(Attach list)
	ECTM (tools to download files)	( )	( )	( )	( )	
	Compressor / Turbine Wash	( )	( )	( )	( )	
	Fuel Nozzle Inspection	( )	( )	( )	( )	
	Propeller Balancing	( )	( )	( )	( )	
	Cockpit instrumentation calibration	( )	( )	( )	( )	
	Borescope inspection	( )	( )	( )	( )	(Attach specifications)

Acknowledgment

I hereby acknowledge that as an operator I must have maintenance capability to support a TBO extension and must meet minimum eligibility criteria as determined by P&WC. I hereby attest the information provided herein is exact to the best of my knowledge and that P&WC may request additional data. I acknowledge that the TBO recommendation requires additional maintenance actions at mid-life in accordance with the applicable service bulletin or the TBO extension may become void. I grant P&WC all rights to independently verify all submitted information and acknowledge this application is subject to P&WC's written approval. I acknowledge failure in the future to operate and maintain engines in accordance with the applicable Pilots Operating Handbook (POH), applicable Maintenance Manuals (Aircraft and Engine), applicable Airworthiness Directives, and the applicable P&WC Service Bulletin's, may render the TBO recommendation null and void. I agree to provide an annual report (Ref. Figure 4. Yearly Operator Report) of engines operated on Option B.

Director of Maintenance

Name (printed) Signature Date

Aircraft Owner

Name (printed) Signature Date

Chief Pilot

Name (printed) Signature Date

P&WC Field Service Representative

Name (printed) Signature Date

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Option B Operator Qualification Checklist
Figure 3 (Sheet 2)

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

Option B TBO Application and Engine Qualification Checklist

Company Name _____ Telephone _____
Company Address _____ Fax _____
_____ Email _____
_____

Company Contact _____ Title _____
Email _____ Telephone _____
Fax _____

Maintenance Facility _____ (If other than operator)
Contact Name _____ Title _____
Email _____ Telephone _____
Fax _____

Engine Data:
Application for TBO extension under Option B requires inspector's initials in each inspector's signature block, or alternativelv) ^k I kèpfqb bkdfkb obsfb t _v ^ M# T @ Field Service Representative.

Engine Model: _____

EIS		Data of entry into service or last overhaul
TTSN		Total Time Since New
TCSN		Total Cycle Since New
TTSO		Total Time Since Overhaul
TCSO		Total Cycles Since Overhaul
TTSHSI		Total Time Since Hot Section Inspection
TCSHSI		Total Cycles Since Hot Section Inspection

General Considerations for Eligibility:
The applicant's Director of Maintenance, Chief Inspector or other qualified inspector shall initial for conformity with the following statements:

	Conforms Yes	Conforms No	Inspector's Initials
1. The above mentioned engine has been built with new P&WC recommended components, components refurbished by P&WC owned shops, or components refurbished by P&WC authorized shops per P&WC standards.	( )	( )	
2. The above mentioned engine is a P&WC factory built engine or an engine overhauled/repaired by a P&WC service center or a P&WC Distributor and Designated Overhaul Facility (DDOF)	( )	( )	
3. If the above mentioned engine was put in storage or was unused for an extended period of time since its last overhaul (or since new if not previously overhauled), there must be documented evidence (logbook entry) that the engine was preserved per the engine maintenance manual or alternative methods found to be acceptable to P&WC.	( )	( )	

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Option B TBO Application and Engine Qualification Checklist
Figure 4 (Sheet 1 of 3)

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

Engine Assembly and Component Records:

Initial for conformity of availability of assembly and component records

		Conforms Yes	Conforms No	Inspector's Initials
Module time and cycles since new, since last overhaul and since HSI		( )	( )	
Accessories time since new and since overhaul		( )	( )	
Total cycles of life limited rotors (Ref. P&WC SB No. 1002)		( )	( )	
The following components must have no more than 12,000 hours total time since new. Initial for conformity with this Service Bulletin.				
The mainline ball bearing No. 1	TTSN_____	( )	( )	
The mainline ball bearing No. 4	TTSN_____	( )	( )	
The compressor turbine blades	TTSN_____	( )	( )	
The power turbine blades	TTSN_____	( )	( )	
The RGB 1st stage Sun and Planet Gears	TTSN_____	( )	( )	
Aircraft must be equipped with an approved exceedance monitor		( )	( )	
Aircraft signed up for ECTM services with a P&WC approved Designated Analysis Center (DAC).		( )	( )	

Service Bulletin and Accessory Configuration Records:

Note: If any of the following SB's are NOT currently complied with, compliance Is required no later than 1st mid-life inspection.

Service Bulletin	Applicability	Description	Completed? Yes	Completed? No	Inspector's Initial
P&WC S.B. No. 1427	PT6A-114	PT Containment Ring	( )	( )	
P&WC S.B. No. 1430	PT6A-114 /114A	Exhaust Duct and No.3 Bearing Cover	( )	( )	
P&WC S.B. No. 1434	PT6A-114	Combustion Chamber & Large Exit Duct	( )	( )	
P&WC S.B. No. 1446	PT6A-114 /114A	External Scavenge Pump	( )	( )	
P&WC S.B. No. 1510	PT6A-114A	Third Stage Compressor Stator	( )	( )	
P&WC S.B. No. 1669	PT6A-114 /114A	Compressor Turbine Blades	( )	( )	

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Option B TBO Application and Engine Qualification Checklist
Figure 4 (Sheet 2)

TURBOPROP ENGINE
OPERATING TIME BETWEEN OVERHAULS AND HOT SECTION INSPECTION FREQUENCY

Accessory Maintenance Records

NOTE: Refer to SB 1703 Appendix Para. J Table 1 for specific requirements.

Accessory	Mid-life Requirement	TSO	Completed? Yes	Completed? No	Inspector's Initial
Propeller Governor	Shop Functionality Check		( )	( )	
FOHE	Shop Functionality Check		( )	( )	
	Replace element packings		( )	( )	
Fuel Pump	Shop Functionality Check		( )	( )	
Fuel Nozzles	Replace pump coupling		( )	( )	
	Overhaul (Except for Nozzles on an exchange Program)				
Bleed Off Valve	Shop Functionality Check		( )	( )	
T5 Harness	Inspect per EMM		( )	( )	
T5 Thermocouple	Inspect per EMM		( )	( )	
T1 Thermocouple	Inspect per EMM		( )	( )	

Mid-life Inspection Status

	Yes	No	
Mid Life Inspection Completed?	( )	( )	

Acknowledgment

I acknowledge the engine submitted for the purpose of TBO evaluation must meet minimum eligibility criteria as determined by P&WC. I hereby attest the information provided herein is exact to the best of my knowledge based upon an inspection of engine records and that P&WC may request additional data. I acknowledge the TBO recommendation requires additional maintenance actions at mid-life in accordance with SB 1703 or the TBO recommendation may become void. I grant P&WC all rights to independently verify all submitted information and acknowledge this application is subject to P&WC written approval. I acknowledge that failure in the future to operate and maintain engines in accordance to the applicable Pilot's Operating Handbook (POH), applicable Maintenance Manuals, applicable airworthiness directives and P&WC SB 1703 may render the TBO recommendation null and void. I acknowledge this is a guide and the text in SB 1703 will govern in all cases. I agree to provide an annual report (Ref Figure 5. Yearly Operator Report) of engines on Option B.

Director of Maintenance

Name (printed) Signature Date

Inspector Completing Checklist

Name (printed) Signature Date

Aircraft Owner

Name (printed) Signature Date

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Option B TBO Application and Engine Qualification Checklist
Figure 4 (Sheet 3)

4. Appendix (Cont'd)

(7) Mid-Life Inspection
Engines registered in the engine specific TBO extension program are subject to a mid-life inspection. Schedule between 2,500 hours and the operator's TBO (Ref. Note 3). Requirements need not be carried out concurrently, and the HSI portion may be scheduled per the Appendix, Para. 4.E.(4). When scheduling this inspection, operators must also consider other limitations such as the time limits per the Appendix, Para. 4.B.(4), and cyclic limits per P&WC S.B. No. 1002. Do the inspection as follows:

NOTE: 1. For P&WC to provide a TBO extension recommendation, the various inspection procedures must be performed by a P&WC service centre or DOF facility/representative/M.O. recommended by P&WC for the procedures carried out.

NOTE: 2. Unless otherwise specified, Maintenance Manual procedures and limits apply.

NOTE: 3. Operator's TBO refers to the engine basic TBO or extended TBO per Option A as applicable, prior to enrollment in Option B.

(a) Verify compliance with all applicable inspection SBs.

(b) Do a full hot section inspection, including all applicable requirements described in the Maintenance Manual (72-00-00). The exposed gas generator surfaces must be free of corrosion and all missing diffuser ducts must be replaced. Compressor turbine and power turbine blades must show no or minimal sulphidation (stage 1 maximum). Engine performance after this inspection must meet the aircraft power assurance requirements with a minimum of 20°C (36°F) ITT margin and 0.5% rpm (200 rpm) Ng margin.

(c) For engines Pre-SB1669 configuration:
Do the CT disk assembly overhaul level inspection (Ref. Para. 3.A.(7)) at this time. Include an overtemperature exposure check per the overhaul manual (72-50-02, Light Overhaul, Overtemperature, Category B (All Conditions Other than Starting)). On the basis of individual service history, P&WC can provide an exemption from this recommendation to those operators who demonstrate a maintenance program encompassing fuel nozzle refurbishment, borescope inspection and engine condition trend monitoring (ECTM). Ref. SIL PT6A-146 for additional details.

(d) Make sure the compressor is free of corrosion.

(e) Repair compressor foreign object damage (FOD).

(f) Inspect the AGB starter generator drive pad splines for wear.

4. Appendix (Cont'd)

(g) Make sure the external surfaces meet all corrosion and damage requirements. Repair gas generator and cast housing surfaces with touch-up paint. Clean and inspect the gas generator drain valves.

(h) Remove and inspect the external pneumatic hoses and tubes (Px and Py tubes) for cracks or other damage. Tubes must show no signs of deformation (compared to a new tube).

(i) Perform all oil system checks, for example

- MOP setting
- Torque meter functional check.

(j) Accessories require inspection per Appendix Table 1.

TABLE 1, Accessories Option B

System Accessory	Recom-mended Configuration	Mid-Life Requirement (Option B only)	Other Requirements
Propeller Governor	SB1470	Shop Functionality Check	
Fuel Heater		Shop Functionality Check Replace element packings	
Fuel Pump		Shop Functionality Check Replace Pump to FCU coupling	
Fuel Control Unit	P&WC S.B. No. 1561	Drivebody Inspection (driveshaft bearing replacement, clean pneumatic section and recalibrate)	Ref. EMM (Chap. 72-00-00, Table 601)
Flow		Shop Functionality Check	
Fuel Nozzles	SB1396 (PT6A-114)	Overhaul (Except for nozzles on an exchange program).	

4. Appendix (Cont'd)

TABLE 1, Accessories Option B (Cont'd)

System Accessory	Recom-mended Configuration	Mid-Life Requirement (Option B only)	Other Requirements
Bleed Off Valve	SB1581 (PT6A-114A)	For Pre-SB1581: Replace diaphragm, clean and re-calibrate	For Pre-SB1581: Inspect per the MM annually
T5 Harness		Inspect per MM	
T5 Thermocouple		Inspect per MM	
T1 Thermocouple		Inspect per MM	

(k) Inspect all controls, linkages, leads and connectors for chafing, corrosion, cracks. Do all controls adjustments and checks specified in the Maintenance Manual (Ref. 71-00-00, Power Plant - Adjustment/Test).

(l) Check the temperature indicating system, including the T1 probe trim resistance.

(m) Check the operation and/or calibration of all engine related instrumentation (ITT, Tq, Ng, Np). Refer to the applicable Aircraft Maintenance Manual (AMM).

(8) Operation and maintenance requirements after registration in the program. Maintain the engine per the Engine and/or Aircraft Maintenance Manual (AMM). In addition, an approved maintenance plan will include the items that follow:

(a) Monitor the engine performance as per the ECTM® program (Ref. Service Information Letter (SIL) Gen-055).

(b) Wash the engine compressor and turbine at intervals that are consistent with the environment in which the engine operates (Ref. Maintenance Manual 71-00-00, Power Plant - Cleaning).

NOTE: Contact the local P&WC FSR for information on the best interval.

(c) At the periodic fuel nozzle inspection, record the nozzle positions per the applicable Maintenance Manual. The concurrent borescope inspection of the hot section must cover the area in line with any nozzle found unserviceable.

NOTE: For nozzle assemblies on an exchange program, do the inspection within 400 hours of removal of nozzles reported as unserviceable.

4. Appendix (Cont'd)

(d) Inspect the compressor first stage blades for FOD at an interval not more than 1,000 hours or one year whichever occurs first and blend per the Maintenance Manual.

(e) Do all control adjustments and checks annually per the Maintenance Manual (Ref. 71-00-00, Power Plant - Adjustment/Test).

(f) Balance the propeller per the Aircraft Maintenance Manual (AMM) or the propeller Component Maintenance Manual (CMM) at an interval not more than 1,000 hrs or one year.

(g) Check the operation and/or calibration of all engine related instrumentation at intervals not more than 1,000 hrs or one year per the Aircraft Maintenance Manual (AMM). (ITT, Tq, Ng, Np).

NOTE: This check is not required if the engine has an exceedance monitor.

(h) Supply a report each year to P&WC with a status update relative to these requirements (Ref. Fig. 5).

(9) Mission Consistency
The mission that the engine is used for and the area of operation must remain as specified at the time of induction. (Ref. Appendix, Para. 4.E.(3)).

(10) Transfer of Engine Specific TBO Recommendations
For changes for an engine registered under the P&WC engine-specific TBO extension program, the operator/owner can apply to P&WC for a transfer. If the operator, its mission, and its M.O. are already established as eligible for the engine models per this SB, no further action will be required. Otherwise, it is necessary to establish the eligibility of the new operator, application, and/or M.O. before the recommendation can be extended to these new conditions.

F. Transfer from one TBO Extension Option to the Other

(1) Operators that have extended their fleet TBO per Option A, per revisions 1 to 6 of this SB, may apply for an individual engine TBO extension per Option B. Refer to the Appendix, Para. 4.E.

(2) Operators that have extended the TBO of individual engines per Option B may consider submitting these engines as samples per Option A. Refer to the Appendix, Para. 4.D.

(a) Each acceptable sample provides a fleet extension of 500 hours relative to the current P&WC recommended fleet TBO for the operator.

PT6A Engine Specific TBO Extension (Option B)
Operator Yearly Report

This form is to be completed yearly by PT6A operators registered in the 'Engine Specific TBO Extension Option B' to support the yearly operation and maintenance requirements of the program.

OPERATOR DATA

Name (owner of engine): _____

Maintenance Facility (if other than owner): _____

ENGINE DATA

Engine Model: _____ **Engine S/N:** _____

TSN: _____ **TSO:** _____ **Current TBO interval:** _____

A) ECTM

Use of ECTM program: ☐ **Yes**

Data review by trained/qualified technicians: ☐ **Yes** **Frequency of reviewed:** _____

Last time/TSN completed: _____

B) ENGINE WASH

Interval for compressor wash: _____ **Last time/TSN completed:** _____

Interval for turbine wash: _____ **Last time/TSN completed:** _____

C) FUEL NOZZLES INSPECTION

Interval for nozzles inspection: _____ **Last time/TSN completed:** _____

Concurrent borescope inspection of hot section: ☐ **Yes**

D) COMPRESSOR BLADES INSPECTION

Interval for blades inspection: _____ **Last time/TSN completed:** _____

E) CONTROL AND POWER ADJUSTMENTS/CHECKS

Interval for adjustments/checks: _____ **Last time/TSN completed:** _____

F) PROPELLER

Interval for propeller balance: _____ **Last time/TSN completed:** _____

G) ENGINE INSTRUMENTATION (ITT, NG, Tq)

Interval for gauges calibration: _____ **Last time/TSN completed:** _____

H) MISSION CONSISTENCY

Mission that the engine is used for and area of operation have remained as specified at induction of TBO extension? ☐ **Yes** ☐ **No**

I hereby attest that the information provided herein is exact to the best of my knowledge and that I may be requested to provide additional data to support yearly requirements of Option B TBO Extension.

Completed by: _____ **Date:** _____

Please return report to: **Pratt & Whitney Canada**
Attn: Manager Serv. Engineering – Small Turboprops (01PD4)
100 Marie–Victorin
Longueuil, Quebec
Canada, J4G1A1
Fax: (450) 647–7567 Email: pt6atboevaluation@pwc.ca

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Option B - Yearly Operator Report
Figure 5

4. Appendix (Cont'd)

(b) The recommendation will apply to engines in the fleet that meet requirements per Option B. Refer to the Appendix, Para. 4.E.

(c) Recommendations in cases where some of the samples submitted were not in satisfactory condition may be lower and/or take into consideration corrective actions put in place.

G. **Minimum Engine Parameters Monitoring System Requirements:**

NOTE: For more information or clarification, contact your local P&WC Field Support Representative (FSR).

(1) **ENGINE AND AIRCRAFT PARAMETERS:**
The system must record and store data from all the parameters that follow:

- Inter Turbine Temperature (ITT);
- Torque (Tq);
- Gas generator speed (Ng);
- Propeller speed (Np);
- Fuel flow (Wf);
- Indicated Outside Air Temperature (IOAT);
- Altitude; and
- Indicated Airspeed (IAS).

(2) **SAMPLING AND RECORDING FREQUENCY:**
The system must monitor, in real time, all of the parameters with a minimum sampling frequency of 5 Hz and record the data at least twice per second during an exceedance event. System software level "C" is recommended. The aircraft Original Equipment Manufacturer (OEM) and P&WC can negotiate acceptable alternative software levels.

(3) **SIGNAL ACCURACY:**
The accuracy of the signal processing, which includes the sensor where applicable, should be within the tolerances that follow:

TABLE 2, Signal Accuracy

Parameter	Tolerance
Inter-Turbine Temperature (ITT)	±5°C

4. Appendix (Cont'd)

TABLE 2, Signal Accuracy (Cont'd)

Parameter	Tolerance
Engine Torque (TQ)	±1%
Compressor (Ng) and Propeller (Np) speed	±0.2%
Fuel Flow (Wf)	±2.5%
Indicated Outside Air Temperature (IOAT)	±2°C
Altitude	±250 ft
Indicated Air Speed (IAS)	±10 knots

(4) **DATE AND TIME:**
For each engine parameter exceedance event and for ECTM® readings, the system must record all the parameters with Date and Time. The device that records the data must keep it during system power-off intervals.

(5) **EVENT DEFINITION:**
The system program must record exceedances for the specific PT6A engine model per the applicable P&WC Maintenance Manual limitations.

(6) **VISUAL INDICATION:**
The system must have a visual indication to the pilot or maintenance personnel to tell them that an engine event occurred and that there may be a maintenance action prior to the next flight.

(7) **SIMULTANEOUS EVENTS:**
The system must have the capability to record simultaneous or multiple events for each parameter monitored, with the minimum requirements that follow:

(a) Identify the affected parameter.

(b) Record the Date and Time that each event starts and ends.

(c) System shall be capable of recording all parameters identified above for a period of time prior to and after an engine exceedance event in a manner that allows for a complete reconstruction of the event.

(8) The examples that follow show methods on how to reconstruct and record simultaneous or multiple events:

(a) Method 1: The system buffers data and then writes it to the permanent memory when necessary.

4. Appendix (Cont'd)

(b) Method 2: System flags are defined at specific set points, which occur before the event definition. If the actual value of a parameter crosses the value defined by the flag, the system starts or stops storing data as required.

(9) **ALLOWABLE DOWNTIME (System or specific elements of system in-operative):** Anytime the system or elements of the system are in-operative, the maximum allowable downtime for specific parameters are as follows:

TABLE 3, Maximum Allowable Downtime

Parameter	Downtime (hours)
Entire System	20
Inter-Turbine Temperature (ITT)	20
Engine Torque (TQ)	40
Compressor (Ng) and Propeller (Np) speed	40
Any other elements not specified	150

(a) Manually record the parameters listed in 4.H.(1) at a stabilized cruise condition, daily or every 6 hours, in compliance with ECTM® requirements. Refer to S.I.L. No. GEN-055.

(10) **FIELD REPROGRAMMING:** The software must make it possible for field maintenance personnel to apply software modifications authorized by the manufacturer for the current installation.

(11) **INSUFFICIENT MEMORY:** The system must generate a notification to the pilot or maintenance personnel when there is a possibility of insufficient remaining memory to store event or trend data during the next flight.