Pratt & Whitney Canada

Une société de United Technologies /A United Technologies Company

PT6T-3D

TEARDOWN REPORT

CP-PS-140089

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Report purpose:

This report is based on a preliminary review of engine components condition immediately after disassembly. This review is not a detail inspection for the purpose of determining their serviceability.
It’s only intent is to provide an as received condition report.

General condition:

As received, power and compressor rotors were free to rotate.

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Teardown Report

Modèle / Model: PT6T-3D	Bon de commande / Sales order No.: 217674		No de série / Serial No. CP-PS- 140089		Date: 13-Feb-2020
Module: REDUCTION GEAR BOX	TBO Basic: 4000	T.B.O. actual: 4000	T.B.O. target: 4000		Service: REPAIRED
Reçu de (dernier operateur) / Received from (last operator): Sierra Nevada Corporation (GVO)			Build Spec. received: 836		Build Spec. Target: 836

Reçu jumelé avec - Received Mated with:

N° de série PS/GG / PS/GG Serial No. CP-GB- 11046	N° de série P/S/RGB / PS/RGB Serial No. CP-PS- 140090	N° de contrôle / Control No. PCE-089829

Date de la dépose / Date of removal: 19-Sep-2019

Motif de la visite / Reason for removal: Performance Problem (Due to torque split)

Livret technique - Logbook:

Type	Couleur - Color	Qté - Qty
NIL	NIL	NIL
CANADIAN	YELLOW	1
NIL	NIL	NIL

Module: POWER SECTION

T.S.N.	4951.5	T.S.O.	1161.3
S.S.N.	5709	S.S.O.	1216
F.S.N.	14139	F.S.O.	4087
C.S.N.	NIL	C.S.O.	NIL
R.E	NIL	R.E.S.O.	NIL

Dernière révision / Last Overhaul:

Date	à heures / at Hours	depuis / since	par / by
16-Nov-2012	3790.2	NEW	P&WC Plan 0005

Dernière réparation / Last Repair:

Date	à heures / at Hours	depuis / since	par / by
NIL			

Dernière visite à l'ét.5 / Last Shop Visit in Plt 5:

Date	à heures / at Hours	depuis / since	par / by
16-Nov-2012	3790.2	NEW	P&WC Plan 0005

Dernière H.S.I. / Last H.S.I.:

Date	à heures / at Hours	depuis / since	par / by
NIL			

Livret technique - Logbook:

Type	Couleur - Color	Qté - Qty
NIL	NIL	NIL
NIL	NIL	NIL
NIL	NIL	NIL

Module:

T.S.N.	NIL	T.S.O.	NIL
S.S.N.	NIL	S.S.O.	NIL
F.S.N.	NIL	F.S.O.	NIL
C.S.N.	NIL	C.S.O.	NIL
R.E	NIL	R.E.S.O.	NIL

Dernière révision / Last Overhaul:

Date	à heures / at Hours	depuis / since	par / by

Dernière réparation / Last Repair:

Date	à heures / at Hours	depuis / since	par / by

Dernière visite à l'ét.5 / Last Shop Visit in Plt 5:

Date	à heures / at Hours	depuis / since	par / by

Dernière H.S.I. / Last H.S.I.:

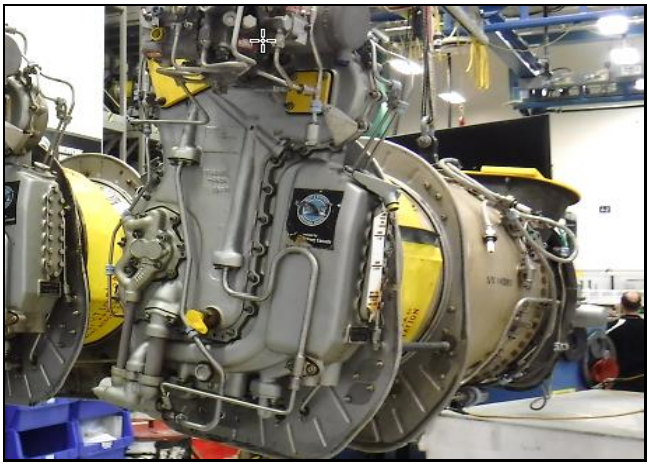
Date	à heures / at Hours	depuis / since	par / by

TEARDOWN REPORT

Complete Engine

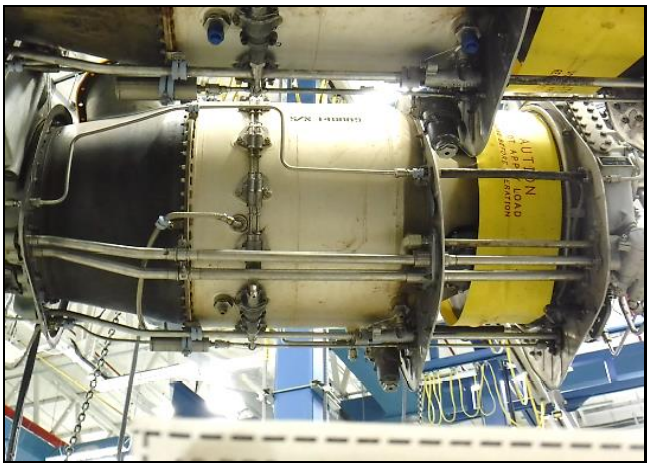
P1

P2



P3

P4



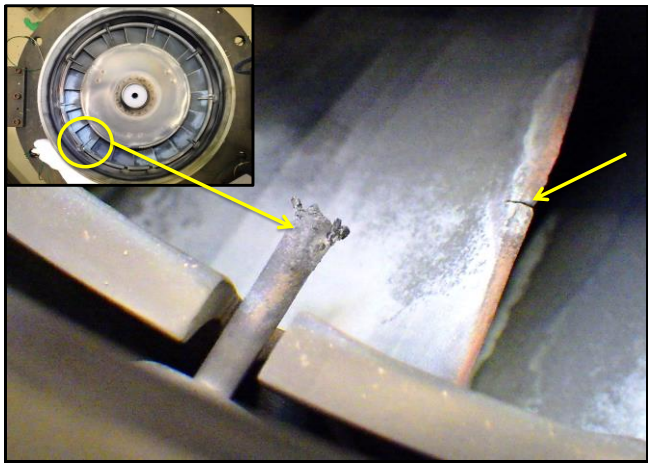
OBSERVATIONS

P1-P4	***Engine as received showed normal condition for total accumulated time and reason for removal.***

TEARDOWN REPORT

Exhaust Case Section

P1



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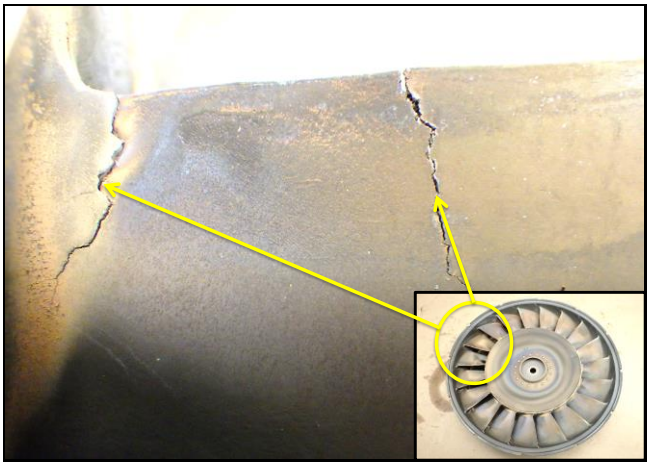
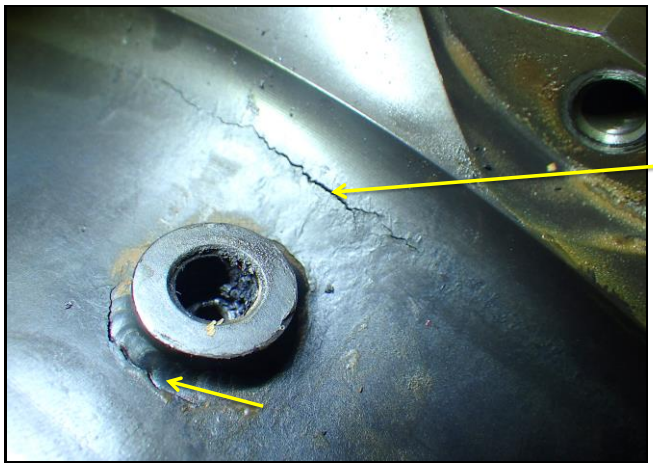
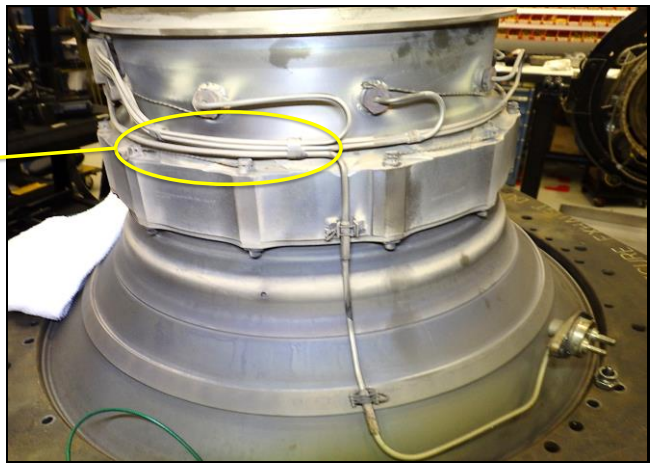


P3



P4



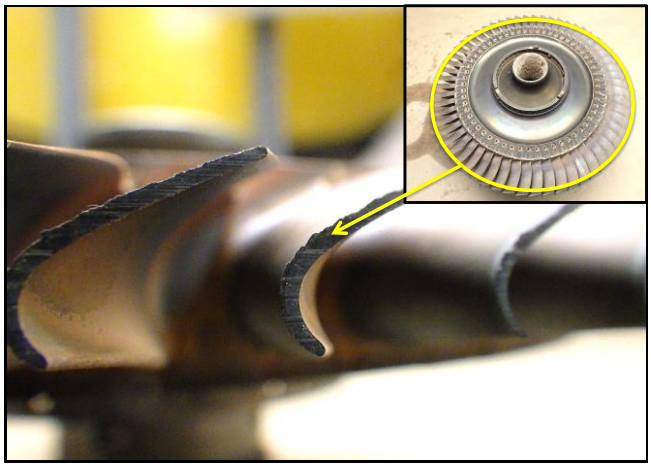
OBSERVATIONS

P1	***Burnt probe found on T5 harness.***
P2	***Major cracks found at power turbine vane airfoils.***
P3	***Major cracks found at power turbine vane ring housing adjacent to T5 boss.***

TEARDOWN REPORT

Hot Section

P1



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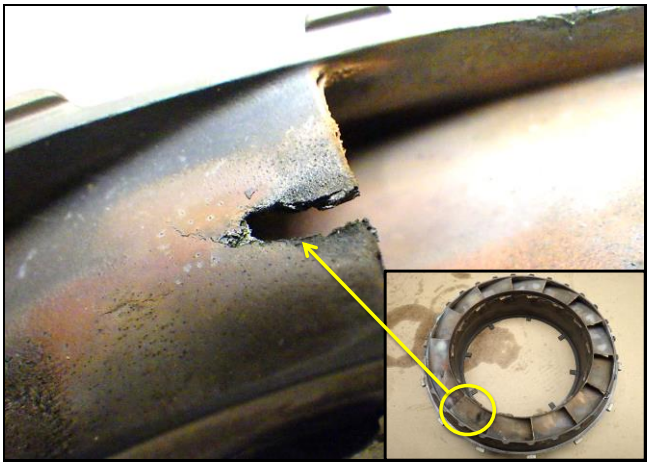

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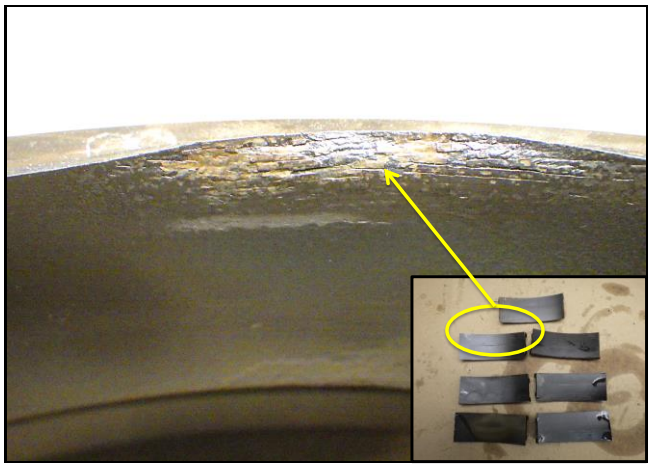
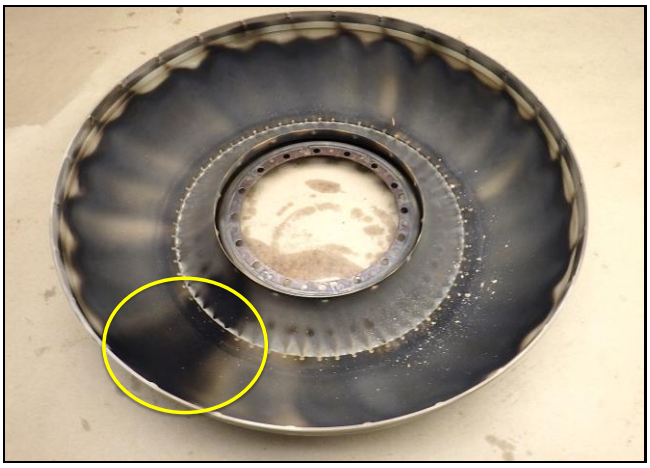


P4



OBSERVATIONS

P1	***Rubbing found at compressor turbine blade tips.***
P2	***Burnt airfoil found at compressor turbine vane ring trailing edge.***
P3	***Distortion and burnt found at compressor turbine shroud segments.***
P4	***Heat discoloration found at large exit duct inner dome.***

TEARDOWN REPORT

Investigation:

This power section was tested upon reception. ITT was 40° Rankine degrees over limit at 970 SH, P3 ratio 0.6 over and SFC 0.017 LB/SHP.HR over. T7 spread was also observed very high. Engine was Ng slow and ITT hot, indicating an issue with the hot section. It was split at "C" flange and several discrepencies were found. CT tip clearances were high, CT blades were rubbed, CT and PT vanes were cracked and CT shroud segments were distorted. Power turbine vane housing displayed major cracks at T5 probe adjacent surface.

Conclusions:

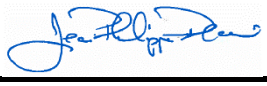
After reviewing the facts, it seems that fuel nozzles no.5 or 6 showed an improper fuel spray pattern. The carbon accumulation found in the combustion chamber liner is most probably related with such fuel streak. The damages reported in the investigation section above are aligned at 4 o'cloak location alongside gas generator. T7 spread issues are mostly associated with fuel nozzles spray pattern. Compressor turbine blades laboratory analysis displayed no solutionning, meaning the blades are still serviceable. Performance deterioration is associated with the hot section degradation.

Required Work Scope:

The engine will be inspected and repaired in accordance with the latest revision of the PT6T-3D maintenance manual, overhaul manual and approved data. In addition, hot section inspection, 50, 100, 150, 300, 600 and 900 hours scheduled will be performed. Upon completion, this engine will be ready to return in service.

NOTE: Conclusion as to the possible causes of the observed problem will be considered as opinions only.

PREPARED BY:



Jean-Philippe Drouin
ENGINE MAINTENANCE TECHNICIAN

April 28, 2020