



## Constructing Strong Letters of Intent (LOI)



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# Agenda

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1. LOI - Delivery Condition Perspective
2. LOI – Redelivery Condition Language
3. LOI – Maintenance Reserve Topics

# LOI - Delivery Condition Perspective

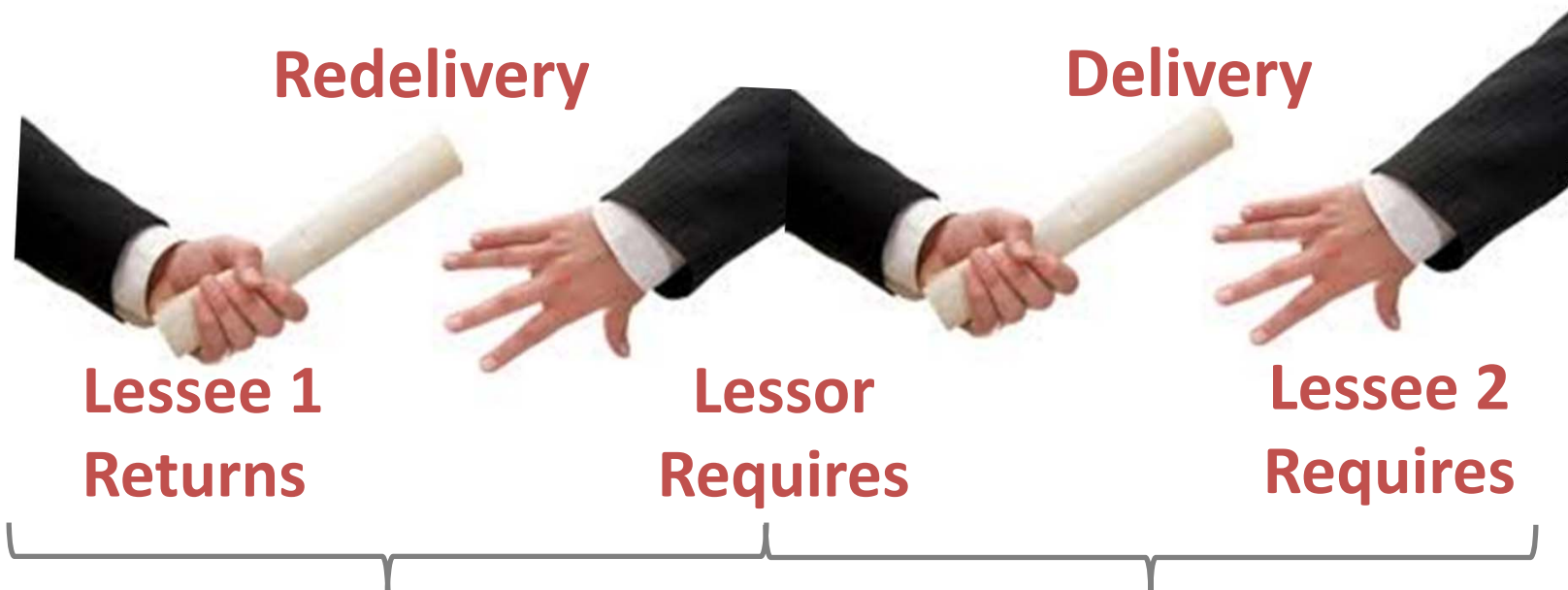
## Delivery Condition – From Lessee’s Perspective



**Aircraft** with major maintenance events cleared for pre-defined intervals consistent with standard C-Check interval (i.e. 20 Mo / 6,000 FH / 3,000 FC).

# LOI - Delivery Condition Perspective

## Delivery Condition – From Lessor’s Perspective



Specify minimum **return conditions** below which lessee is obliged to perform mx before returning aircraft.

Specify minimum **delivery conditions** below which lessor is obliged to perform mx before delivering aircraft.

# LOI - Redelivery Condition Language

## Redelivery Conditions

Aircraft Inspection &  
Documentation Review

General Condition of  
Aircraft at Redelivery

Check & Part Lives  
at Redelivery



## LOI Delivery Conditions

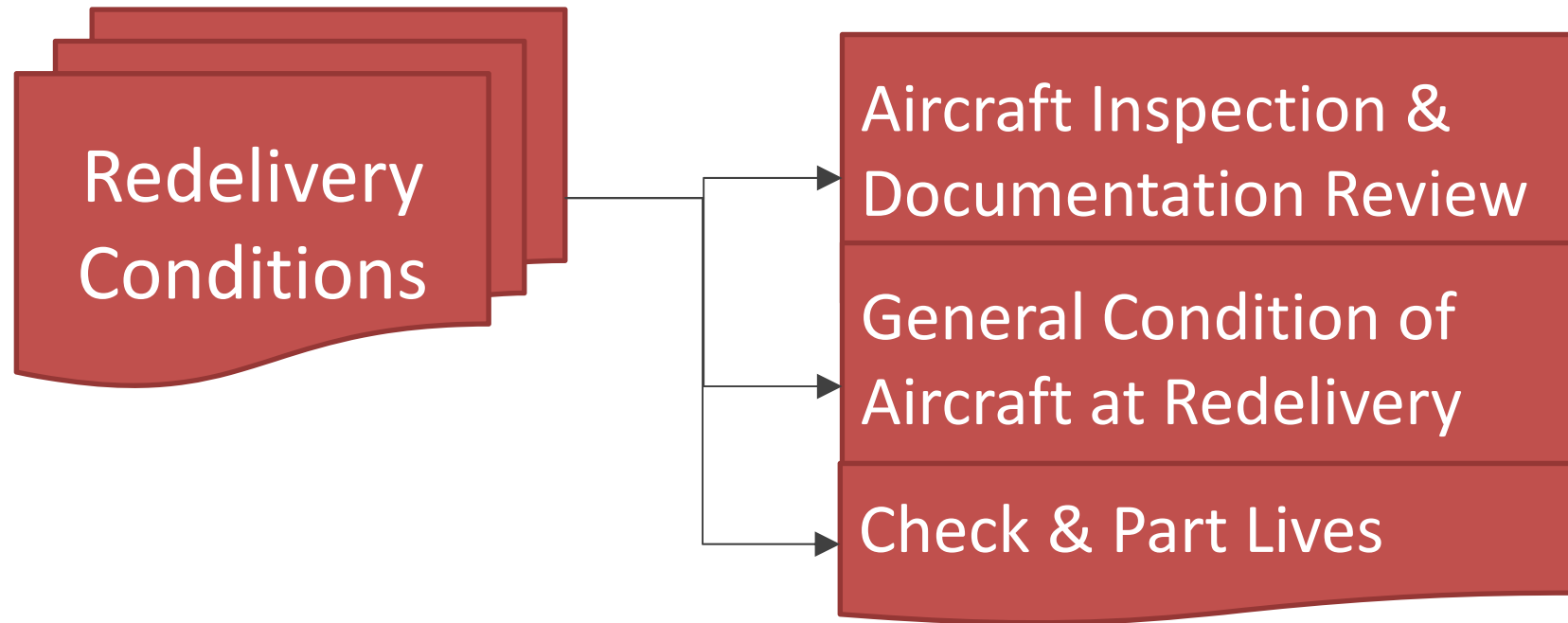
Aircraft Inspection &  
Documentation Review

General Condition of  
Aircraft at Delivery

Check and Part Lives  
At Delivery

The status of **Redelivery Conditions** are generally used to establish LOI **Delivery Conditions**

# LOI - Redelivery Condition Language



Therefore - Structuring Strong **Redelivery Conditions** is key to Constructing Strong LOIs

## Aircraft Inspection & Documentation Review



**Redelivery check workscope review** : 3-6 months prior to lease expiry

**Full documentation review** : 1-3 months prior to lease expiry



**At redelivery check** : Ability to observe functional & operational checks, and perform visual inspections.

## General Condition of Aircraft at Redelivery



**Trend Monitoring Data :** EGT Margin and approximation of EGT Margin erosion rate

**Power Assurance Run:** In accordance with OEM's maintenance manual.



**Engine Borescope :** A full hot & cold section videotape borescope in accordance with OEM's maintenance manual.



## General Condition of Aircraft at Redelivery



**Thrust Reverser, Nacelles & Nose Cowlings :**  
Detail external inspection for damage, delamination, corrosion in accordance with the OEM's AMM & SRM



**Airframe Repairs :** No temporary, time-limited or interim repairs. No external doublers unless recommended by OEM. All repairs per the SRM or per data supported by FAA/EASA.

# LOI - Redelivery Condition Language

## Check & Part Lives

Airframe

Engine

APU

Landing Gear

Components

While it is important to establish appropriate minimum performance intervals (i.e. FH, FC, Months), it is equally important to understand **how to frame the redelivery conditions**

# LOI - Redelivery Condition Language

## Check & Part Lives - Airframe

The Airframe shall be returned fresh out of **Redelivery Check** that would be due under:



**Option 1**

OEM's Current MPD

OR

**Option 2**

Lessee's Approved  
Maintenance Program

# LOI - Redelivery Condition Language

## Check & Part Lives - Airframe



### Option 1

Simplifies transition given tasks are in phase with the OEM recommended intervals. Easier to bridge to another lessee's mx program

### Option 2

If operator deviated from MPD, potentially can lead to a higher level of bridging work.

# LOI - Redelivery Condition Language

## Check & Part Lives - Airframe



### Airplane : 737      Airframe Mx Schedule

<u>Airline</u>	<u>Model</u>	<u>C</u>	<u>D/SI</u>
A	700 800	7,500 FH	8 Years
B	700 800	4,000 FH	10 Years

Delivery from Airline A mx program to Airline B can be expensive.

One can minimize/avoid this by having Airline A return per the MPD.

# LOI - Redelivery Condition Language

## Check & Part Lives - Airframe



## Example Airframe Redelivery Language

The Airframe shall be returned to Lessor fresh out of the **Redelivery Check** that would be due and owing **under the current MPD** sufficient to clear the Aircraft for a period not less than 20 months, 6,000 Flight Hours and 3,000 Cycles.

# LOI - Redelivery Condition Language

## Check & Part Lives – Engines & APU



At Redelivery, no individual Engine shall have:

**Option 1**

Operating time since last engine shop visit (TSLSV)

OR

**Option 2**

Operating time remaining till next engine shop visit (TRTSV)

# LOI - Redelivery Condition Language

## Check & Part Lives – Engines (Option 1)



**Pro**

Easier to administer; by quantifying minimum TSLSV there is a greater statistical likelihood of meeting contractual minimums.

**Con**

Can be difficult to predict how much time remaining exist on the engines.



# LOI - Redelivery Condition Language

## Check & Part Lives – Engines (Option 1)

### Example 1 – Consistent use of TSLSV

Current Lessee Contractual TSLSV = 6,000 FH

Next Lessee Contractual TSLSV = 6,000 FH



# LOI - Redelivery Condition Language

## Check & Part Lives – Engines (Option 1)



### Example 2 – Combining TSLSV & TRTSV

Current Lessee Contractual TSLSV = 6,000 FH

Next Lessee Contractual TRTSV = 6,000 FH

Trend Data Time Remain = 2,000 FH



# LOI - Redelivery Condition Language

## Check & Part Lives – Engines (Option 2)



**Pro**

Needs validation by trend-monitoring data , which is a better gauge to the overall health of the engine

**Con**

Trend-monitoring data can be subjective

# LOI - Redelivery Condition Language

## Check & Part Lives – Engines (Option 2)



### Example 1 – Agreement on trend data

Contractual Time Remaining = 6,000 FH

Avg EGTM & EGTM Erosion Rate = 18°C & 3°C/1,000 FH

Statistical Time Remain = 6,000 FH [18/3 \* 1,000 FH]





## Factors Influencing Direct Maintenance Costs (DMC)

**Seek to Address these DMC factors in your LOIs**

Age / Maturity (Airframe & Engine)

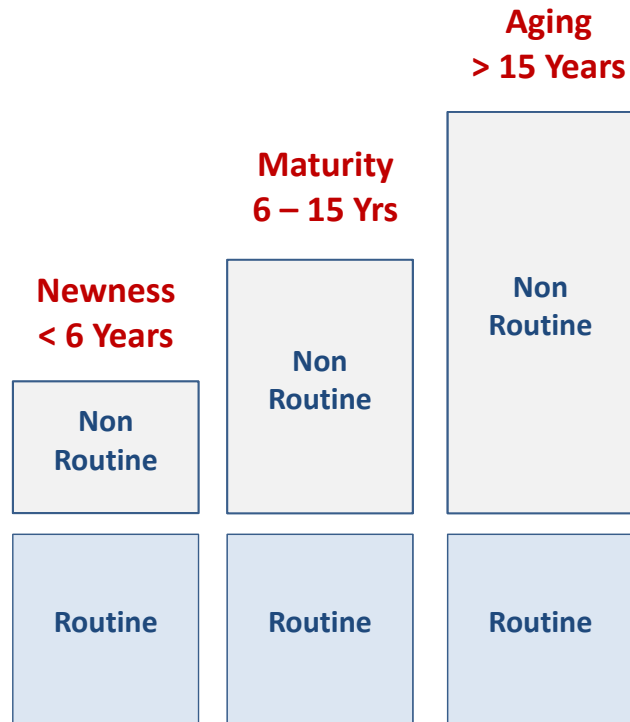
Operation (Airframe & Engine)

Environment (Engine)

Escalation

# LOI - Maintenance Reserves Topics

## Airframe - Age Factor



### A320 Airframe “SC Checks”:

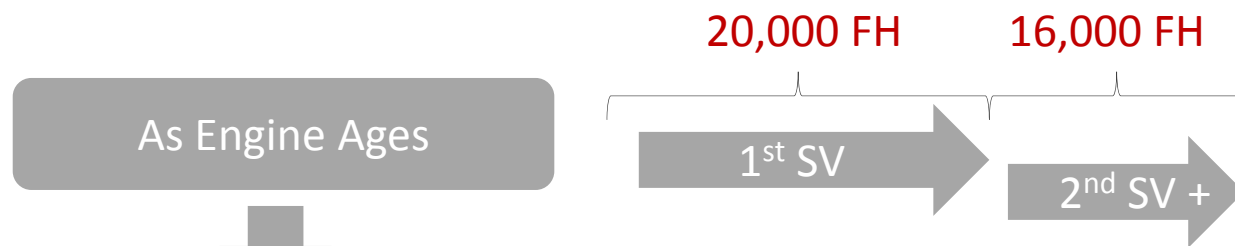
(a) **US \$11,480** per Month for the 4C/6Y SI. Following completion of the first 4C/6Y SI, this amount will be increased to **US \$12,800**.

(b) **US \$6,270** per Month for the 8C/12Y SI. Following completion of the first 8C/12Y SI, this amount will be increased to **US \$7,000**.



# LOI - Maintenance Reserves Topics

## Engine - Age Factor



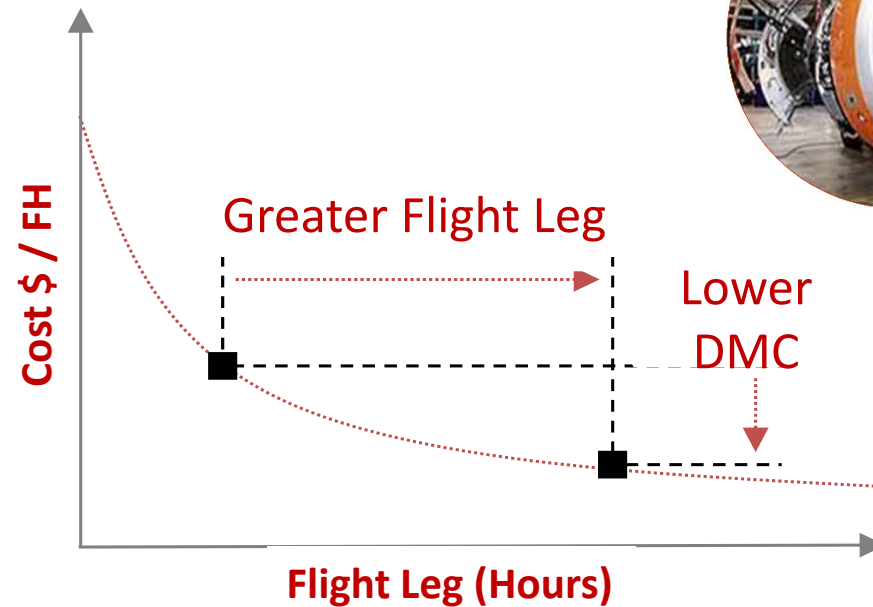
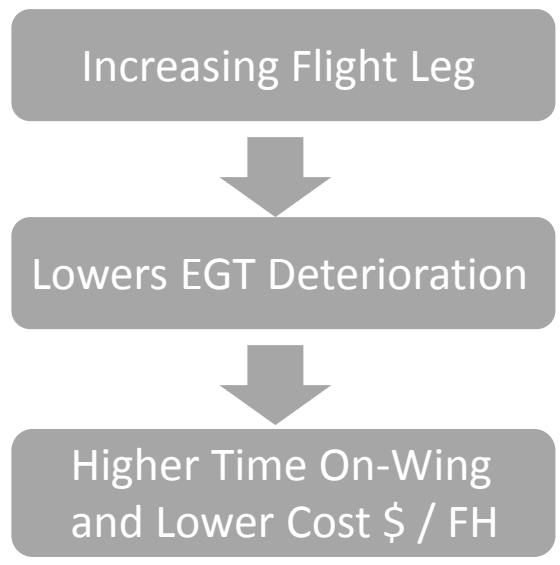
### Developing PR Rates for each Phase

- US \$88/FH from delivery through first performance restoration
- US \$130/FH as a mature engine following first performance restoration
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# LOI - Maintenance Reserves Topics

## Engine - Operating Factor : Flight Leg

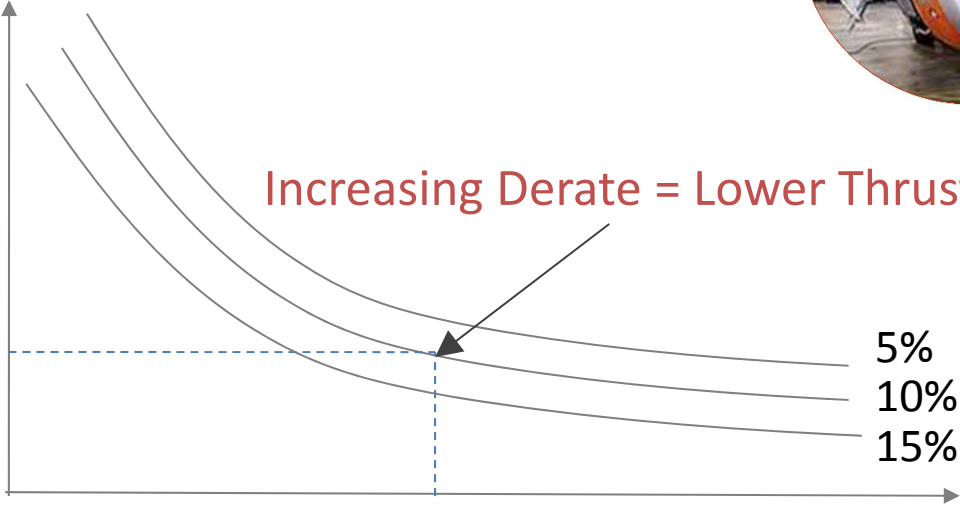
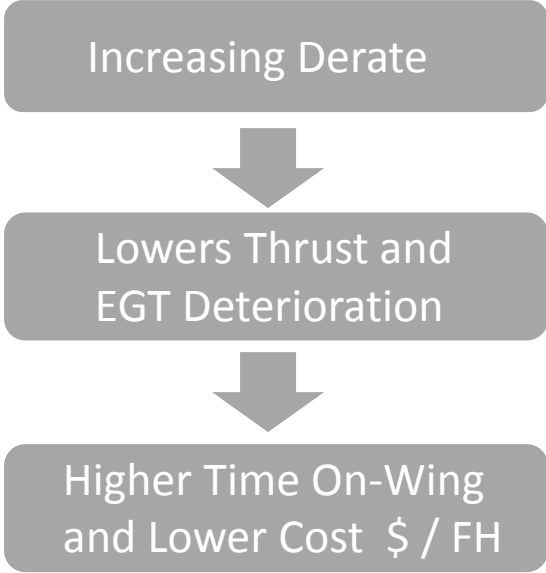


### For Each Operational Phase : Develop Flight Leg Severity Matrix

Flight Leg	1.0	1.5	2.0	2.5	3.0	3.5	4.0
First-Run	145	115	88	86	84	82	80
Mature-Run	215	169	130	128	126	124	122

# LOI - Maintenance Reserves Topics

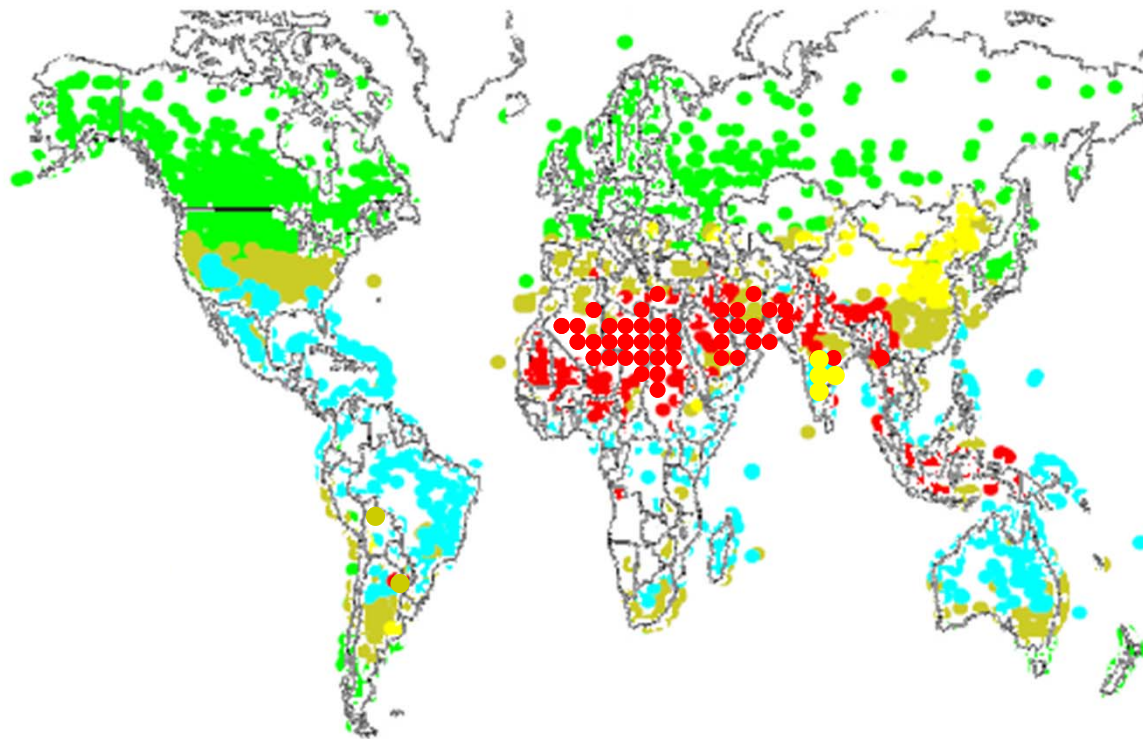
## Engine - Operating Factor : Derate



	1.0	1.5	2.0	2.5	3.0
5% Matrix =	\$194	\$150	<b>\$88</b>	\$86	\$84
10% Matrix =	\$176	\$136	<b>\$80</b>	\$78	\$76
15% Matrix =	\$158	\$122	<b>\$72</b>	\$70	\$68

# LOI - Maintenance Reserves Topics

## Engine - Operating Factor: Environment



- Lowest
- Medium / Low
- Medium
- High
- Highest

Colors highlight severity and rate of occurrence of distress

Engine - Environmental Distress Chart

# LOI - Maintenance Reserves Topics

## Engine – Severity Matrix

### CFM56-7B26 : Engine Restoration Matrix 10% Derate



#### From Delivery Through First Performance Restoration

Region	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Temperate	145	115	88	86	84	82	80
Desert	163	127	98	96	93	91	89
Erosive	173	136	105	103	100	99	97

#### As a Mature Engine Following First Performance Restoration

Region	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Temperate	215	169	130	128	126	124	122
Desert	240	188	145	142	139	136	134
Erosive	257	202	155	152	149	146	144

# LOI - Maintenance Reserves Topics

## Escalation

Target no lower than 3% for all events except LLPs

LLPs escalated to current catalog prices & indexed to

Ultimate life limits, or

Current life limits

# LOI - Maintenance Reserves Topics



## LLP Indexed to : Ultimate vs. Current Life Limit

GE90-115B - LLP COSTS							
Item #	Module	Part Description	Part Cost	Current Limit	Ultimate Limit	Current \$/FC	Ultimate \$/FC
1	Fan	Fwd Shaft	198,100	13,100	15,000	15.10	13.20
2		Disk	440,600	15,000	15,000	29.40	29.40
3		Booster Spool	408,000	15,000	15,000	27.20	27.20
4		Mid Shaft	324,500	9,400	15,000	34.50	21.60
5		Blades	2,554,200	30,000	30,000	85.10	85.10
6	HPC	Fwd Shaft	137,900	15,000	15,000	9.20	9.20
7		Stg 1 Blisk	389,000	15,000	15,000	25.90	25.90
8		2-5 Spool	421,200	8,800	15,000	47.90	28.10
9		Stg 6 Blisk	108,700	8,500	15,000	12.80	7.20
10		Impeller	33,300	15,000	15,000	2.20	2.20
11		7-9 Spool	603,600	7,700	15,000	78.40	40.20
12		CDP Seal	132,300	12,400	15,000	10.70	8.80
13	HPT	Fwd Seal	308,200	9,000	15,000	34.20	20.50
14		Disk 1	654,300	8,100	15,000	80.80	43.60
15		I/S Seal	337,400	11,400	15,000	29.60	22.50
16		Disk 2	353,100	8,600	15,000	41.10	23.50
17		Aft Seal	145,700	15,000	15,000	9.70	9.70
18	LPT	Stg Disk 1	163,800	15,000	15,000	10.90	10.90
19		Stg Disk 2	257,700	13,800	15,000	18.70	17.20
20		Stg Disk 3	292,800	15,000	15,000	19.50	19.50
21		Stg Disk 4	240,200	8,700	15,000	27.60	16.00
22		Stg Disk 5	177,900	15,000	15,000	11.90	11.90
23		Stg Disk 6	185,900	10,800	15,000	17.20	12.40
24		Cone Shaft	167,100	15,000	15,000	11.10	11.10
			<b>9,035,500</b>			<b>690.70</b>	<b>516.90</b>

# LOI - Maintenance Reserves Topics

**If : Power-by-the-Hour Agreement in Lieu of Reserves, than Ensure Lessor has Ability to:**

→ Assign PBH program to subsequent Lessee

→ Apply existing amounts towards cost of next mx event