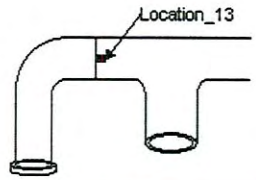
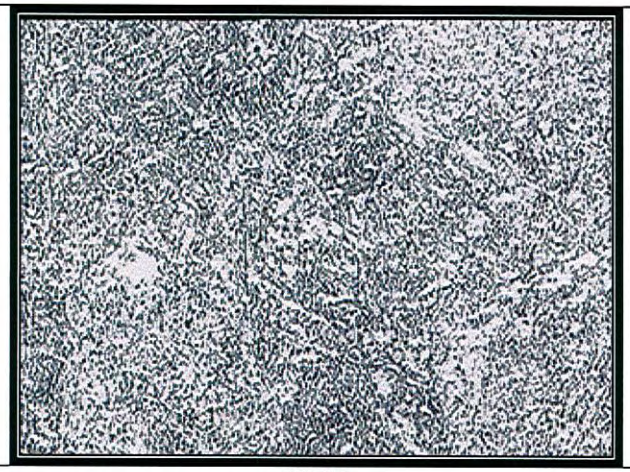
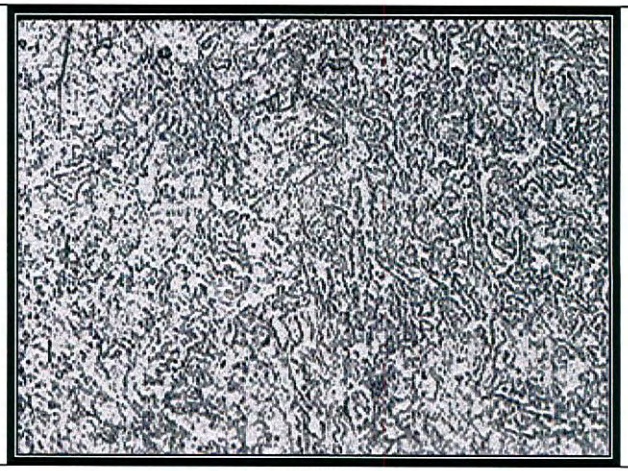
Name of Component: IP Steam Inlet
Location: IP Steam Inlet T joint _ Weld Metal _ Replica No. 13
Hardness: 180-186HB.





200X



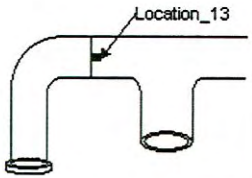
400X

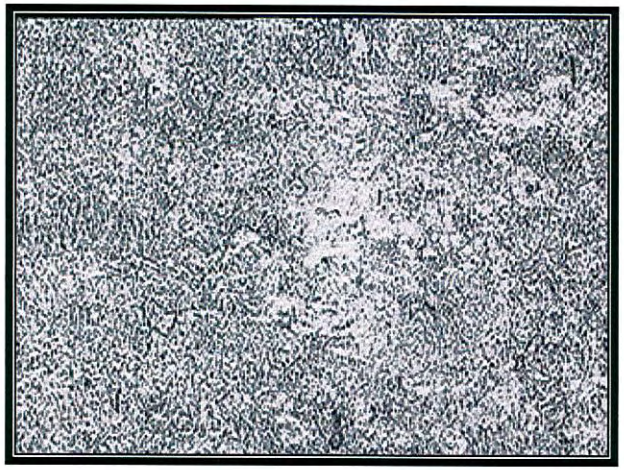
Observation: Microstructure shows tempered Bainite with spherodisation carbides.

Degradation Level- IIL

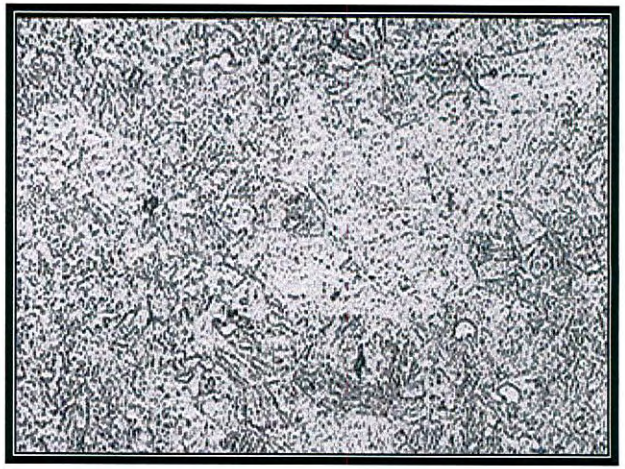
Fig: 84

Name of Component: IP Steam Inlet
Location: IP Steam Inlet T joint _ Heat affected zone _ Replica No. 13
Hardness: 181-185HB.





200X



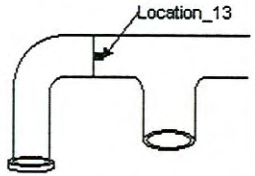
400X

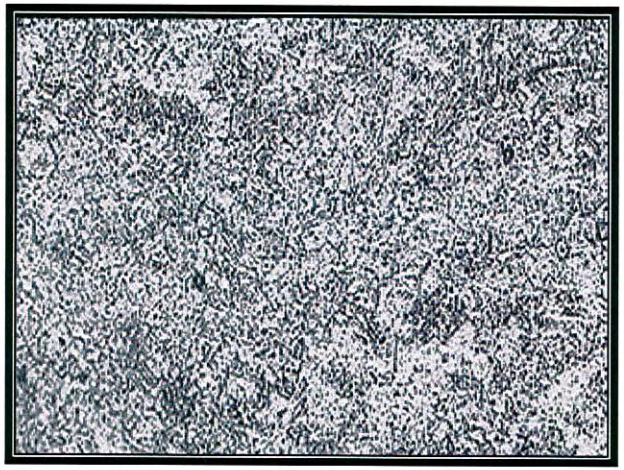
Observation: Microstructure shows tempered Bainite with spherodisation carbides.

Degradation Level- IIL

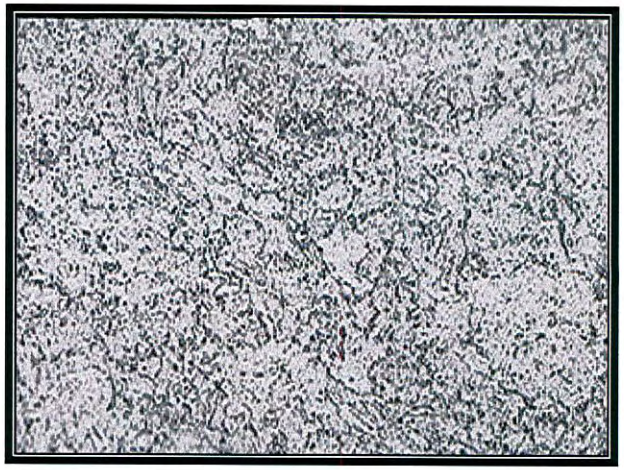
Fig: 85

Name of Component: IP Steam Inlet
Location: IP Steam Inlet T joint _ Parent Metal _ Replica No. 13
Hardness: 158-162HB





200X



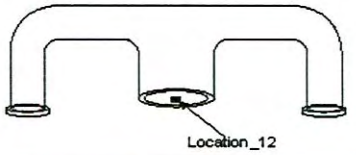
400X

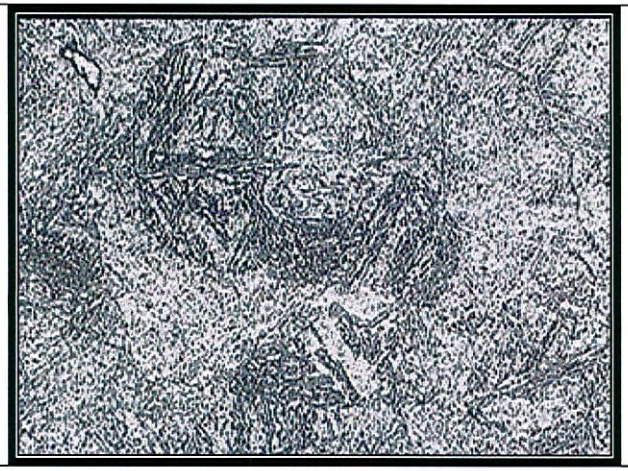
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.

Degradation Level- IVL

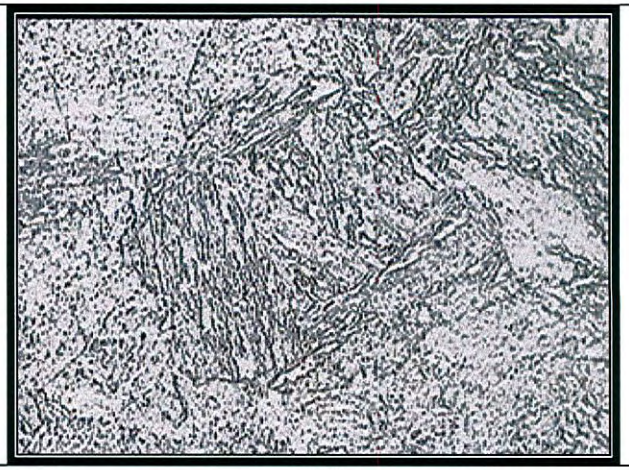
Fig: 86

Name of Component: IP Steam Inlet
Location: IP Steam Inlet _ Parent Metal _ Replica No. 12
Hardness: 203-209HB.





200X



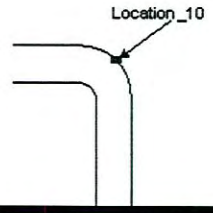
400X

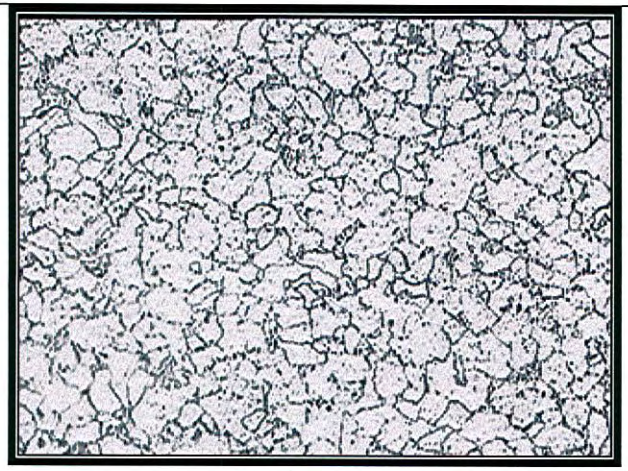
Observation: Microstructure shows tempered Bainite with spherodisation carbides.

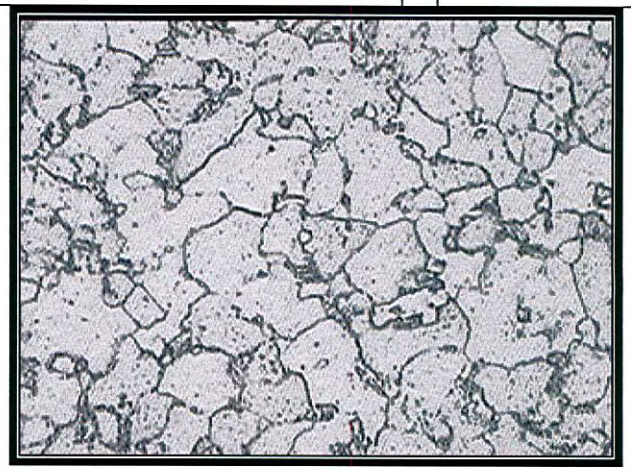
Degradation Level- IIL

Fig: 87

Name of Component: Main Steam Line
Location: Main Steam Line RHS on Bend_ Parent Metal _ Replica No. 10
Hardness: 128-138HB.



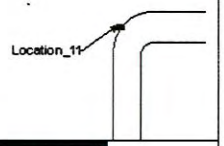




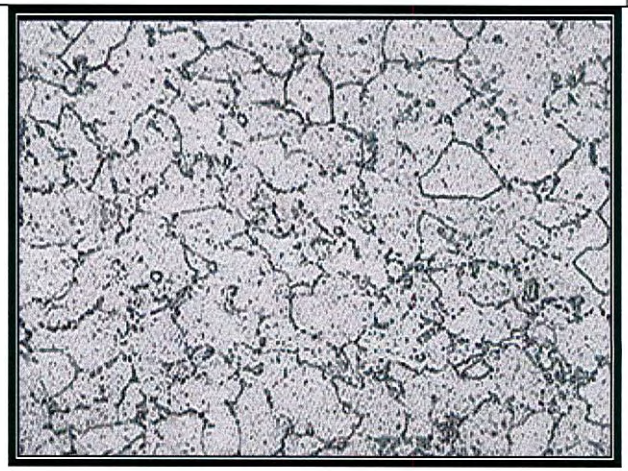
200X	400X
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.	Degradation Level- IVL

Fig: 88

Name of Component: Main Steam Line
Location: Main Steam Line LHS on Bend_ Parent Metal _ Replica No. 11
Hardness: 130-134HB.



200X



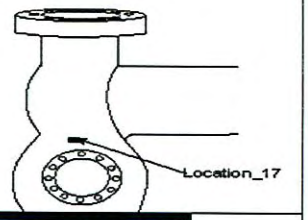
400X

Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 89

Name of Component: HPCV-1 Body
Location: HPCV-1 Body outer _ Parent Metal _ Replica No. 17
Hardness: 181-198HB.



200X

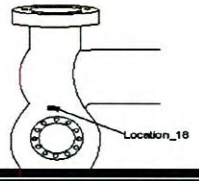
400X

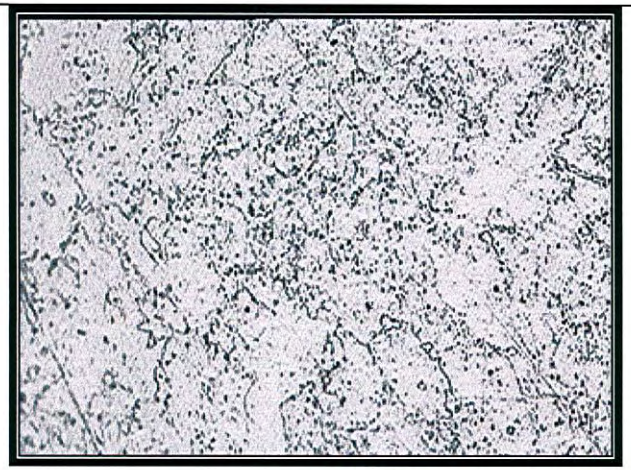
Observation: Microstructure shows tempered Bainite with spherodisation carbides.

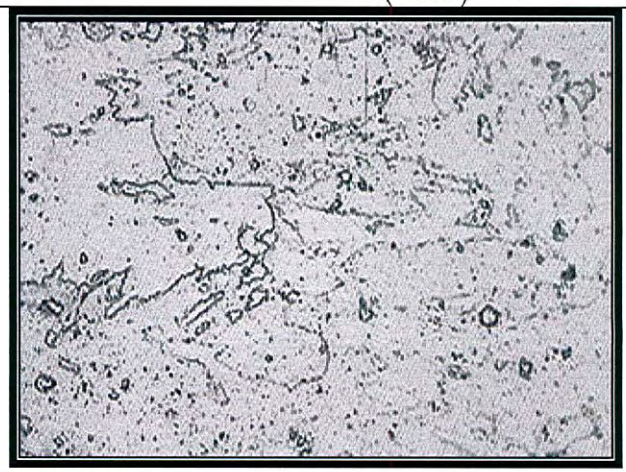
Degradation Level- IIL

Fig: 90

Name of Component: HPCV-2 Body
Location: HPCV-2 Body outer _ Parent Metal _ Replica No. 18
Hardness: 171-187HB.



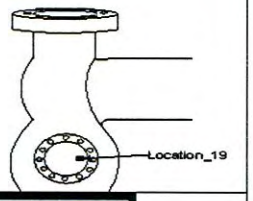


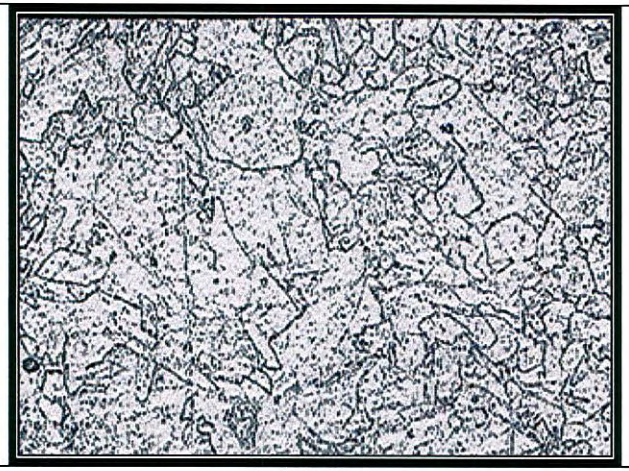


200X	400X
Observation: Microstructure shows tempered bainite and carbides precipitation at grain boundary is observed.	Degradation Level- IVL

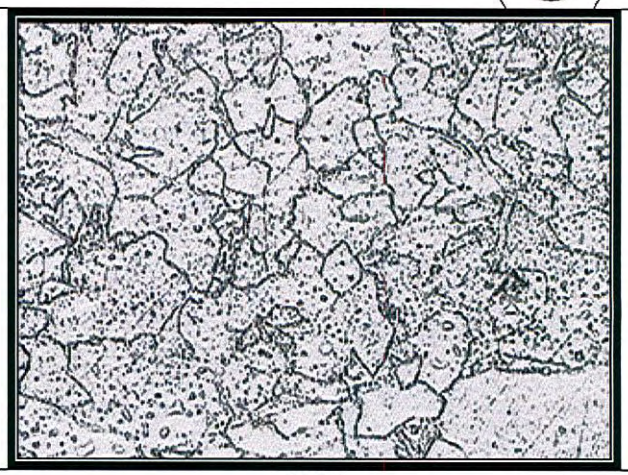
Fig: 91

Name of Component: IPCV-1 Body
Location: IPCV-1 Body Inner_ Parent Metal _ Replica No. 19
Hardness: 175-178HB.





200X



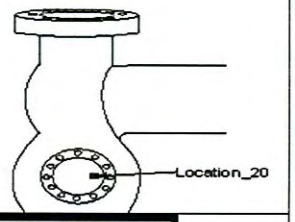
400X

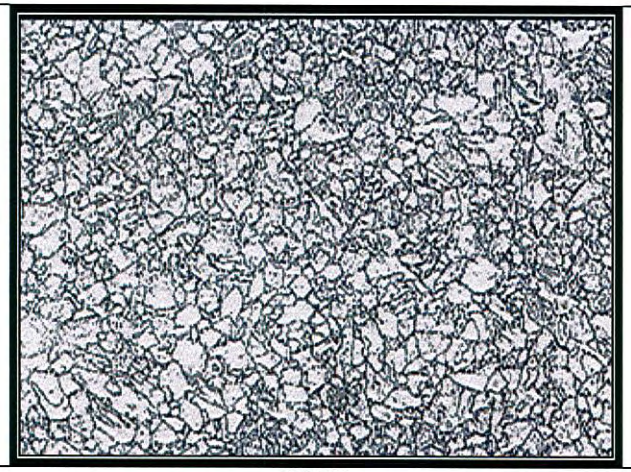
Observation: Microstructure shows ferrite and bainite and carbides at grain boundaries.

Degradation Level- IVL

Fig: 92

Name of Component: IPCV-2 Body
Location: IPCV-2 Body Inner_ Parent Metal _ Replica No. 20
Hardness: 171-179HB.





200X

400X

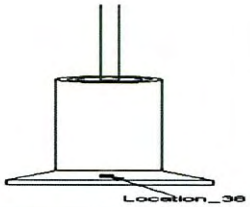
Observation: Microstructure shows ferrite and bainite and carbides at grain boundaries.

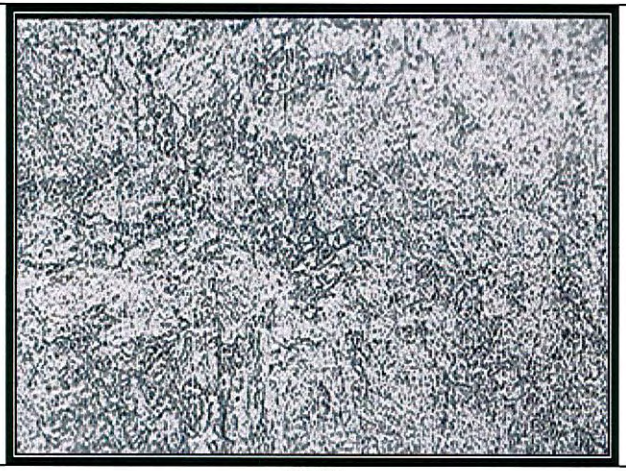
Degradation Level- IVL

Fig: 93

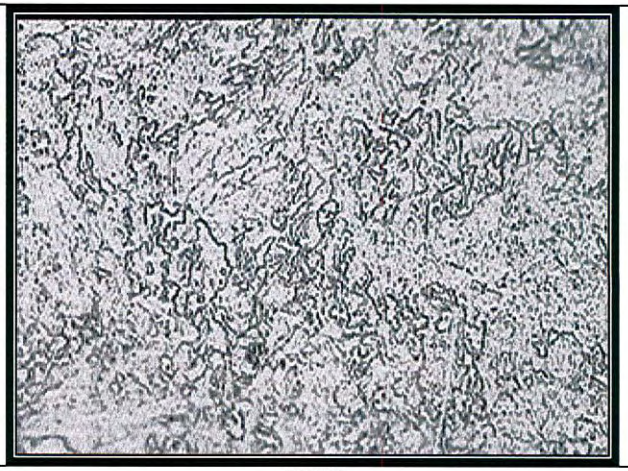
225

Name of Component: LP Bypass
Location: LP Bypass con _ Parent Metal _ Replica No. 38
Hardness: 171-181HB.





200X



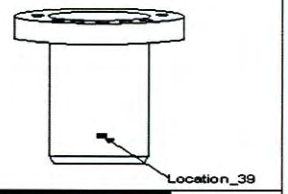
400X

Observation: Microstructure shows tempered Bainite with spherodisation carbides.

Degradation Level- IIL

Fig: 94

Name of Component: LP Bypass
Location: LP Bypass con _ Parent Metal _ Replica No. 39
Hardness: 191-201HB.



200X

400X

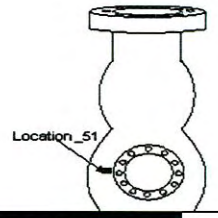
Observation: Microstructure shows tempered Bainite with spherodisation of carbides.

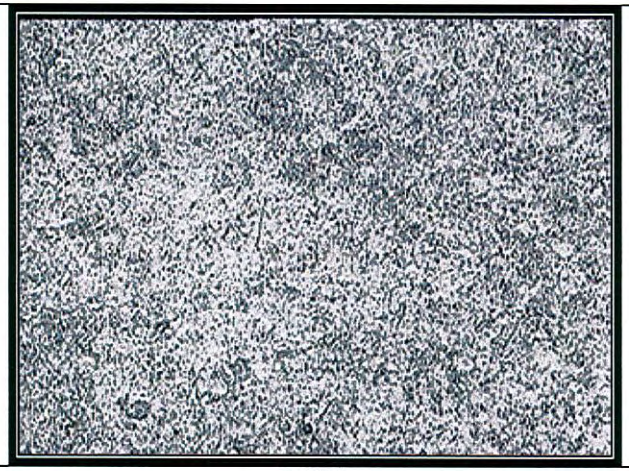
Degradation Level- IIL

Fig: 95

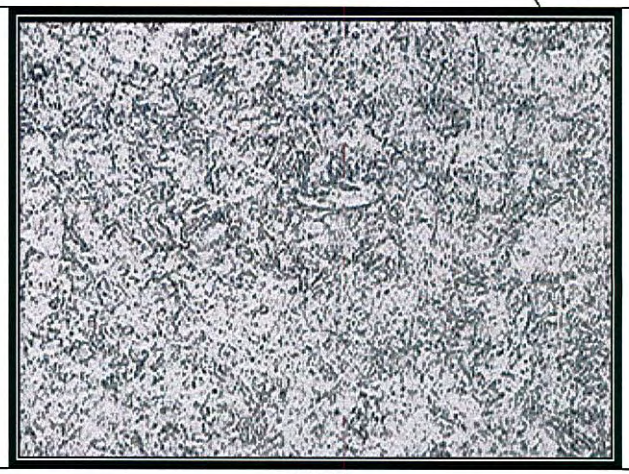
227

Name of Component: LP Bypass valve
Location: LP Bypass Body_ Parent Metal _ Replica No. 51
Hardness: 185-196HB.





200X



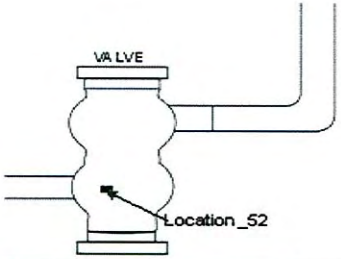
400X

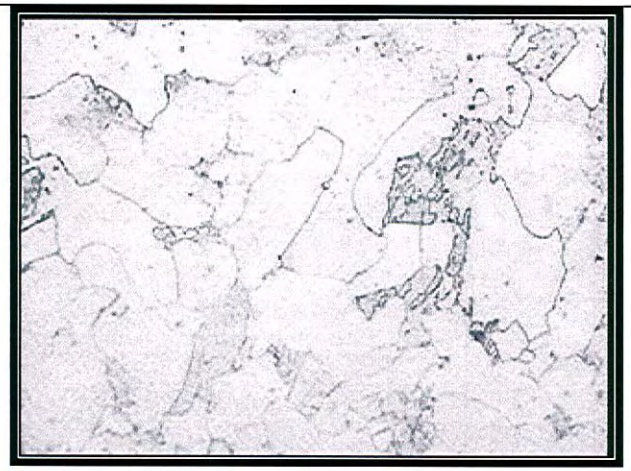
Observation: Microstructure shows tempered Bainite with spherodisation carbides.

Degradation Level- IIL

Fig: 96

Name of Component: HP Bypass valve
Location: HP Bypass Body_ Parent Metal _ Replica No. 52
Hardness: 122-138HB.





200X

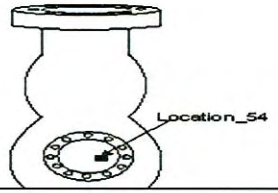
400X

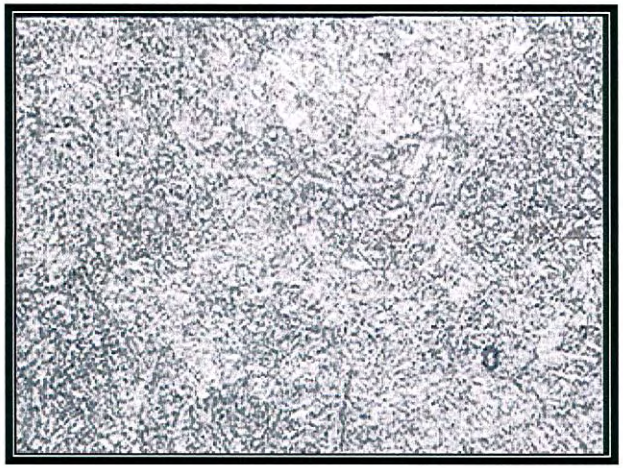
Observation: Microstructure shows tempered Bainite with spherodisation carbides.

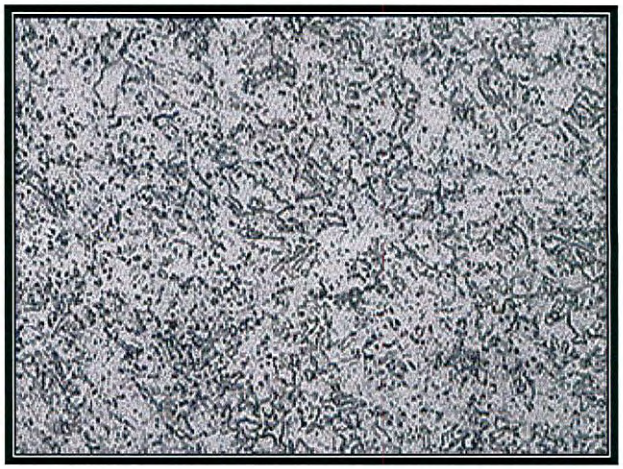
Degradation Level- IIL

Fig: 97

Name of Component: IPCV-3
Location: IPCV-3 Inner body_ Parent Metal _ Replica No. 54
Hardness: 181-187HB



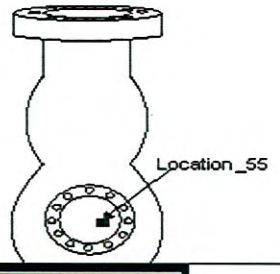


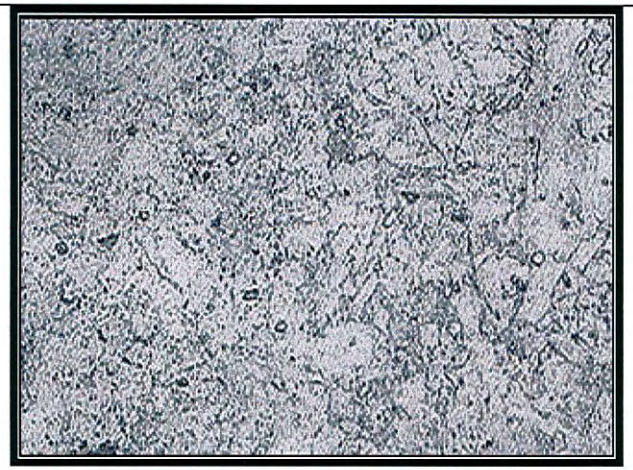


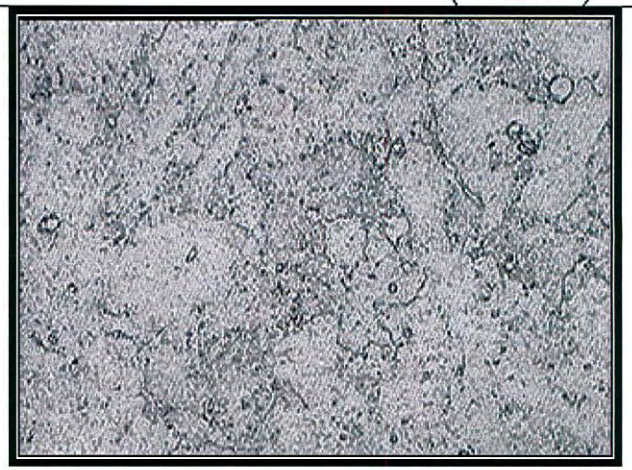
200X	400X
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.	Degradation Level- IVL

Fig: 98

Name of Component: IPCV-4
Location: IPCV-4 Inner body_ Parent Metal _ Replica No. 55
Hardness: 171-178HB





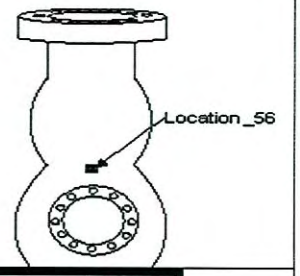


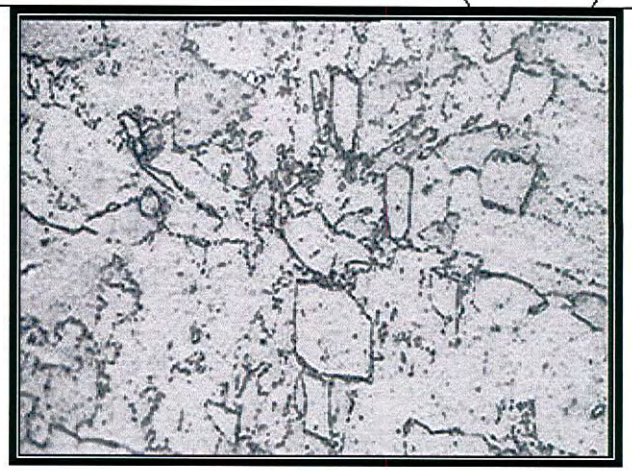
200X	400X
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.	Degradation Level- IVL

Fig: 99

231

Name of Component: HPCV-3
Location: HPCV-3 outer body_ Parent Metal _ Replica No. 56
Hardness: 186-196HB

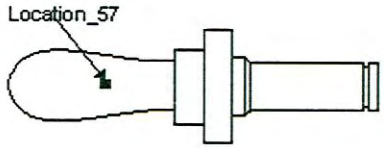




200X	400X
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.	Degradation Level- IVL

Fig: 100

Name of Component: HPSV -1
Location: HPSV bush-1 _ Parent Metal _ Replica No. 57
Hardness: 150-164HB



200X

400X

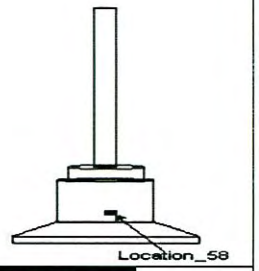
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.

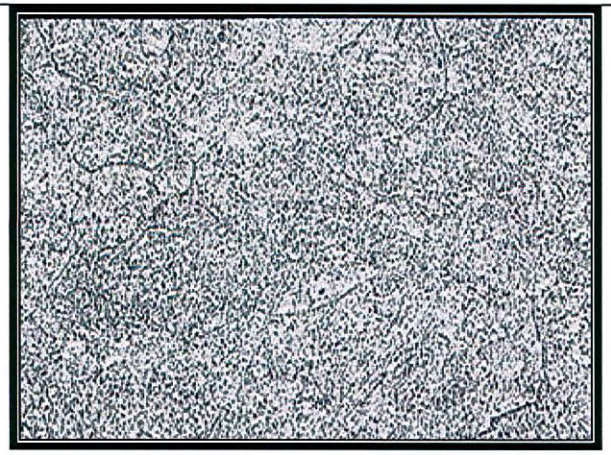
Degradation Level- IVL

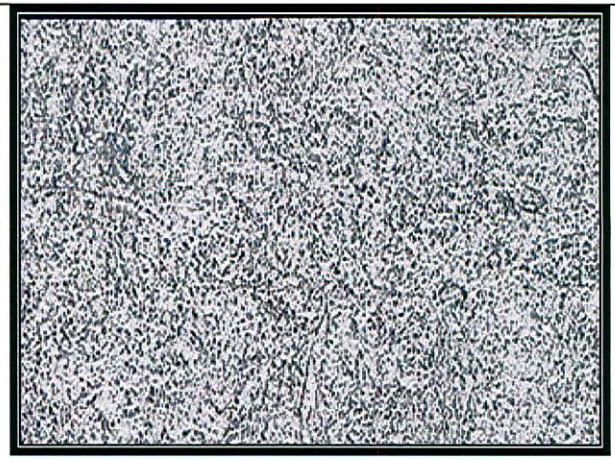
Fig: 101

233

Name of Component: HPSV-2
Location: HPSV con-2 _ Parent Metal _ Replica No. 58
Hardness: 180-192HB



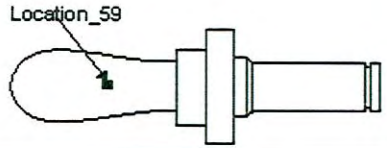


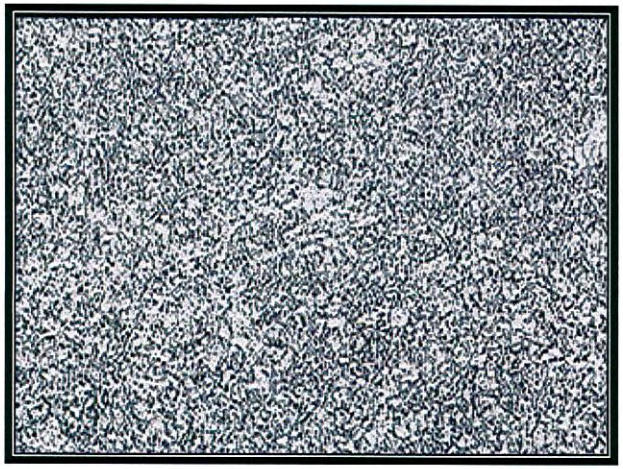


200X	400X
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.	Degradation Level- IVL

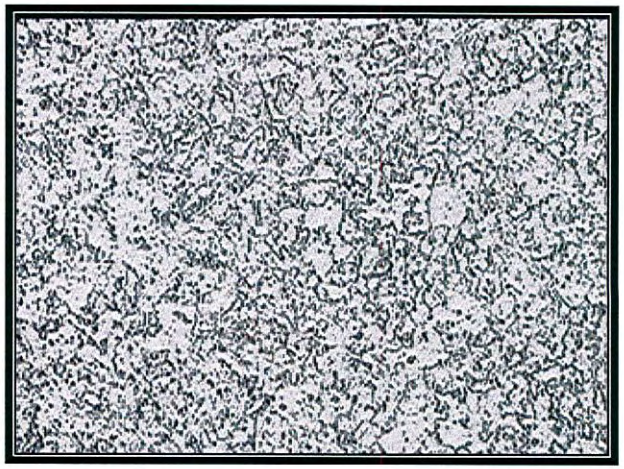
Fig: 102

Name of Component: HPSV-3
Location: HPSV bush-3 _ Parent Metal _ Replica No. 59
Hardness: 191-200HB





200X



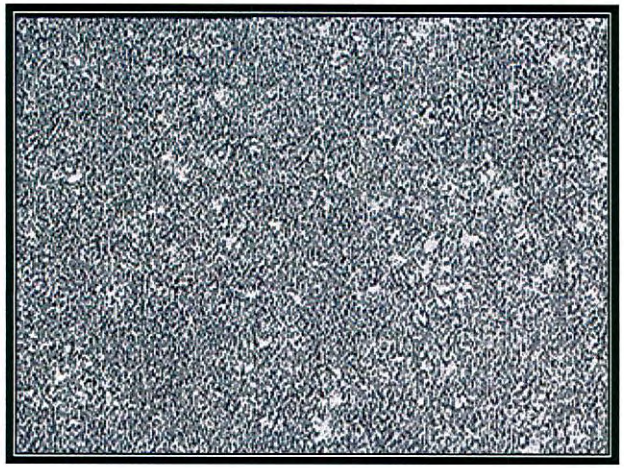
400X

Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

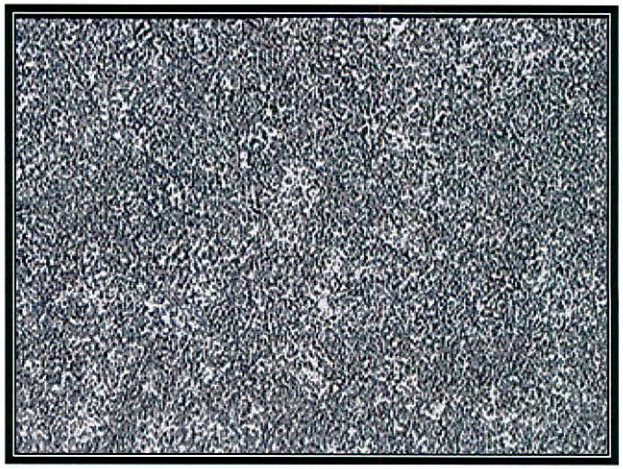
Degradation Level- IVL

Fig: 103

Name of Component: HPSV-4
Location: HPSV con-4 _ Parent Metal _ Replica No. 60
Hardness: 199-201HB



200X



400X

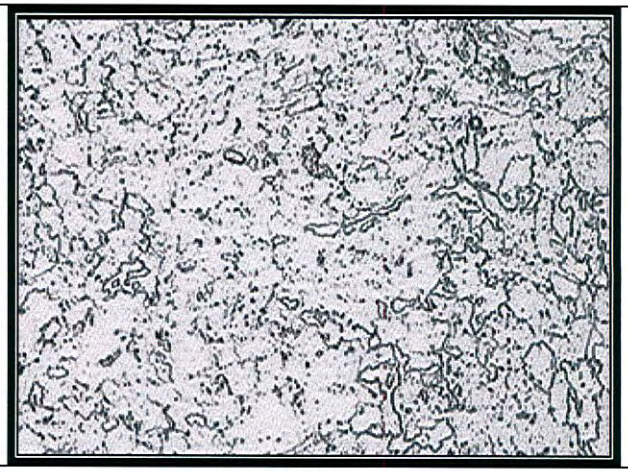
Observation: Microstructure shows tempered Bainite with spherodisation carbides.

Degradation Level- IIL

Fig: 104

Name of Component: IPSV-1
Location: IPSV-1Bush _ Parent Metal _ Replica No. 1
Hardness: 156-161HB

200X



400X

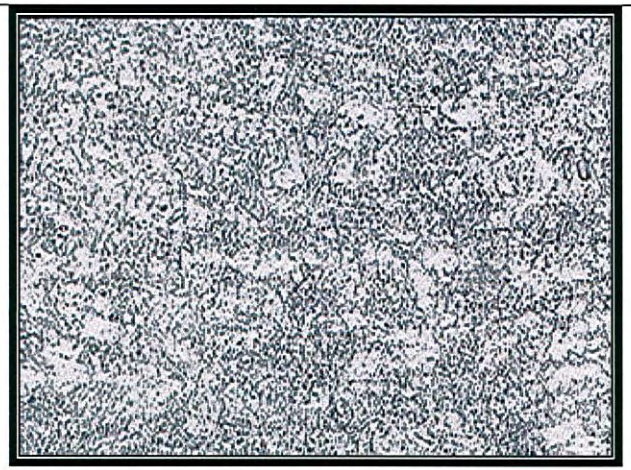
Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 105

237

Name of Component: IPSV-3
Location: IPSV-3Bush _ Parent Metal _ Replica No. 2
Hardness: 157-164HB



200X

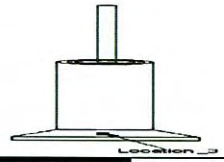
400X

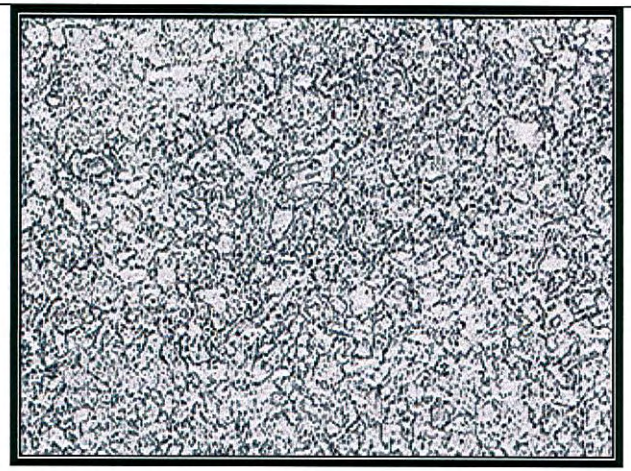
Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

Degradation Level- IVL

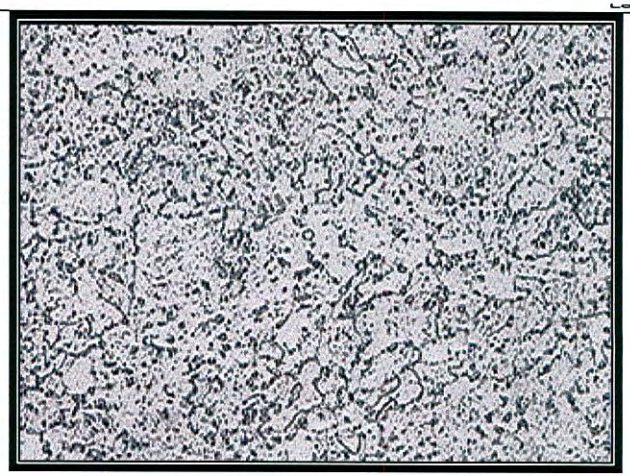
Fig: 106

Name of Component: IPSV-2
Location: IPSV-2 con _ Parent Metal _ Replica No. 3
Hardness: 140-148HB





200X



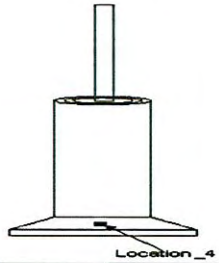
400X

Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 107

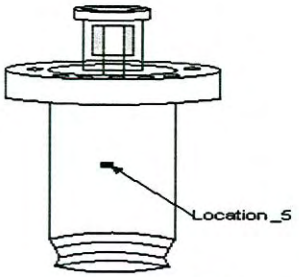
Name of Component: IPSV-4
Location: IPSV-4 con _ Parent Metal _ Replica No. 4
Hardness: 148-151HB

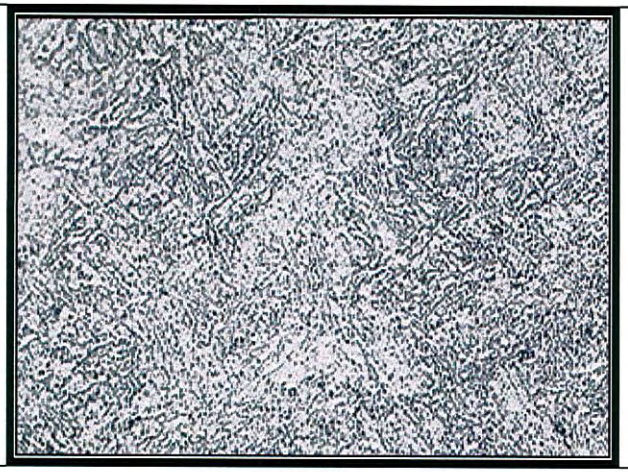


200X	400X
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary..	Degradation Level- IVL

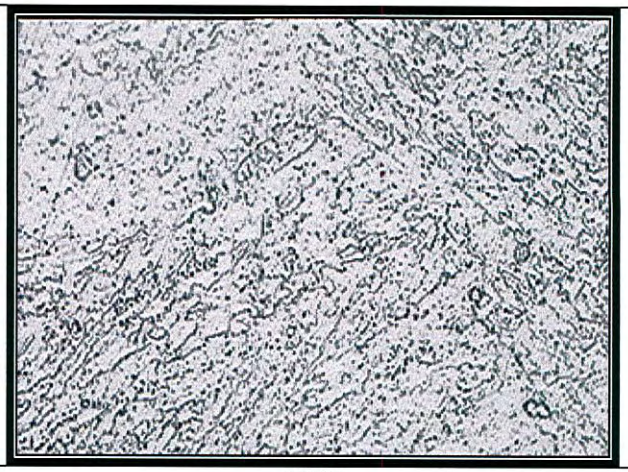
Fig: 108

Name of Component: IPCV-2
Location: IPCV-2 bush _ Parent Metal _ Replica No. 5
Hardness: 155-157HB.





200X



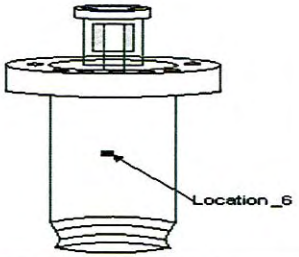
400X

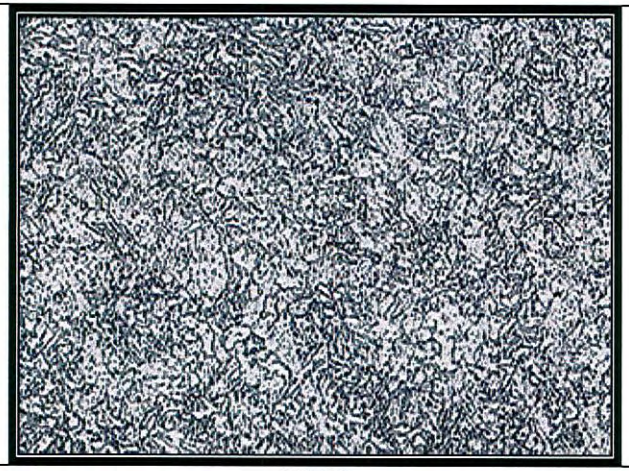
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.

Degradation Level- IVL

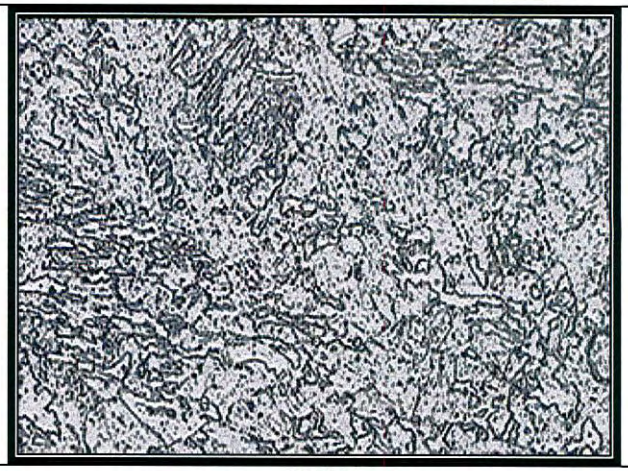
Fig: 109

Name of Component: IPCV-4
Location: IPCV-4 bush _ Parent Metal _ Replica No. 6
Hardness: 158-161HB





200X



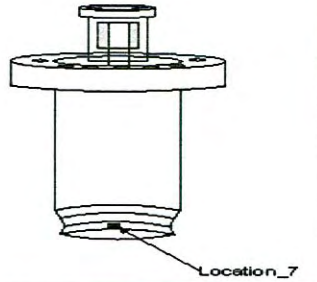
400X

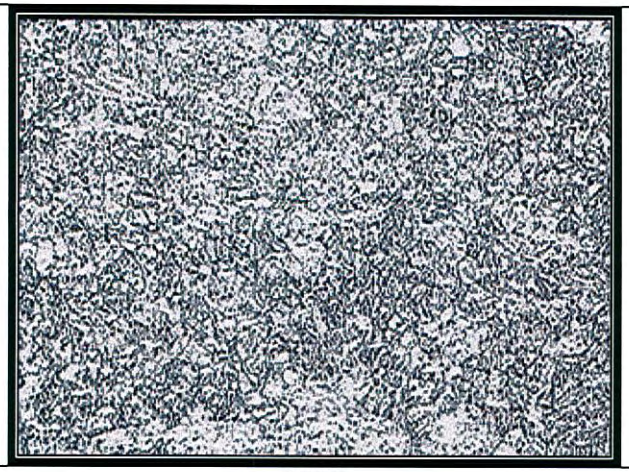
Observation: Microstructure shows tempered Bainite with precipitation of carbides.

Degradation Level- IIL

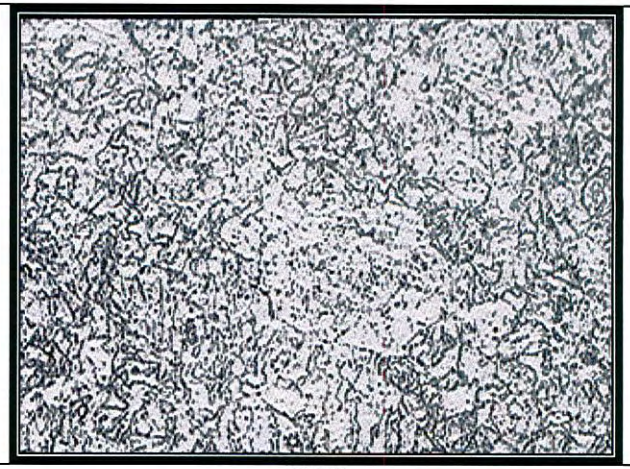
Fig: 110

Name of Component: IPCV-3
Location: IPCV-3 con _ Parent Metal _ Replica No. 7
Hardness: 168-171HB.





200X



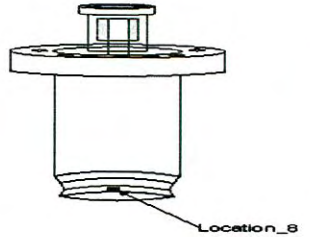
400X

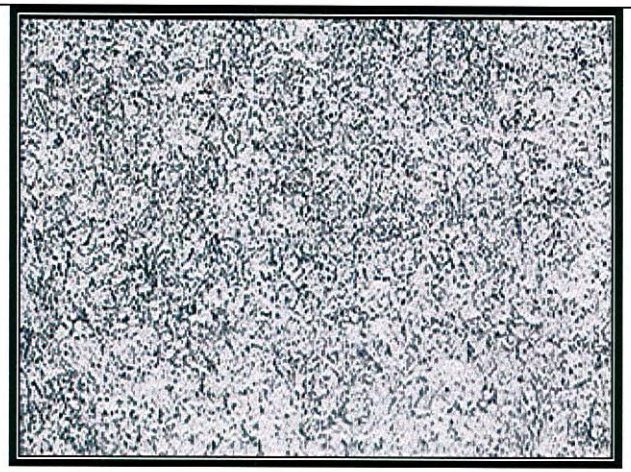
Observation: Microstructure shows tempered Bainite with spherodisation carbides.

Degradation Level- IIL

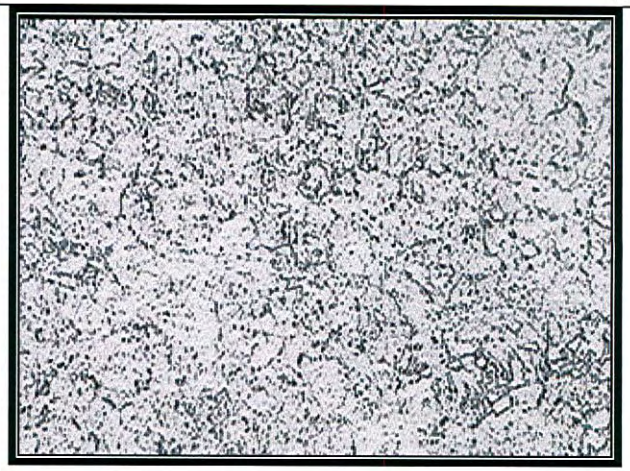
Fig: 111

Name of Component: IPCV-1
Location: IPCV-1 con _ Parent Metal _ Replica No. 8
Hardness: 171-178HB.





200X



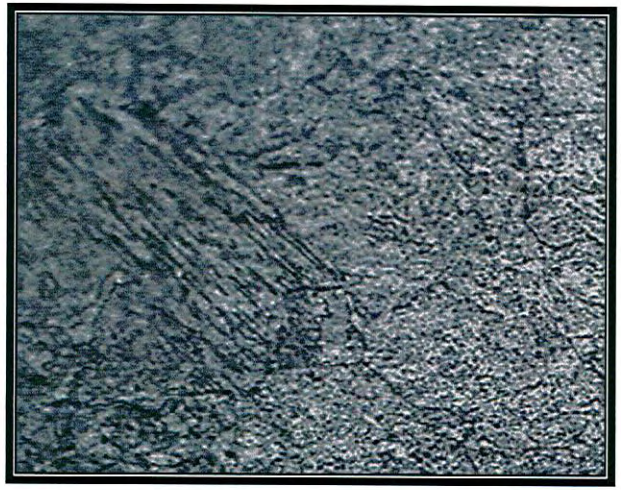
400X

Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

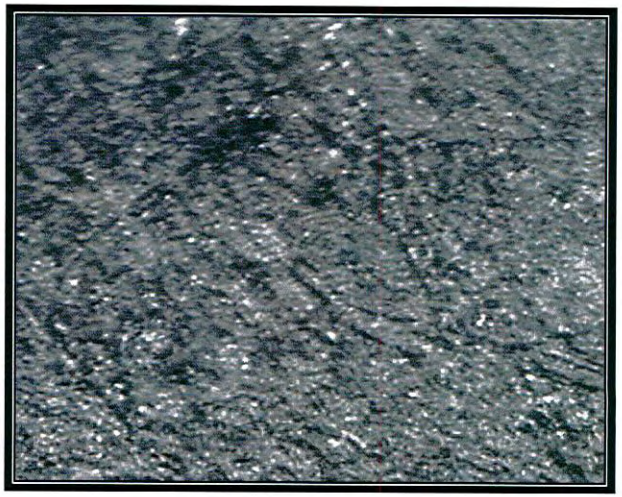
Degradation Level- IVL

Fig: 112

Name of Component: HP CV-1
Location: HP CV-1_CONE
Hardness: 160-162HB.



200X



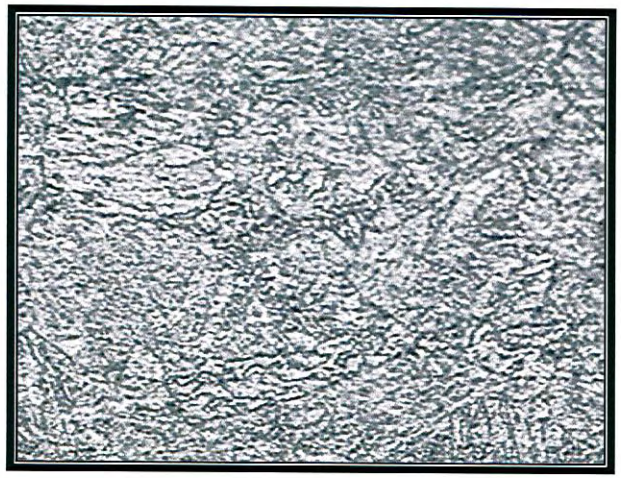
400X

Observation: Microstructure shows tempered Bainite with precipitation of carbides..

Degradation Level- IIL

Fig: 113

Name of Component: HP CV-1
Location: HP CV-1_BUSH
Hardness: 162-165HB



200X

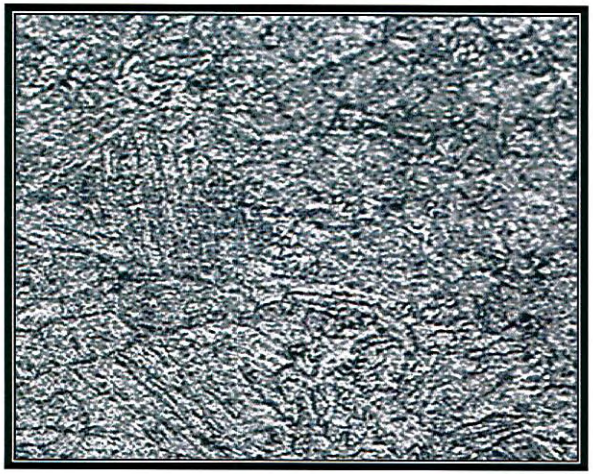
400X

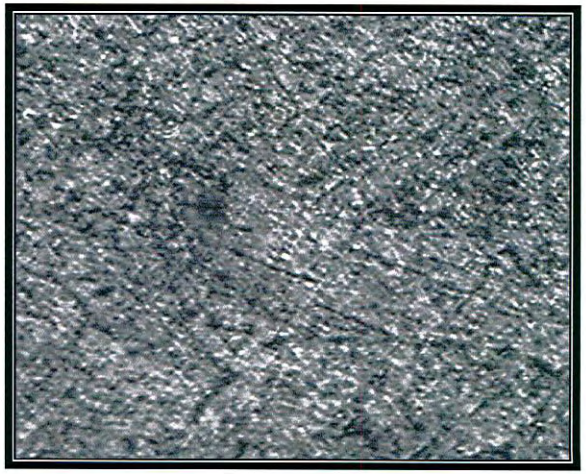
Observation: Microstructure shows tempered Bainite with precipitation of carbides.

Degradation Level- IIL

Fig: 114

Name of Component: HP CV-1
Location: HP CV-1_BUSH
Hardness: 165-168HB





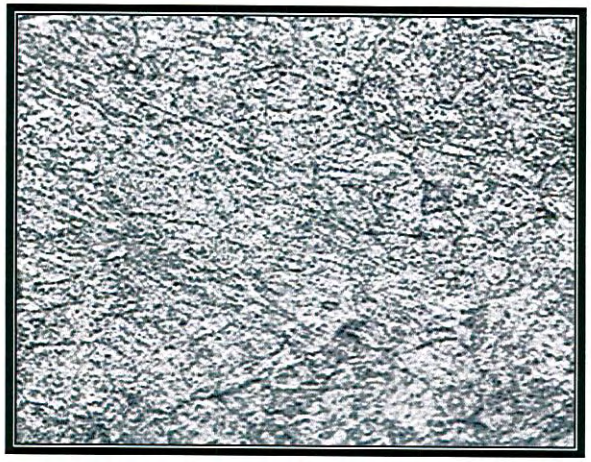
200X

Observation: Microstructure shows tempered Bainite with precipitation of carbides.

Degradation Level- IIL

Fig: 115

Name of Component: HP CV-2
Location: HP CV-2_CONE
Hardness: 160-163HB



200X

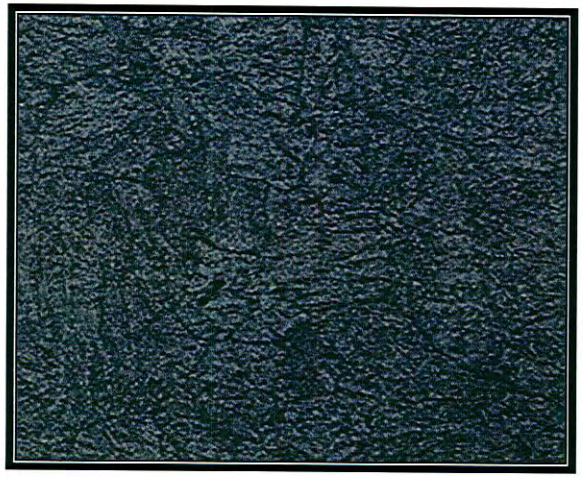
Observation: Microstructure shows tempered Bainite with precipitation of carbides.

400X

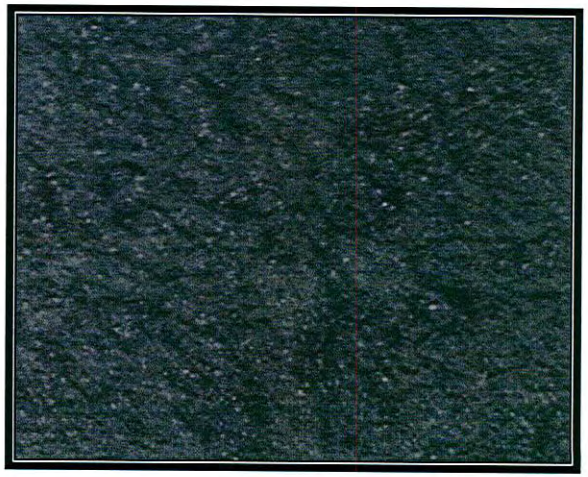
Degradation Level- IIL

Fig: 116

Name of Component: HP CV-2
Location: HP CV-2_BUSH
Hardness: 158-160HB



200X



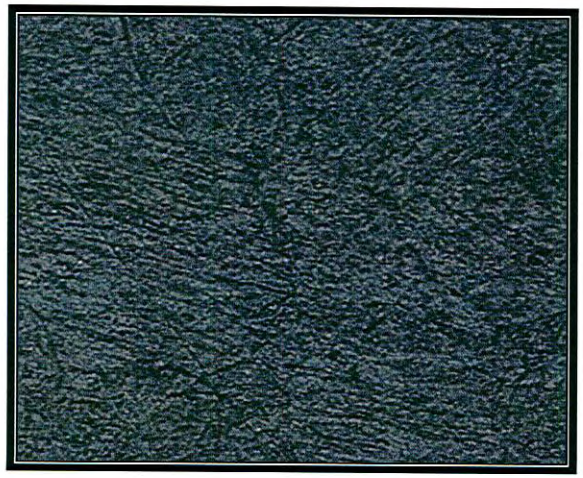
400X

Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 117

Name of Component: HP CV-2
Location: HP CV-2_BUSH
Hardness: 160-163HB



200X

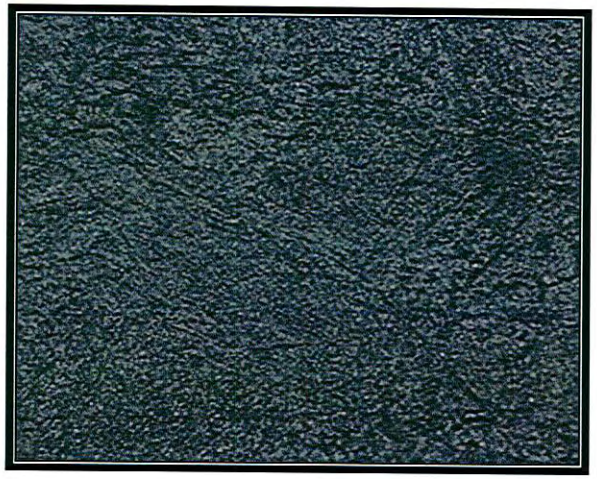
400X

Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

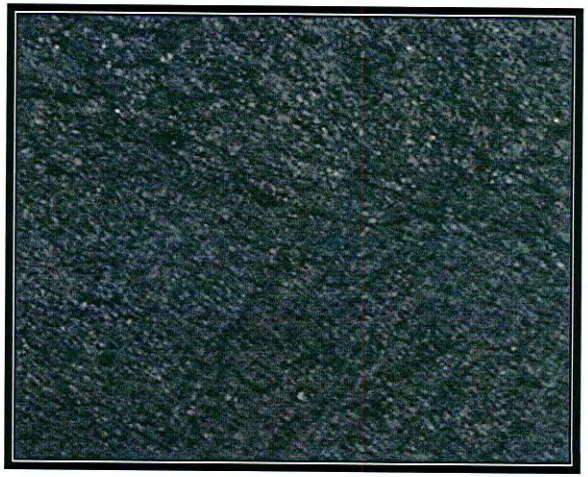
Degradation Level- IVL

Fig: 118

Name of Component: HP CV-3
Location: HP CV-3_CONE
Hardness: 161-162HB



200X



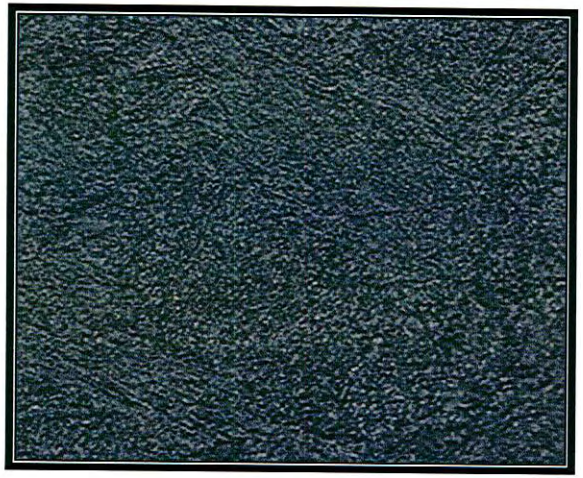
400X

Observation: Microstructure shows tempered Bainite with precipitation of carbides.

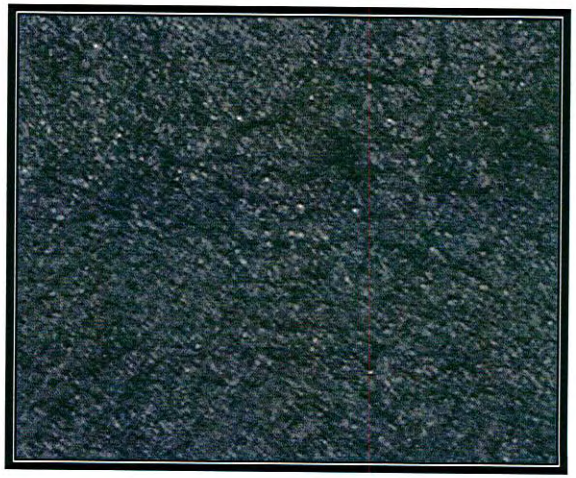
Degradation Level- IIL

Fig: 119

Name of Component: HP CV-3
Location: HP CV-3_BUSH
Hardness: 160-162HB



200X



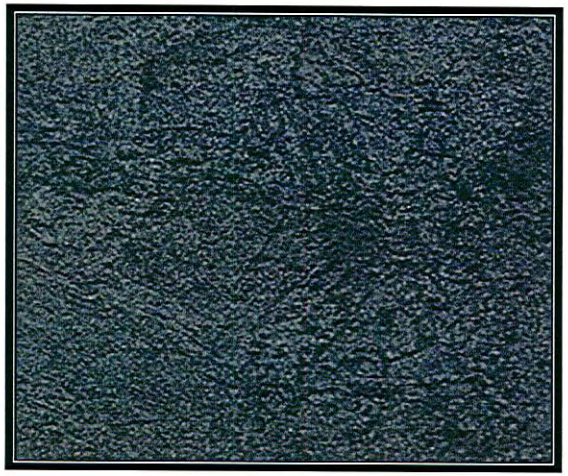
400X

Observation: Microstructure shows tempered Bainite with precipitation of carbides..

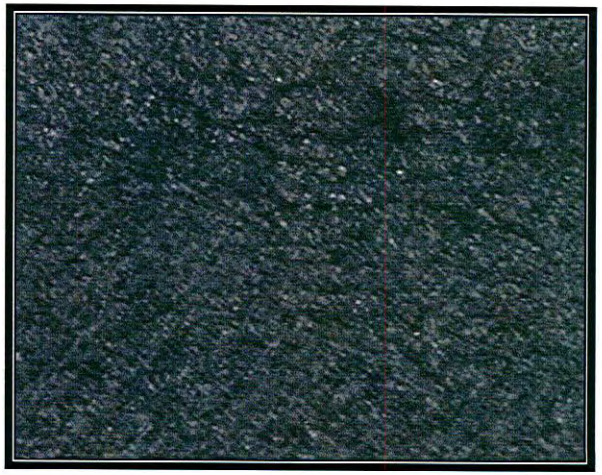
Degradation Level- IIL

Fig: 120

Name of Component: HP CV-4
Location: HP CV-4_CONE
Hardness: 163-165HB



200X



400X

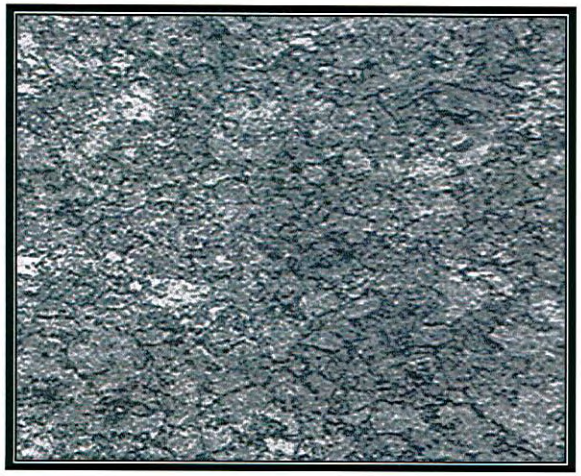
Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 121

253

Name of Component: HP CV-4
Location: HP CV-4_BUSH
Hardness: 155-158HB



200X

400X

Observation: Microstructure shows tempered Bainite with precipitation of carbides.

Degradation Level- IIL

Fig: 122

Name of Component: HP CV-4
Location: HP CV-4_BUSH
Hardness: 140-145HB

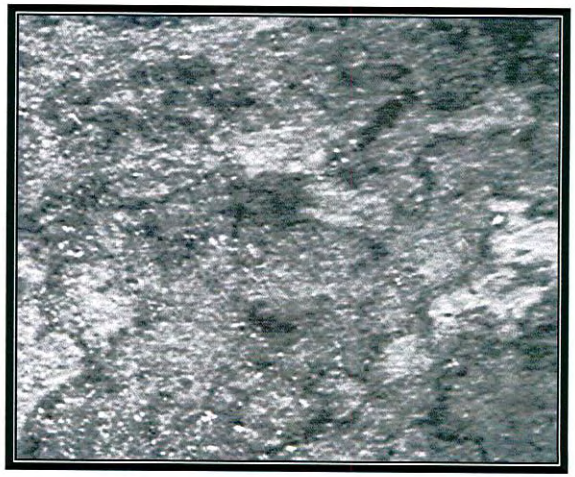
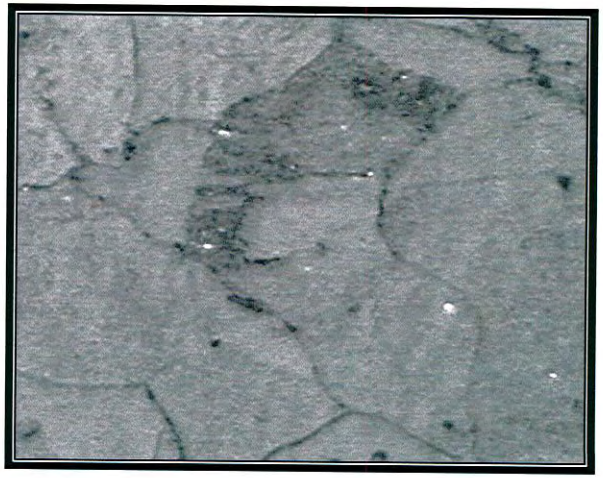
	
200X	400X
Observation:	No significant degradation observed

Fig: 123

Name of Component: IP CV-1
Location: IP CV-1_BUSH
Hardness: 135-139HB

200X



400X

Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 124

Name of Component: IP CV-1
Location: IP CV-1_BUSH
Hardness:136-138HB

200X

400X

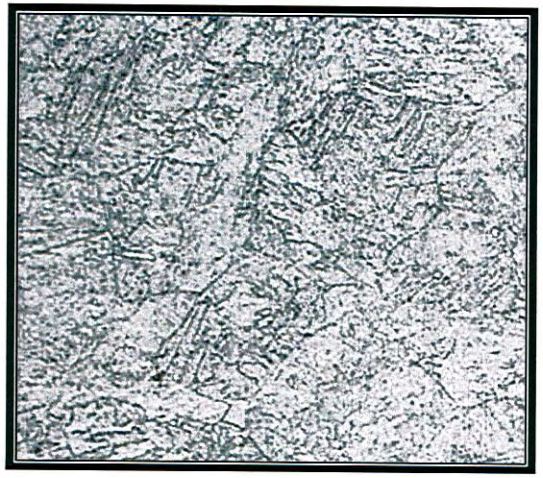
Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 125

852

Name of Component: IP CV-2
Location: IP CV-2_CONE
Hardness: 155-156HB



200X

400X

Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 126

Name of Component: IP CV-2
Location: IP CV-2_BUSH
Hardness: 160-165HB

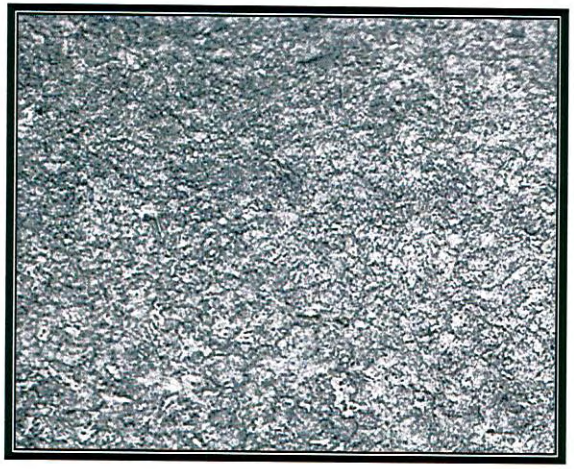
	
200X	400X
Observation: Microstructure shows ferrite and Bainite with precipitation of carbides at grain boundary.	Degradation Level- IVL

Fig: 127

ALSTOM	Client	J-Power (Electric Power Development Co. Ltd.,)
	Project	Turbine and System Assessment for NTPC-Korba Unit #4
	Order No.	CGP10028C
	Contractor	ALSTOM K.K. NASL Ltd. (Nominated subcontractor in India)
NTPC ALSTOM Power Services Pvt. Ltd.	**Document**	**FINAL REPORT VOL. I B(RLA OF TURBINE)**

Name of Component: IP CV-3
Location: IP CV-3_BUSH
Hardness: 140-145HB

200X

400X

Observation: Microstructure shows tempered Bainite precipitation of carbides at grain boundary.

Degradation Level- IVL

Fig: 128

Name of Component: IP CV-3
Location: IP CV-3_CONE
Hardness: 145-150HB

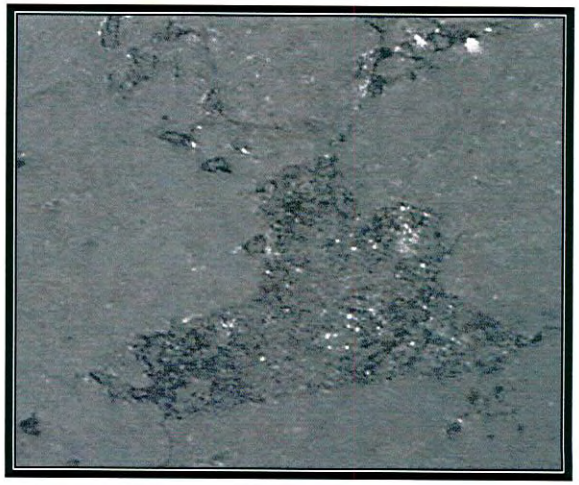
	
200X	400X
Observation: Microstructure shows tempered Bainite with precipitation of carbides..	Degradation Level- IIL

Fig: 129