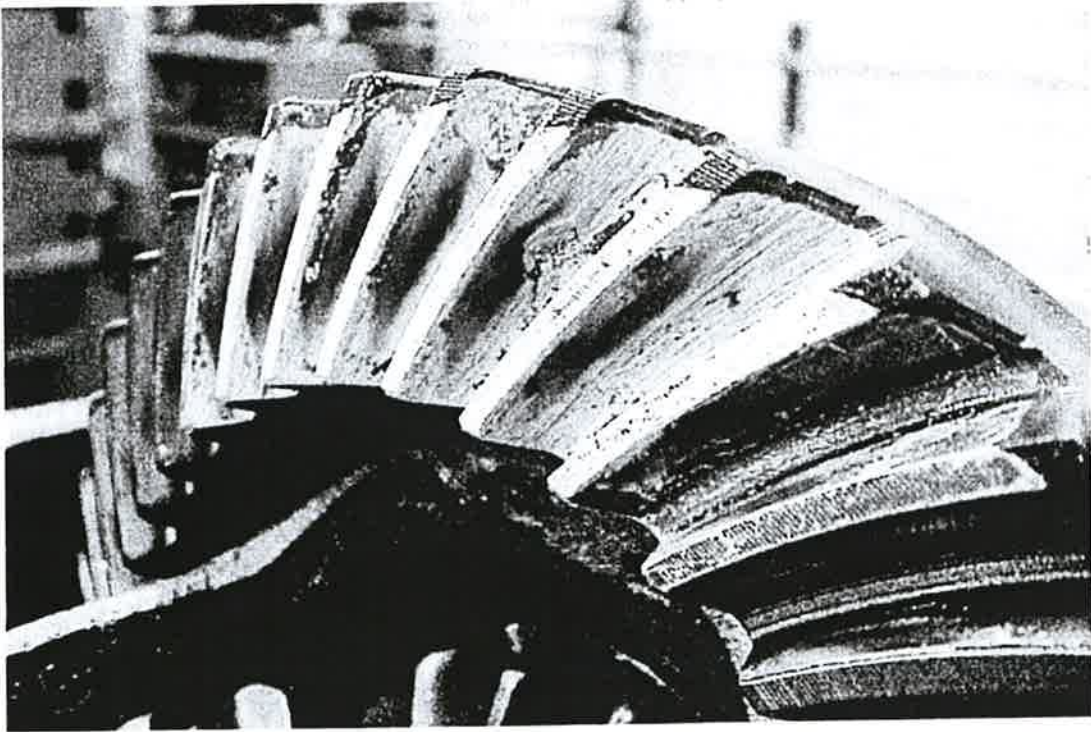
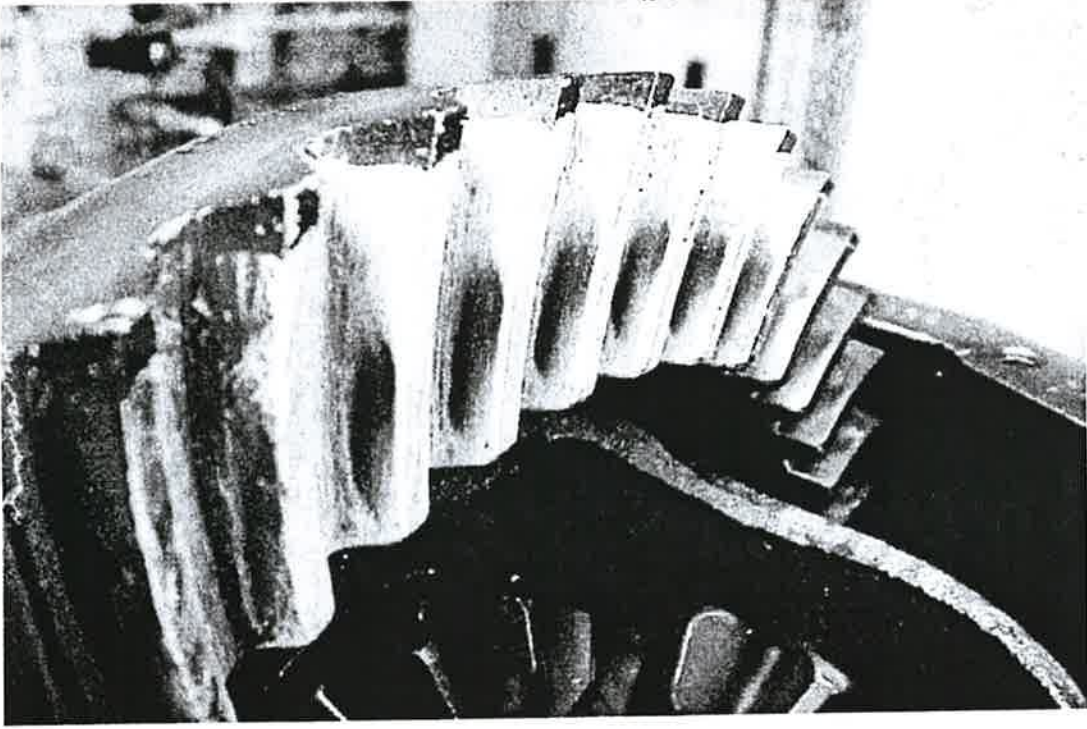


V1L500/P4T813 NON-LUBRITED MATRIX RESULTS

Testkey	Lab	STD	Run	Oil	VAL	Pinbat	DTCOMP	Pwear	Pridg	Pripp	Pspit	Rwear	Rridg	Rripp	Rspit	fpccrat	lpcrat	Mfg. Min	
																		B/Lash	KUSA COM1
✓ 59315	A	4	215	127	MG	V1L500	20080628	7	8	7	8	7	9	9	9.9	0	2	0.008	4625 Broken Tooth
✓ 59293	B	191	2636	127	AG	V1L500	20080701	6	7	8	9.6	6	7	9	9.9	0	2	0.008	4593
59290	D	3A	924	127	AG	V1L500	20080708	7	7	8	9.9	7	7	10	9.8	0	2	0.006	4930
✓ 67290	B	191	2640	134	AG	V1L500	20080706	6	5	7	7	5	4	9	9.8	1	2	0.004	4692
✓ 58911	A	4	214	155	AG	V1L500	20080628	7	9	9	9.6	8	10	9	9.9	0	2	0.008	4913
✓ 61848	B	191	2637	155	AG	V1L500	20080702	7	9	9	9.6	8	10	10	9.9	0	2	0.008	5143
58891	D	3A	923	155	MG	V1L500	20080706	7	8	9	2	7	9	8	2	0	2	0.008	4927 Broken Tooth
58892	D	3A	926	155	MG	V1L500	20080710	7	8	10	2	8	9	10	9.8	0	2	0.004	4933 Broken Tooth
✓ 63270	B	191	2642	153-1	MG	V1L500	20080708	6	4	8	2	5	4	9	9.8	1	2	0.007	5401 Broken Tooth
✓ 64181	A	4	219	153-1	AG	V1L500	20090709	6	7	7	9.8	7	9	10	9.9	0	2	0.006	4925

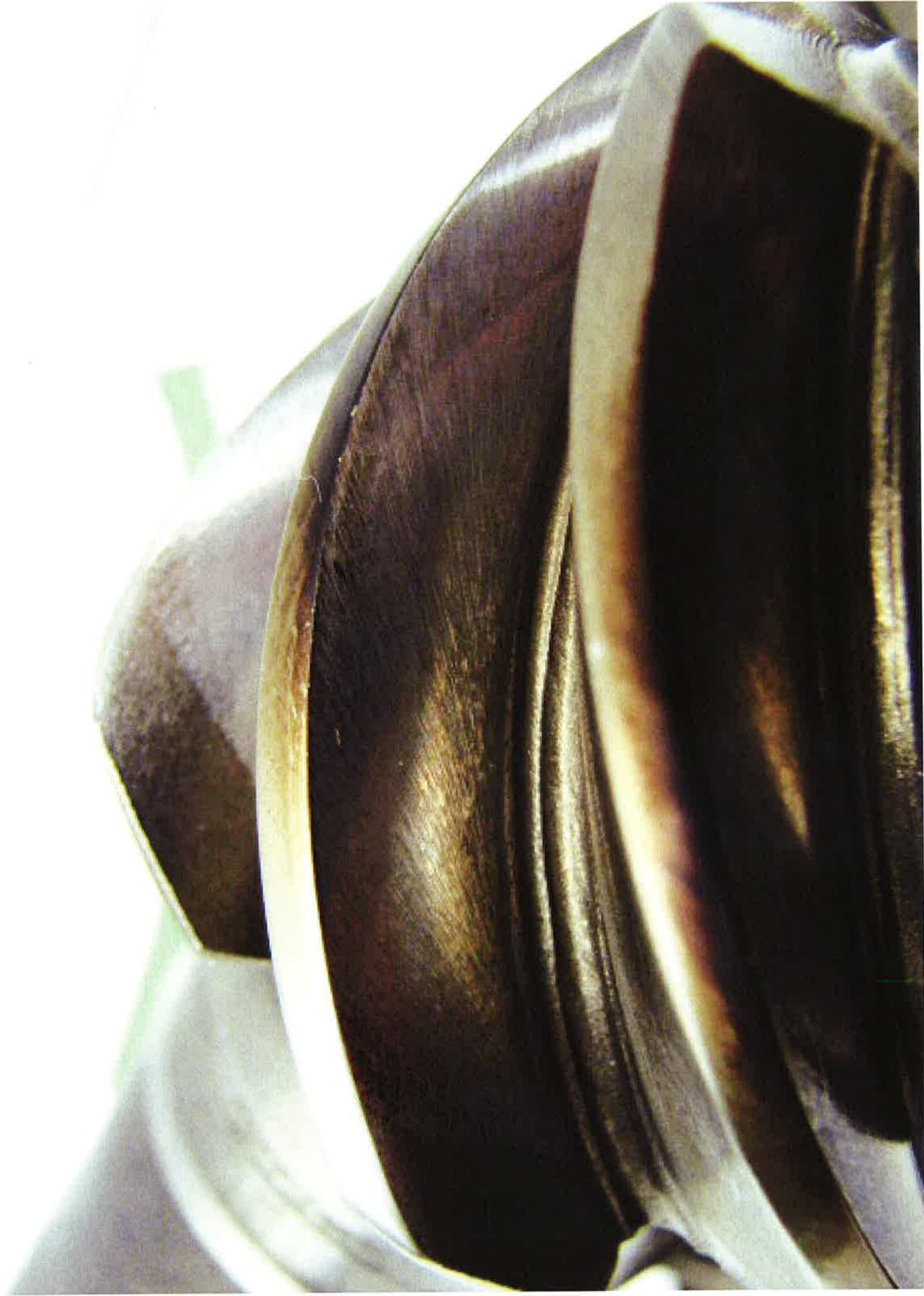
L37
Test: Matrix Test
Auth. Code: CMIR-59315 (SR-0266)
Oil: 04-0215
Run: LO-210344
SwRI: *6-27-08*
Date / Time: *D. Hawk*
Hours:



SwRI CMIR 59315 non-Lubrite



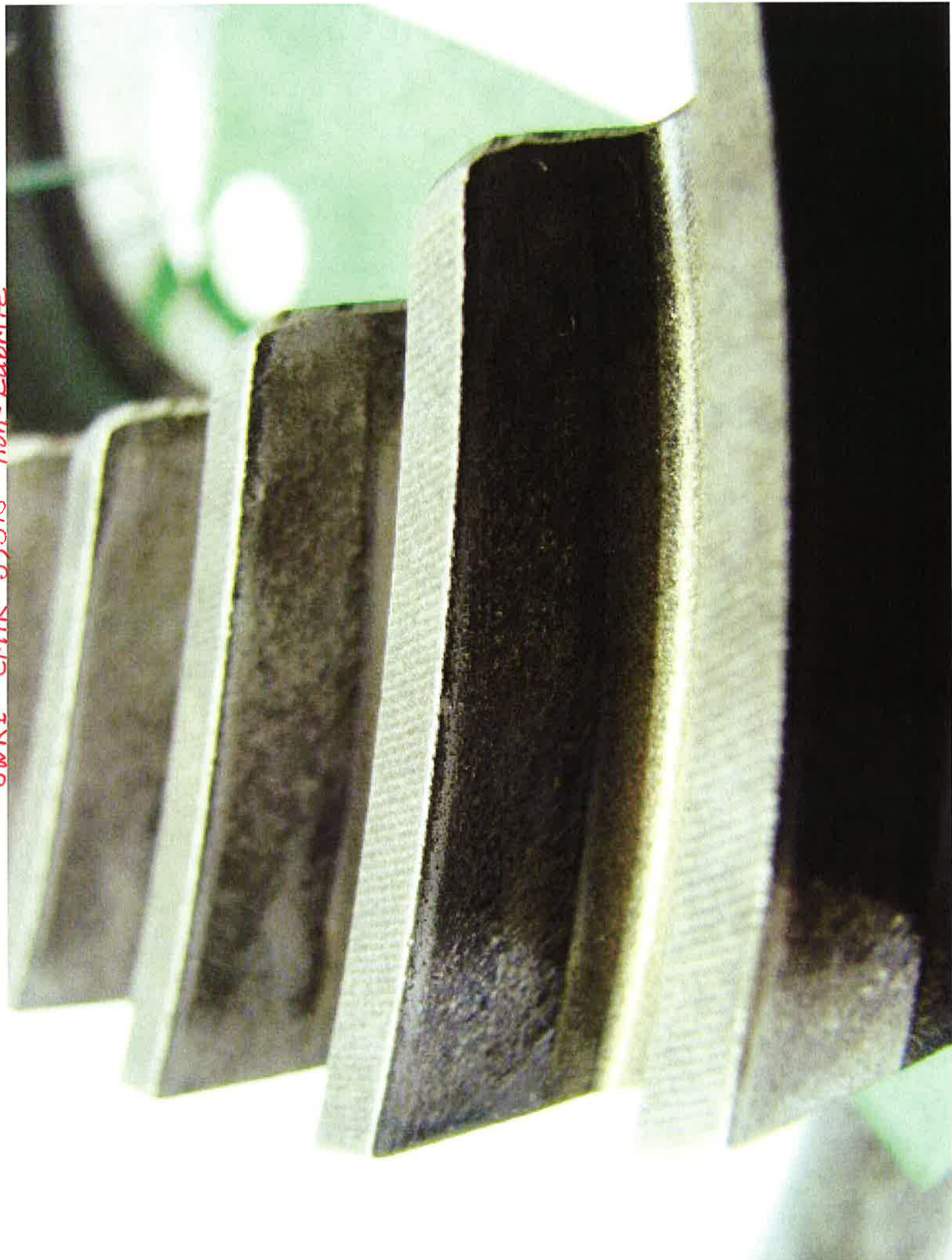
SwRI CMIR 59315 non-Lubrite



SwRI CMIR 59315 non-Lubrite



SWRI CMIR 59315 non-Lubricite



P05 TEST

Axle Unit Data Logsheet

**CMM 057293
TMC 127**

Note: This logsheet can be used for the following Axle tests: L-37, L-20 and Gear Spalling.

		Break	Turn
Initial		25.0	22.5
E	Hot	22.5	20.0
	Cold	10	7.5
O	Without Axles	7.5	5
T	Pinion Only	7.5	5

		Backlash	
		Initial	EOT
1	0.0080	0.0150	
2	0.0090	0.0130	
3	0.0090	0.0140	
4	0.0085	0.0120	
Avg.	0.0086		

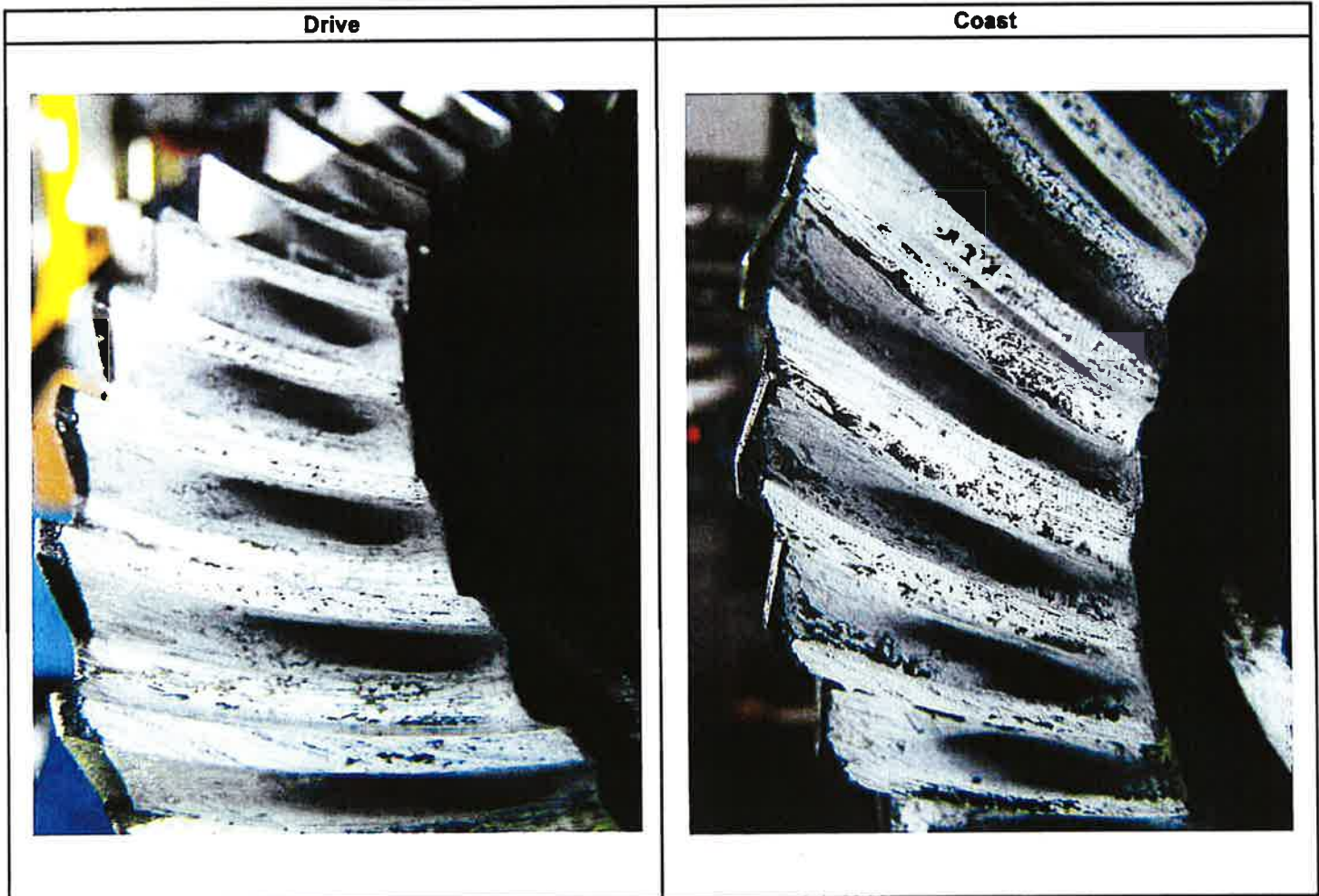
TRN Number	TRNN23203
Hardware ID	2L
Ring Batch ID	P4T813
Pinion Batch ID	V1L500
Gear Test Type	Non Lubricated
Axle Ass'y Date	164-08-A
Axle ID Number	060AA1002
Pattern Contact	L2 F0
Agree Y/N?	Yes
Operator	JPK/MRFI
Prep Date	06/30/08

DE.
9-20-08
9-20-08

		Tool ID #'s	
Initial	582-05	563-114	
EOT	282-05	563-114	
Mfg's Build Info			
Backlash	0.008		
R/T	30.0		

		Axle Cleaned	
Oper.	JPK		
Date	6-30-08		

Comments **KUSA04593**



D6121 L-37

High Torque Test - Standard

Lubrizol Mechanical Test

Laboratory
Oil Code
TRN Number
Test Number
EOT Date

LUBRIZOL
0059293
TRNNZ3ZBB
191-2636
20080701

TMC 127

Pinion



Ring



PRE TEST

CMR 062290
Axle Unit Data Logsheet

062290

TMC 134

①

Note: This logsheet can be used for the following Axle tests: L-37, L-20 and Gear Spalling.

		Break	Turn
Initial		40.0	35.0
E	Hot	26.0	17.5
	Cold	20.0	10.0
O	Without Axles	17.5	6.0
T	Pinion Only	15.0	5.0

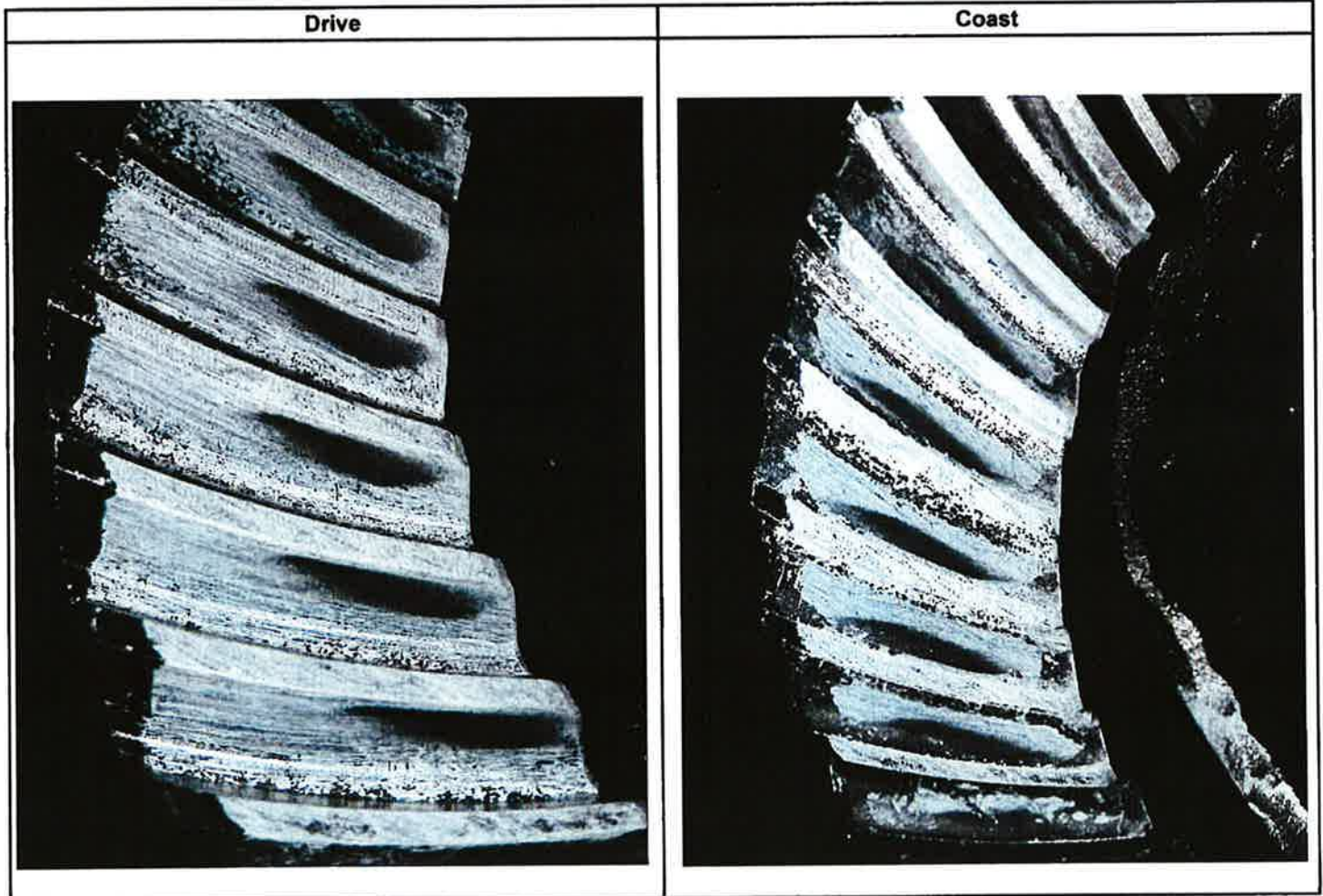
		Backlash	
		Initial	EOT
1	0.0025	.008	
2	0.0025	.0075	
3	0.0020	.0075	
4	0.0030	.008	
Avg.	0.0025		

TRN Number	TRNW6829B
Hardware ID	1V
Ring Batch ID	P4T813
Pinion Batch ID	VIL500
Gear Test Type	Non Lubrited
Axle Ass'y Date	164-08-A
Axle ID Number	060AA1002
Axle Serial No.	KUSA04692
Pattern Contact	L2 F+1
Agree Y/N?	Yes
Operator	JPK
Prep Date	07/03/08

Tool ID #'s		
Initial	582-05	563-114
EOT	582-05	563-114 RAL
Mfg's Build Info		
Backlash	0.004	
R/T	35.0	

Axle Cleaned	
Oper.	JPK
Date	7-4-08

Comments **Non-Lubrited unapproved hardware for matrix testing**



D6121 L-37

High Torque Test - Standard

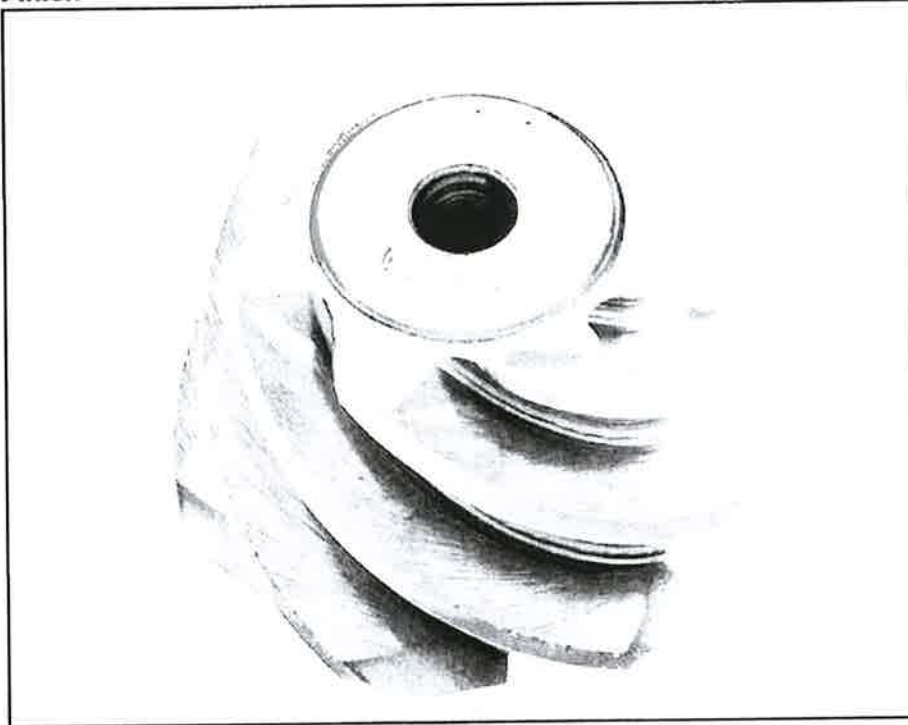
Lubrizol Mechanical Test

Laboratory
Oil Code
TRN Number
Test Number
EOT Date

LUBRIZOL
067290
TRNW68ZPB
191-2640
20080706

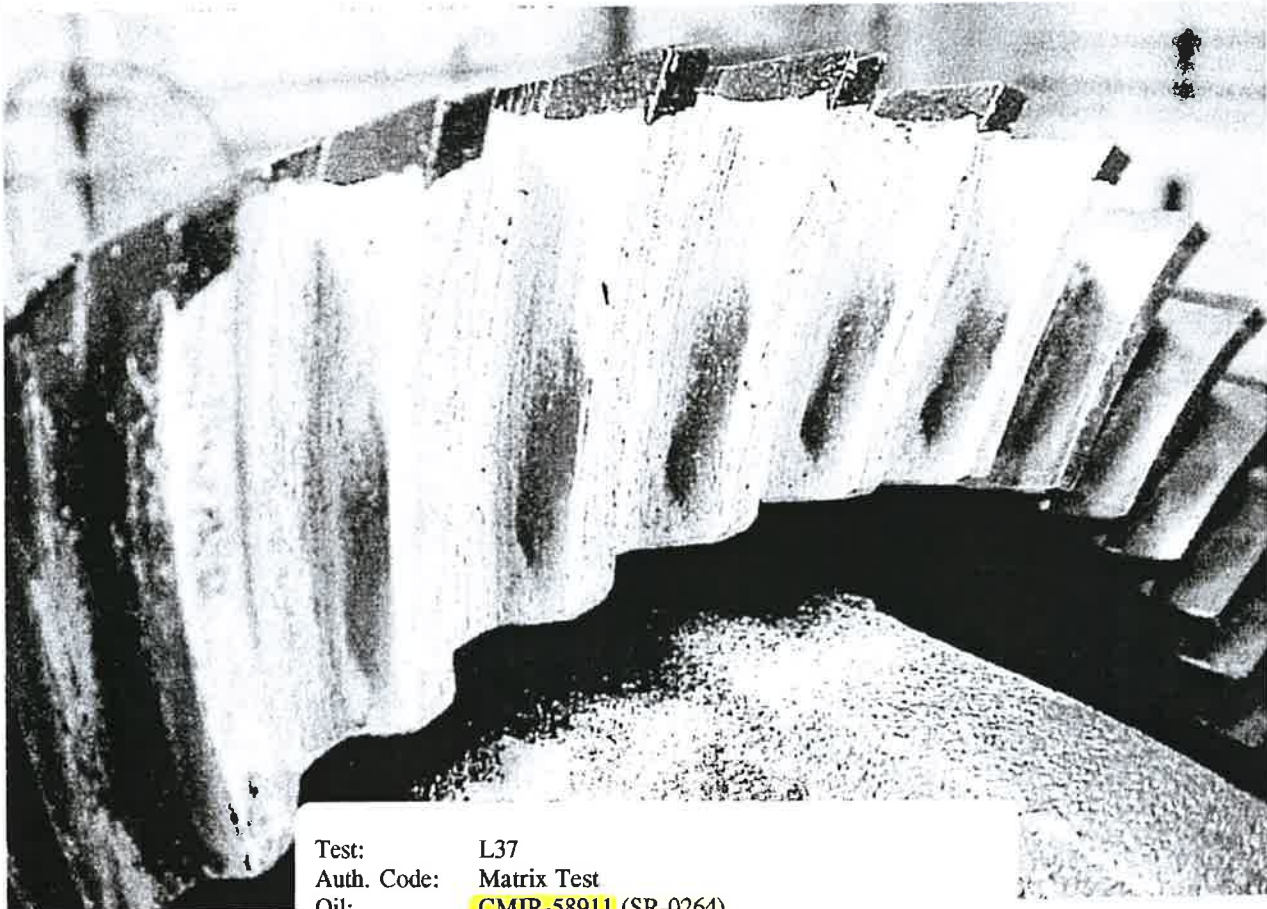
TMC-134

Pinion



Ring

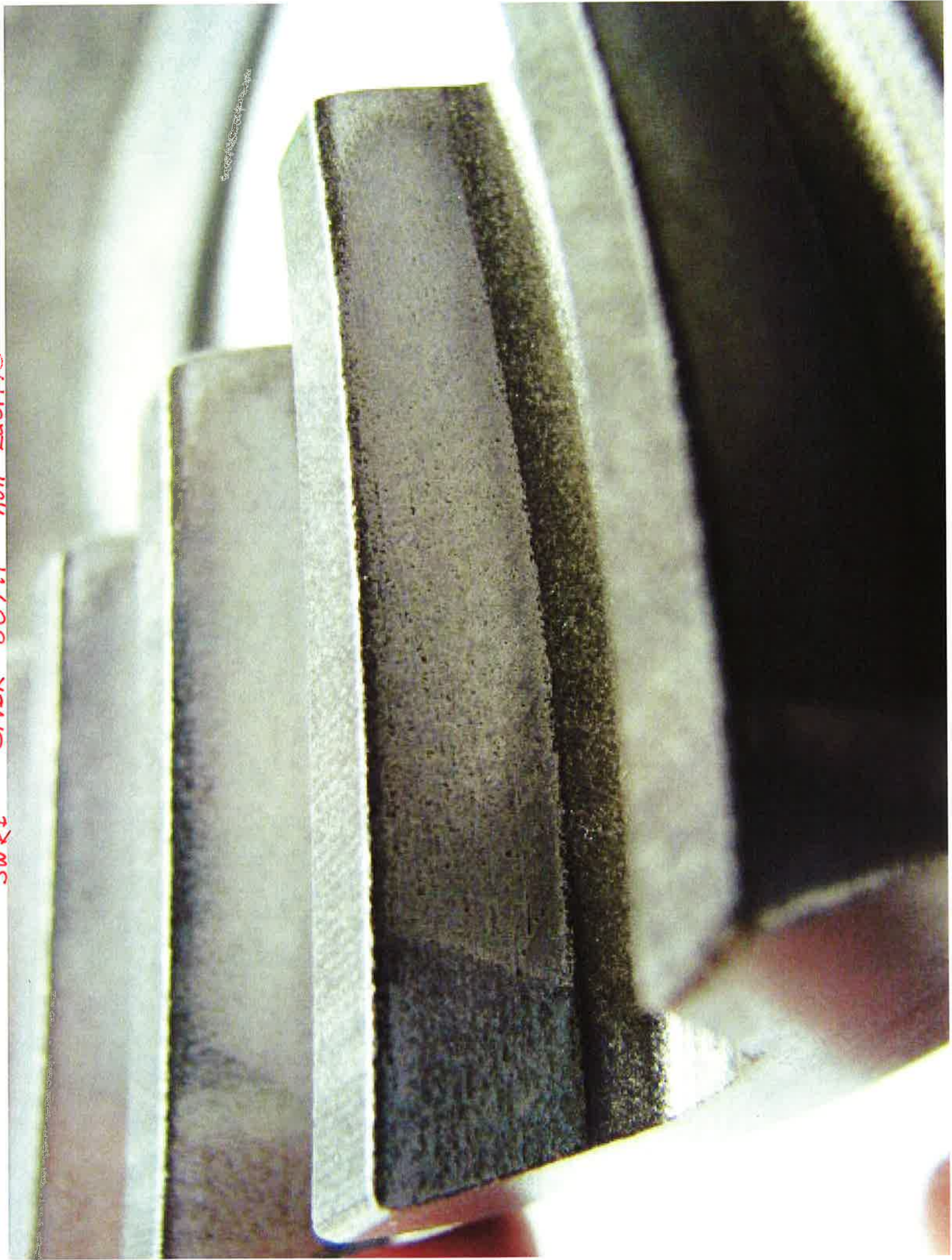




Test: L37
Auth. Code: Matrix Test
Oil: CMIR-58911 (SR-0264)
Run: 04-0214
SwRI: LO-209113
Date / Time: 6-27-08
Hours: - 0 -



SWRI CMIR 58911 non-Lubrite



SwRI CMIR 58911 non-Lubrite



SwRI CMIR 58911 non-Lubrite



SwRI CMIR 58911 non-Lubnife



PRE TEST

Axle Unit Data Logsheet

**CMR 06/848
TMC 155**

Note: This logsheet can be used for the following Axle tests: L-37, L-20 and Gear Spalling.

		Break	Turn
Initial		32.5	30.0
E	Hot	27.5	25
	Cold	20	15
O	Without Axles	15	12.5
T	Pinion Only	15	12.5

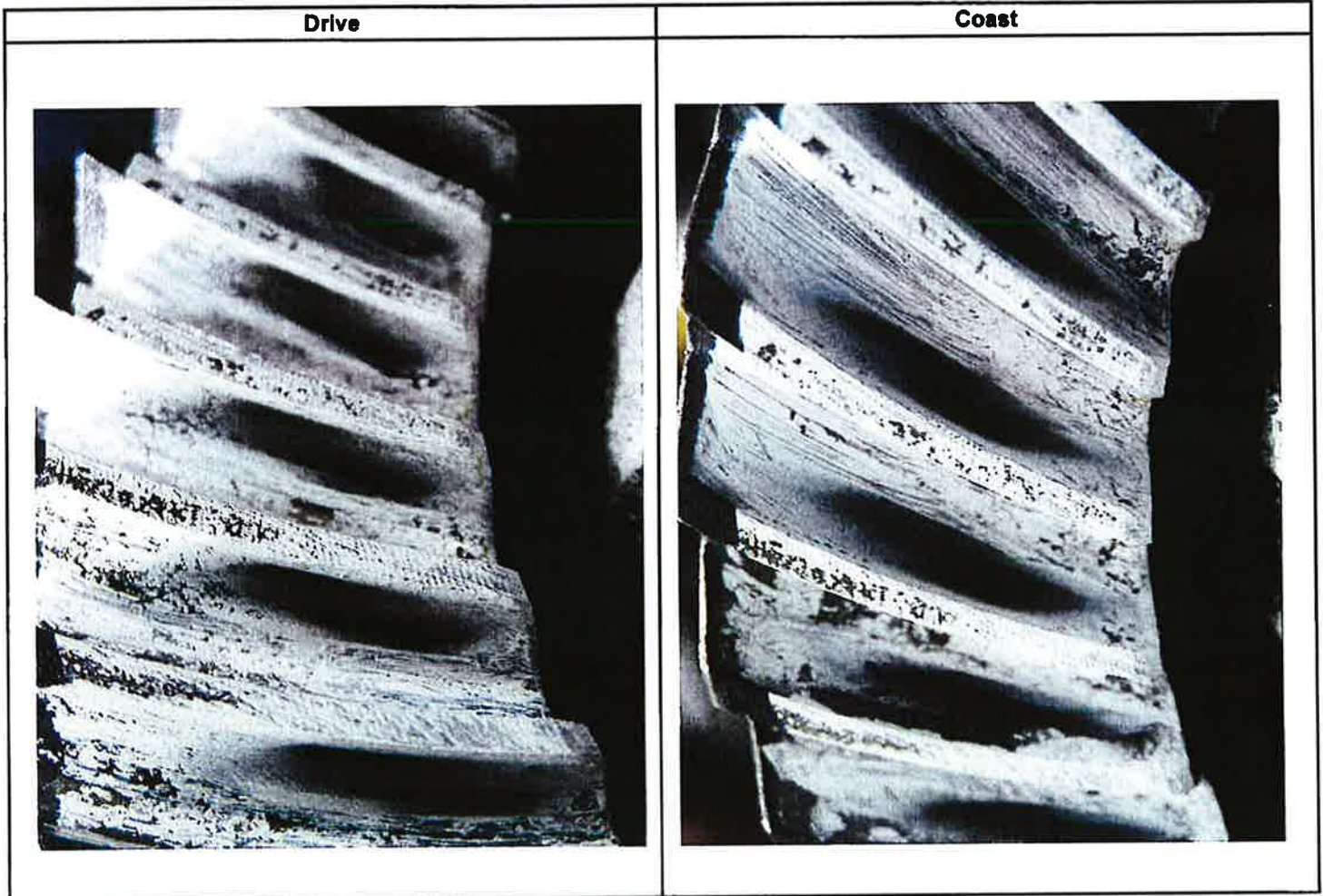
		Backlash	
		Initial	EOT
1	0.0080	.0085	
2	0.0070	.008	
3	0.0070	.008	
4	0.0070	.008	
Avg.	0.0073		

TRN Number	TRND3V7BB
Hardware ID	5V
Ring Batch ID	P4T813
Pinion Batch ID	V14500
Gear Test Type	Non Lubricated
Axle Ass'y Date	171-08-A
Axle ID Number	060AA1002
Pattern Contact	L2 F0
Agree Y/N?	Yes
Operator	JPK/MRFI
Prep Date	06/30/08

Tool ID #'s		
Initial	582-05	563-114
EOT	582-05	563-114
Mfg's Build Info		
Backlash	0.008	
R/T	30.0	

Axle Cleaned	
Oper.	JPK
Date	7-1-08

Comments **KUSA05143**



D6121 L-37

High Torque Test - Standard

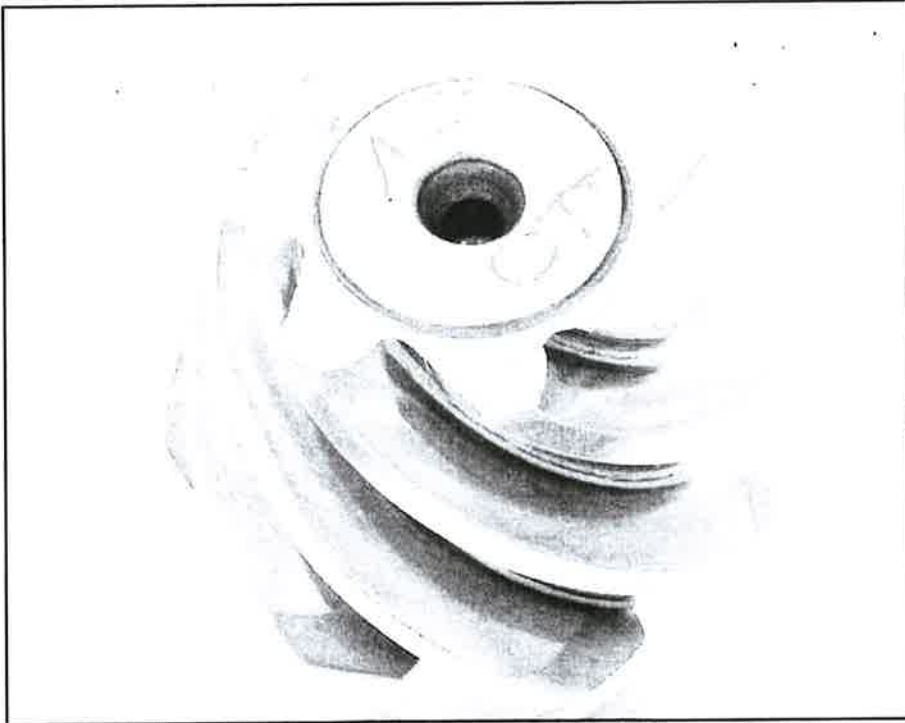
Lubrizol Mechanical Test

Laboratory
Oil Code
TRN Number
Test Number
EOT Date

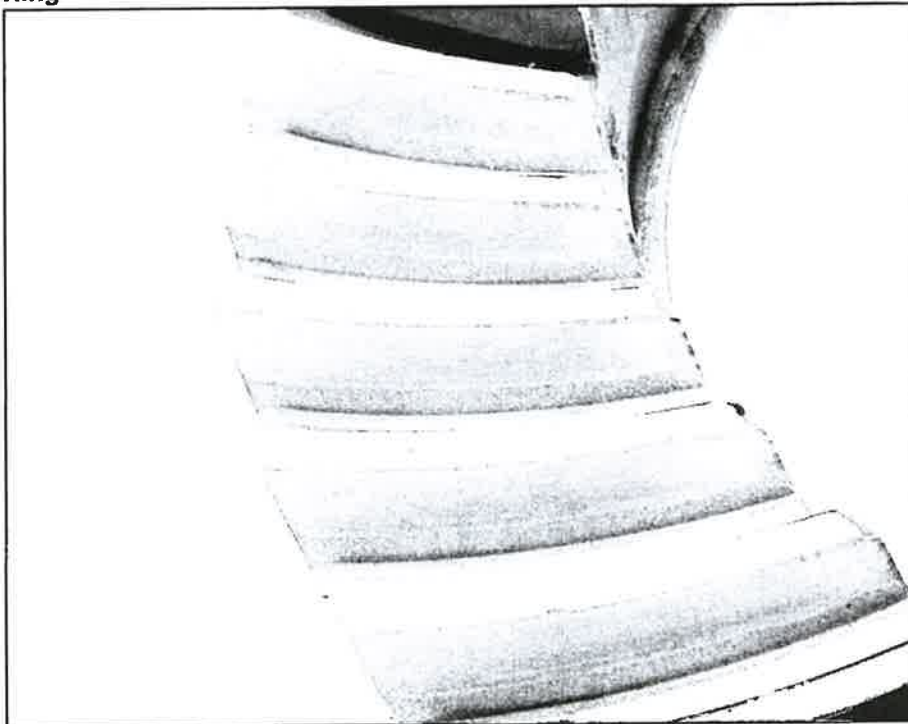
LUBRIZOL
061848
TRND3V7BB
191-2637
20080702

TMC 155

Pinion



Ring



PRE-TEST

Axle Unit Data Logsheet CMR 063270 TMC 153-1 ^②

Note: This logsheet can be used for the following Axle tests: L-37, L-20 and Gear Spalling.

		Break	Turn
Initial		50.0	40.0
E	Hot	22.5	20.0
	Cold	20.0	15.0
O	Without Axles	15.0	10.0
T	Pinion Only	10.0	10.0

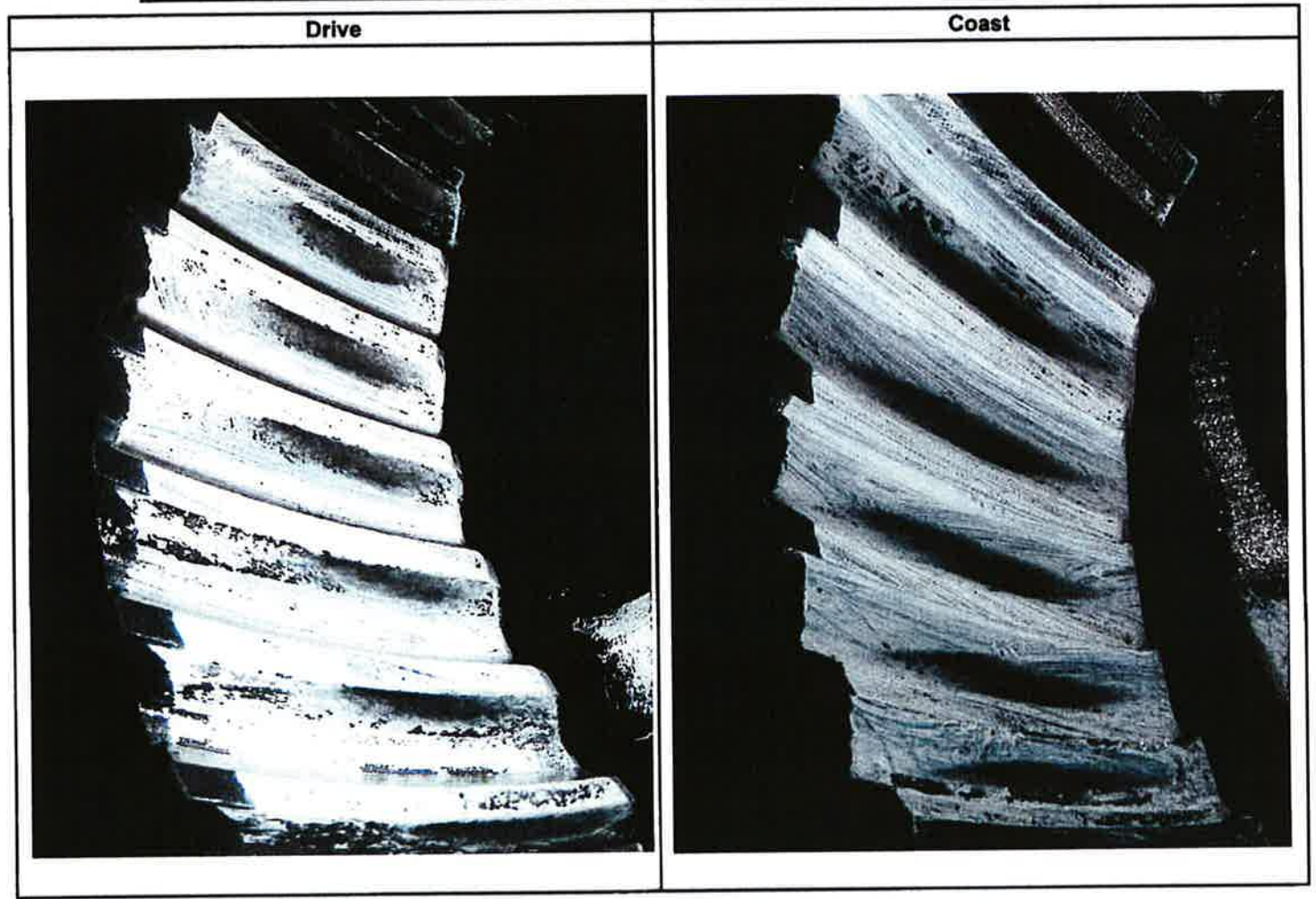
		Backlash	
		Initial	EOT
1	0.0080	.009	
2	0.0080	.010	
3	0.0070	.009	
4	0.0070	.010	
Avg.	0.0075		

TRN Number	TRNG2TQW
Hardware ID	2J
Ring Batch ID	P4T813
Pinion Batch ID	VIL500
Gear Test Type	Non Lubricated
Axle Ass'y Date	172-08-A
Axle ID Number	060AA1002
Axle Serial No.	KUSA05401
Pattern Contact	L2 F+1
Agree Y/N?	Yes
Operator	JPK
Prep Date	07/03/08

Tool ID #'s		
Initial	582-05	563-114
EOT	582-05	563-114
Mfg's Build Info		
Backlash	0.007	
R/T	25.0	

Axle Cleaned	
Oper.	JAD
Date	7-6-08

Comments **Non-Lubricated unapproved hardware for matrix testing**



D6121 L-37

High Torque Test - Standard

Lubrizol Mechanical Test

Laboratory

LUBRIZOL

Oil Code

063270

TRN Number

TRNG2TQWC

Test Number

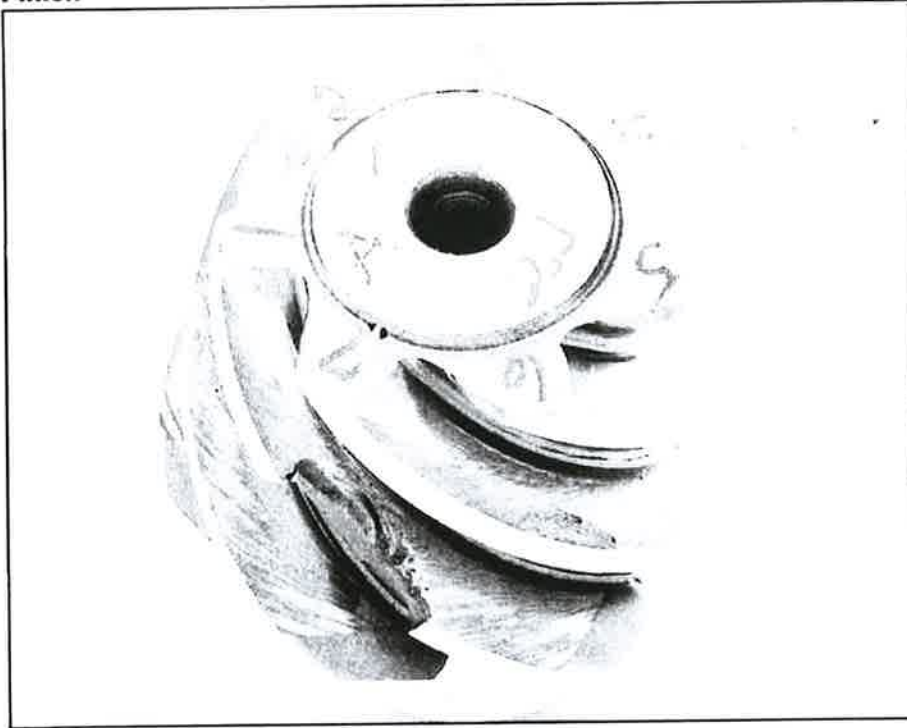
191-2642

EOT Date

20080708

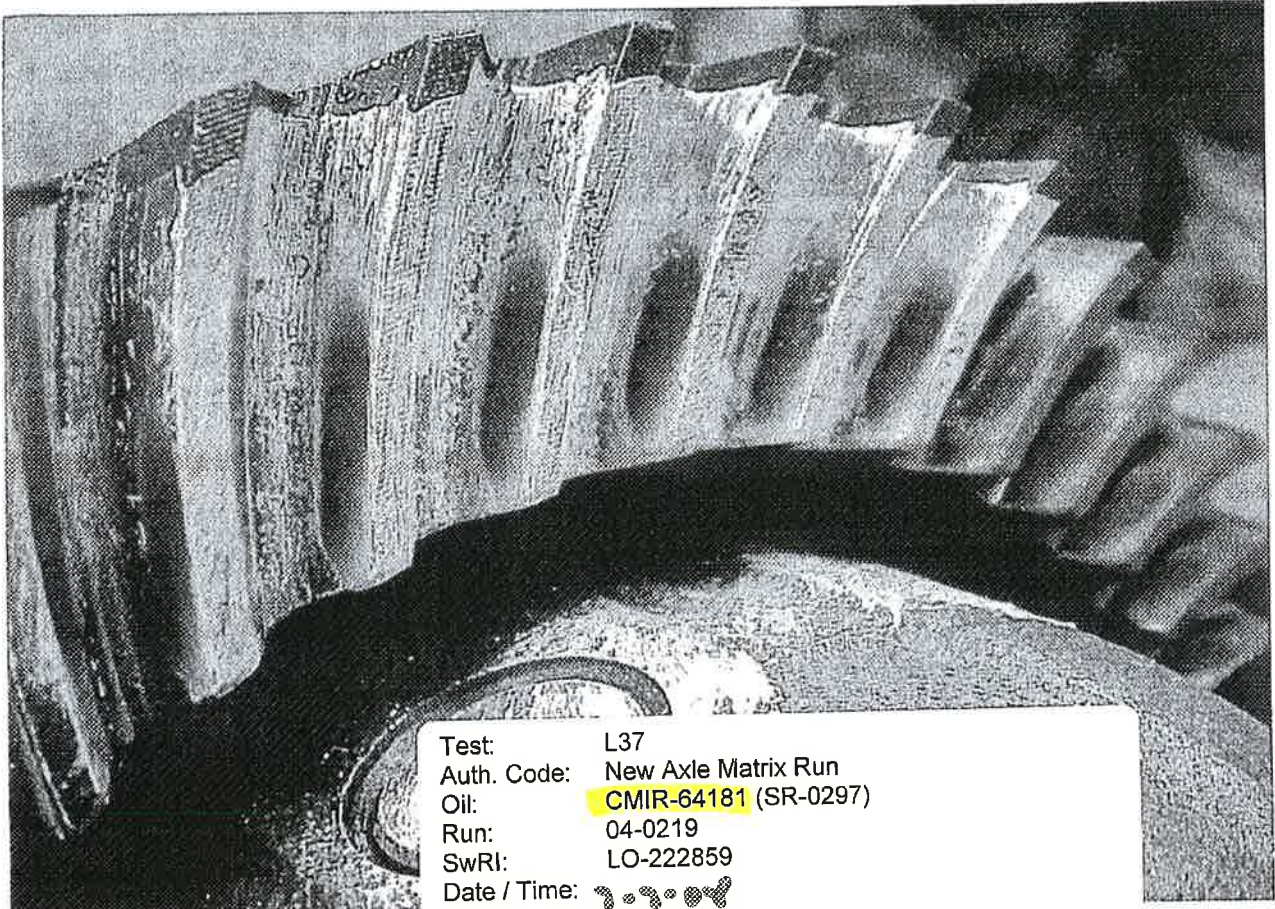
TMC 153-1

Pinion

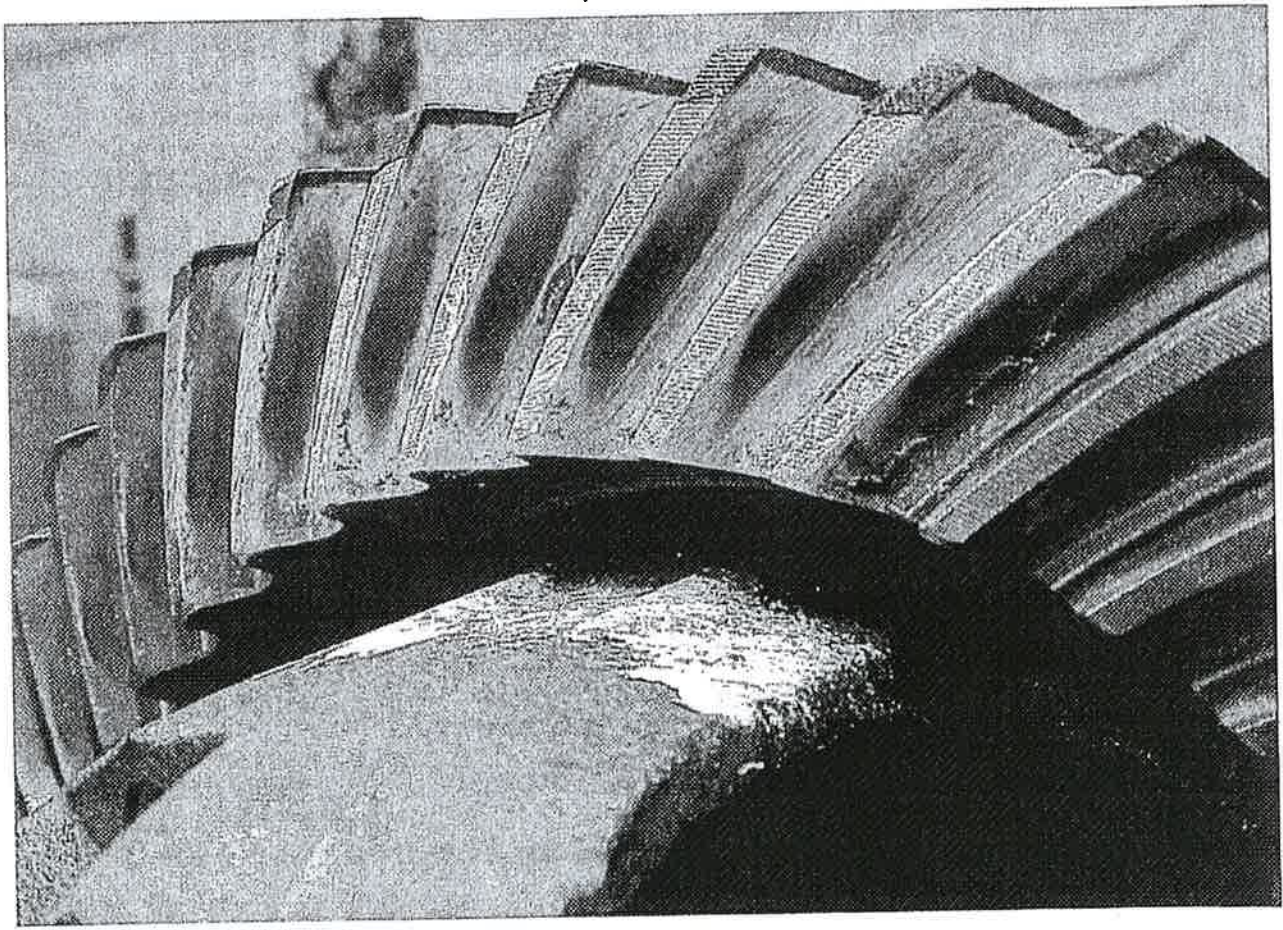


Ring





Test: L37
Auth. Code: New Axle Matrix Run
Oil: CMIR-64181 (SR-0297)
Run: 04-0219
SwRI: LO-222859
Date / Time: 7-7-04
Hours: 24



SwRI CMIR 64181 non-Lubrite



FIGURE 1: SWRI SAMPLE HYPOID DRIVE GEAR SET AS RECEIVED.

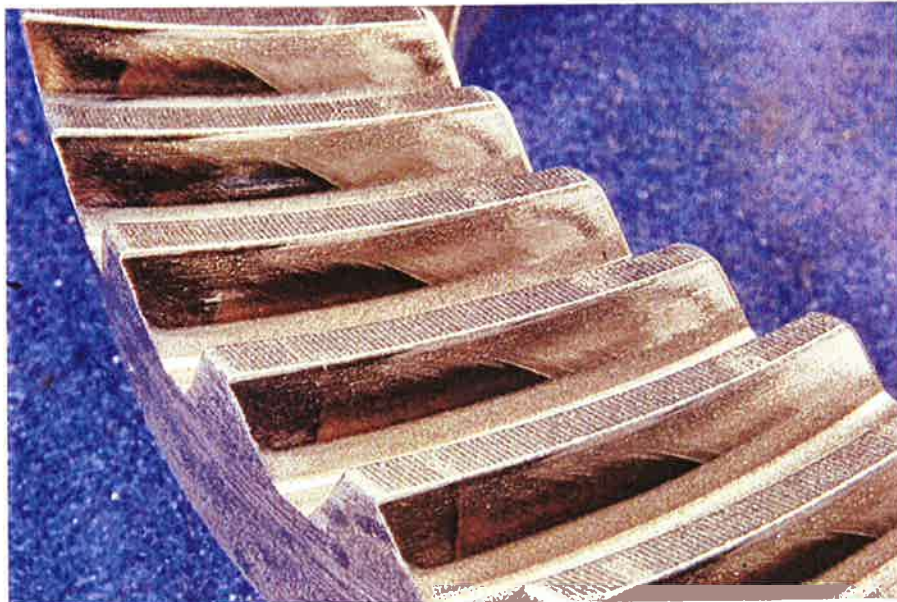


FIGURE 2: SWRI SAMPLE TYPICAL GEAR CONTACT PATTERN ON TOOTH DRIVE SIDE. NOTE THE HARD CONTACT AT ROOT AND UPPER FLANK EDGE NEAR TOP LAND ON THE HEEL END OF TEETH. THE OVERALL PATTERN IS BIASED TOWARD THE HEEL END.

SWRI CMIR 64181 non-Lubrite

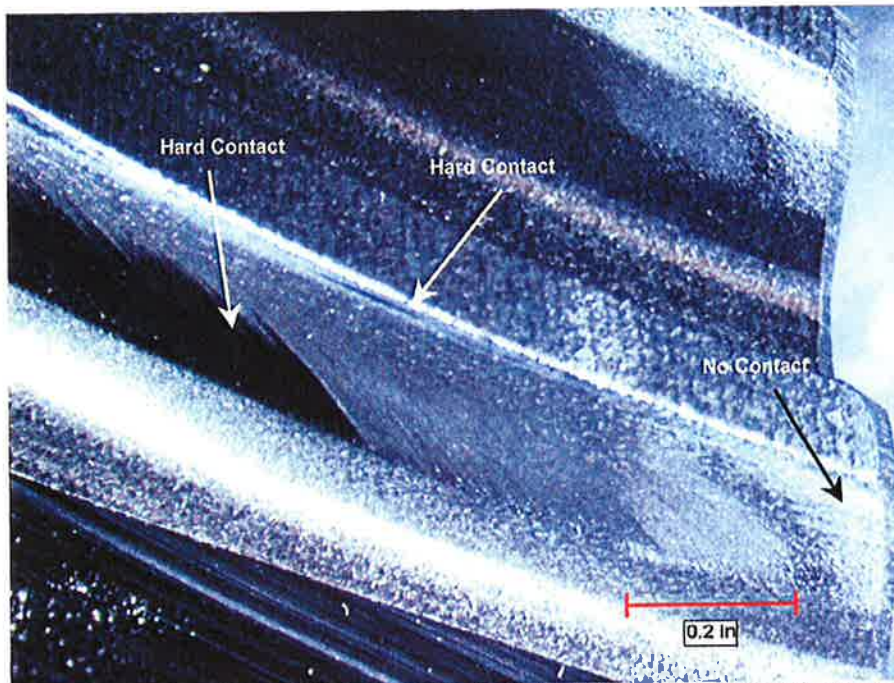


FIGURE 5: SWRI SAMPLE ENLARGED IMAGE OF FIGURE 3 GEAR TOOTH SURFACE ON DRIVE SIDE AT TOE END. NOTE UNEVEN REGION OF CONTACT BETWEEN UPPER AND LOWER FLANK, AND TOE END VERSUS TOOTH MID-SECTION. AREA OF HARD CONTACT IS VISIBLE AT UPPER FLANK EDGE ADJACENT TO TOP LAND.

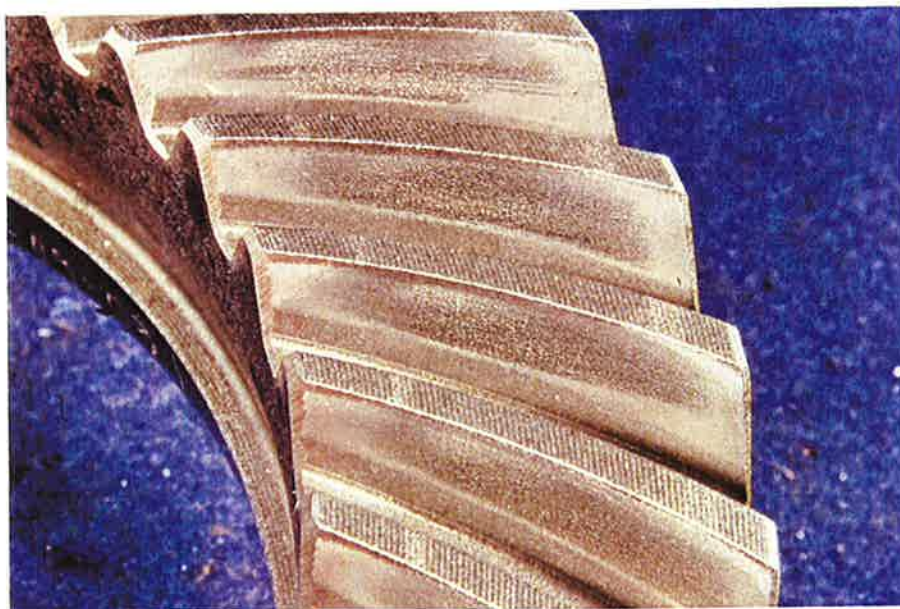


FIGURE 6: SWRI SAMPLE TYPICAL GEAR CONTACT PATTERN ON TOOTH COAST SIDE.

SwRI CMIR 64181 non-Lubrite



FIGURE 2: SWRI SAMPLE TYPICAL PINION GEAR CONTACT PATTERN ON TOOTH DRIVE SIDE. THE PATTERN HAS A DARKER REGION WITH POLISH AND RIDGING AT THE HEEL END, WHICH TRANSITIONS TO REGION OF LIGHTER POLISH AND RIDGING AT THE TOE END.

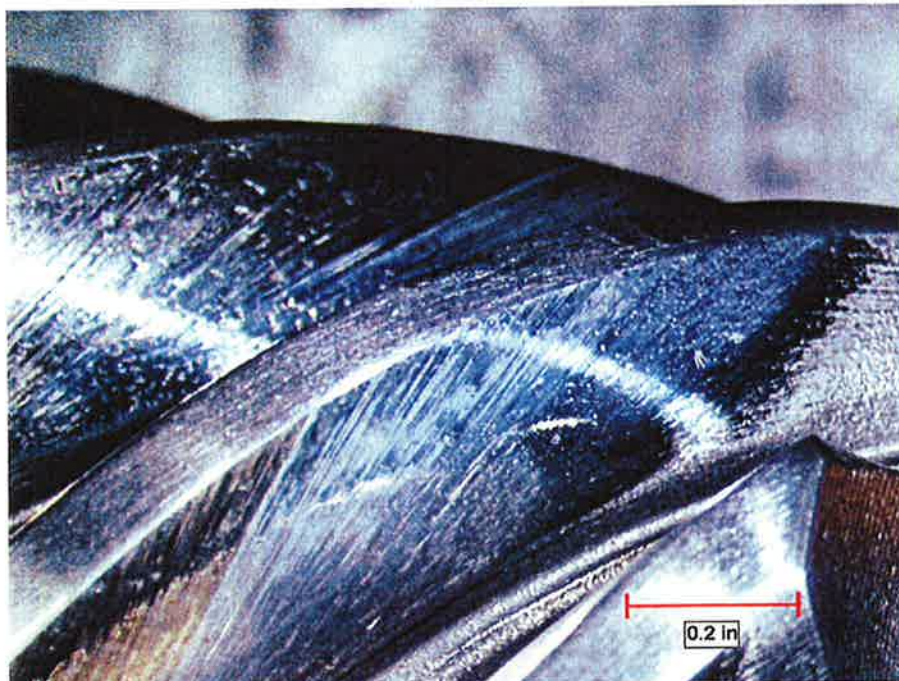


FIGURE 3: ENLARGED IMAGE OF FIGURE 2 PINION GEAR TOOTH SURFACE ON DRIVE SIDE. NOTE RIDGING PRESENT ON TOOTH FLANK.

SWRI CMIR 64181 non-lubricate



FIGURE 4: SWRI SAMPLE TYPICAL PINION GEAR CONTACT PATTERN ON TOOTH COAST SIDE. THE PATTERN IS MORE LIGHTLY POLISHED WITH SOME SCORING ON THE UPPER FLANK OF THE CENTRAL TOOTH REGION.

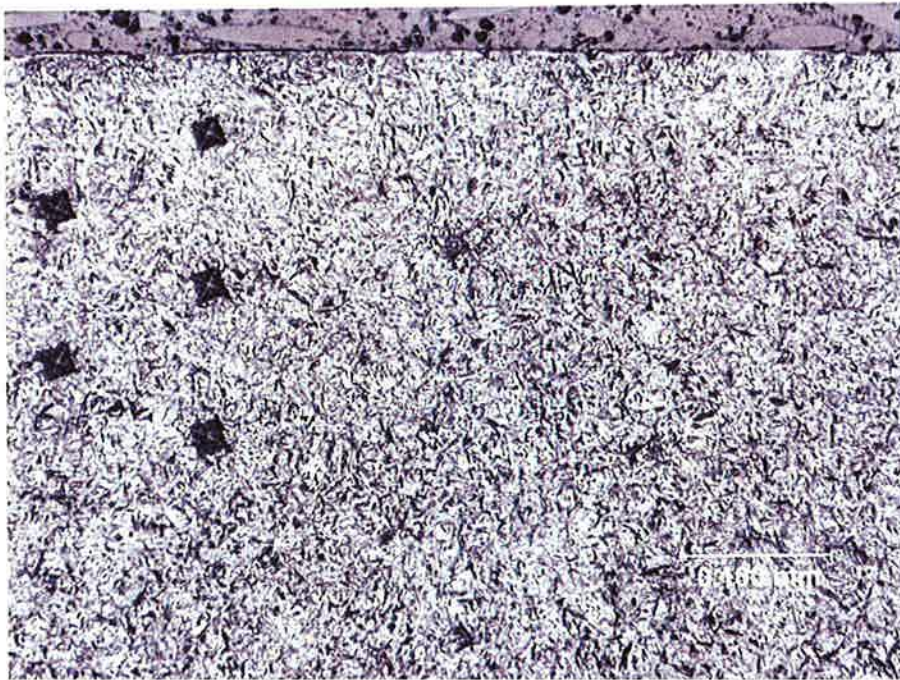
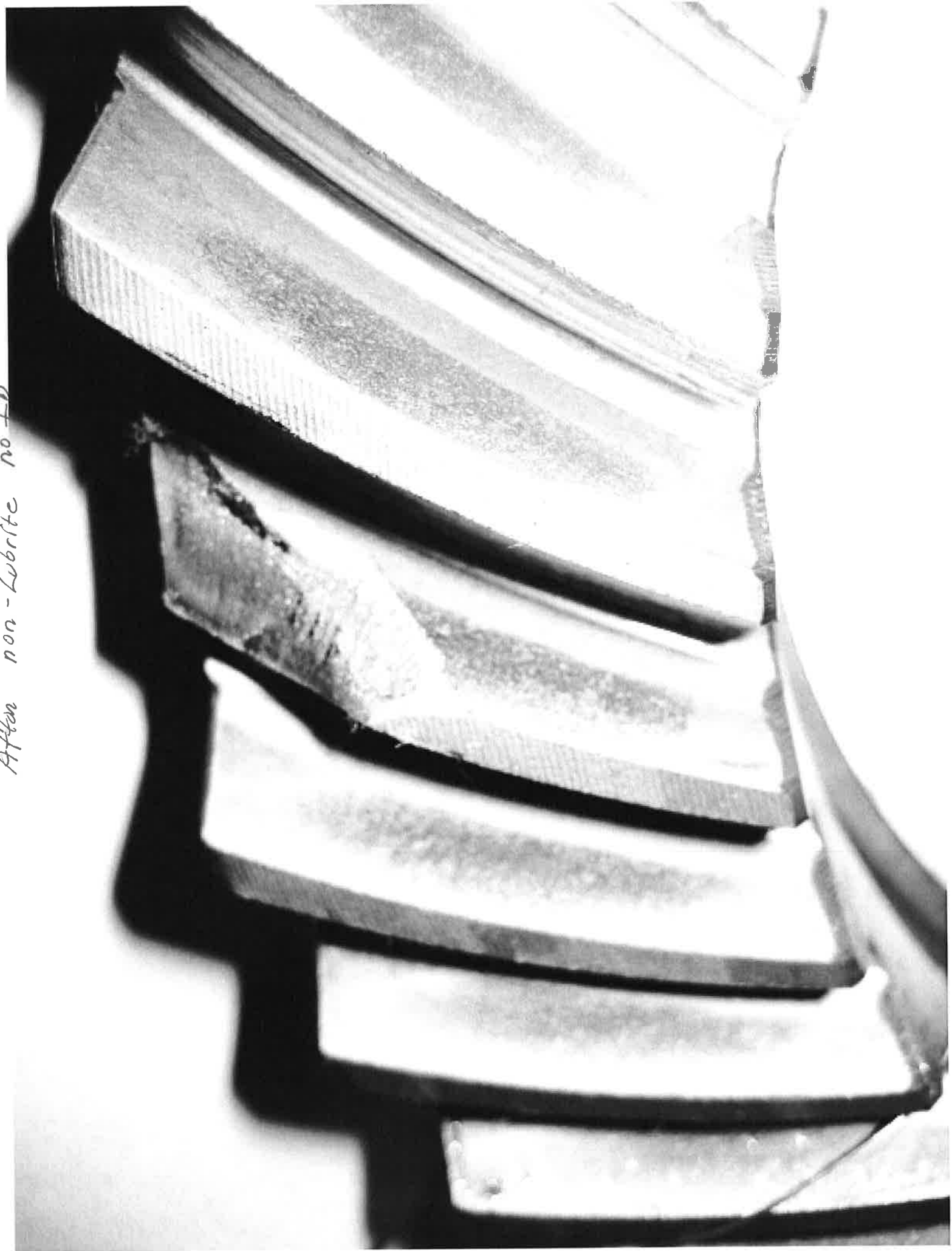


FIGURE 5: SWRI SAMPLE TYPICAL MICROSTRUCTURE OF THE PINION TOOTH CASE AT THE PITCH, CONSISTING OF TEMPERED MARTENSITE. ETCHED IN 2% NITAL.

After non-lubricate no ID



Afton non-lubricate no ID



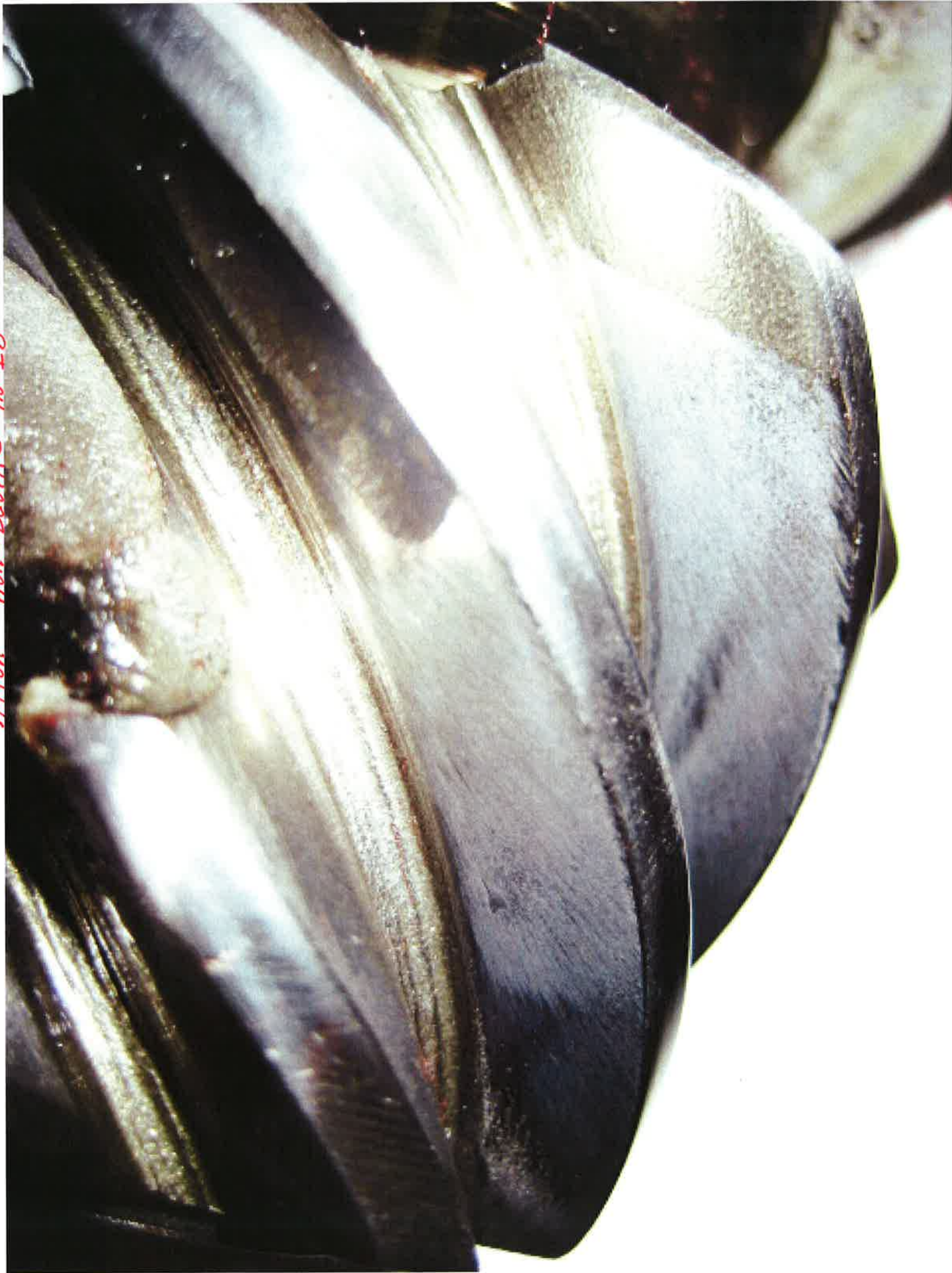
A from non-Lubrite no ID



Affon non-Lubrite no ID



After non-lubric no ID



Afton non-lubricite no ID

