Hydraulic Oil Filtration P&H 2800 : Camberwell Coal, Hunter Valley

The FM502 recycling buggy was connected to the hoist gear case of the shovel for a period of three weeks, the aim being to reduce the iron content within the case.

Samples attached indicate that before filtration commenced the Iron was at 71ppm, Silicon at 43ppm and the PQ90 Fe mg ltr at 218. After two weeks with the FM502 buggy connected, Iron was reduced to 36ppm, a reduction of 53%, Silicon at 21ppm, a reduction of 51% and the PQ 90 was at 94, a reduction of 56%.

The filtergram attached taken after completion of the evaluation indicates the size and types of various particles trapped in the FTA filter. The element itself is totally loaded indicating the large amounts of contamination in the system.

Site	Camberwell Coal
Attention To:	BRAD HAWKINS
Machine:	201 P&H 2800 XPA Shovel
Sample Location:	Hoist Gearcase
Oil Type:	HARRISONS GEAR OIL 460

Oil Test

4 Walter Street \ PO Box 490
Singleton NSW 2330
Phone: (02) 6571-1444
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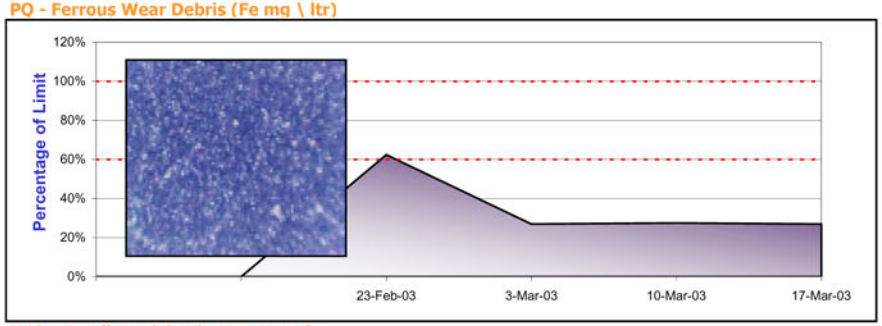
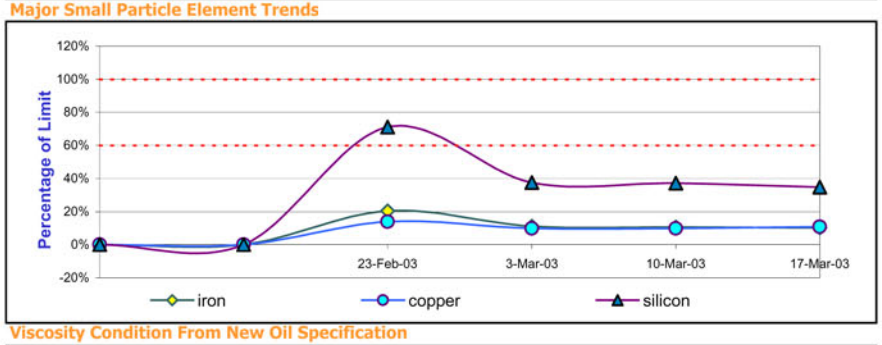
OKAY

Sample Date				23-Feb-03	3-Mar-03	10-Mar-03	17-Mar-03
Analysis Report No.		-	-	190,250	190,251	190,499	190,915
Service Meter Reading		-	-	63683hrs	63683hrs	0hrs	64047hrs
Electric SMR		-	-	0hrs	0hrs	0hrs	0hrs
Oil Hrs		-	-	603	731	-	-
Oil Changed?				No	No	Unsure	No
Wear Metals	Limit	ppm	ppm	ppm	ppm	ppm	ppm
lead				1	2	1	1
iron	350			71	39	37	36
aluminium	20			9	4	4	4
copper	80			11	8	8	9
chromium	15			1	0	1	0
tin				10	8	7	8
nickel	15			0	0	0	0
silver				0	0	0	0
titanium				7	3	1	2
Contaminants	Limit	ppm	ppm	ppm	ppm	ppm	ppm
silicon	60			43	23	22	21
sodium				12	8	8	8
vanadium				0	0	0	0
Oil Additives	Limit	ppm	ppm	ppm	ppm	ppm	ppm
magnesium				2	0.9	0.8	0.8
zinc				1161	1221	1182	1199
molybdenum				506	270	246	343
calcium				6	4	4	4
phosphorous				865	856	826	836
boron				164	134	136	126
barium				2	0	0	0.5
Physical Tests							
TBN				0	0	0	0
TAN				0.00	0.00	0.00	0.00
fuel dilution %				0	0	0	0
water %				0	0	0	0
viscosity index				98	99	95	98
visc @ 100oC - Cst				31.62	31.87	30.95	31.18
visc @ 40oC - Cst	460			468	468	475	457
FTIR Analysis							
soot - abs				0	0	0	0
glycol%				0	0	0	0
water %				0	0	0	0
oxidation - abs				0	0	0	0
nitration - abs				0	0	0	0
sulphation - abs				0	0	0	0
Particle Analysis							
particle count in 1ml				0	0	0	0
ISO-4406 4\ 6\ 14µm		-\-\-	-\-\-	-\-\-	-\-\-	-\-\-	-\-\-
PQ90 Fe - mg \ ltr	350			218	94	96	94

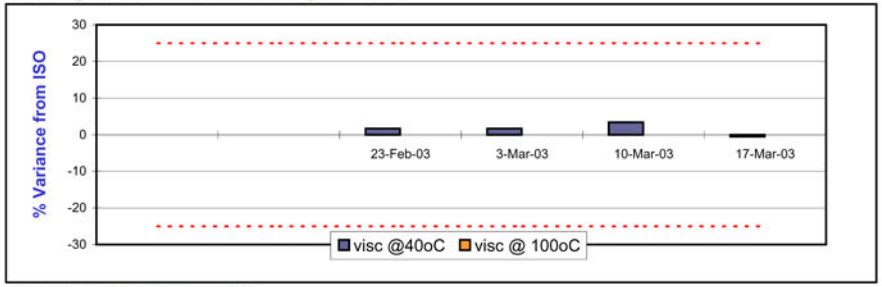
PQ - Ferrous Wear Debris (Fe mg \ ltr)



Major Small Particle Element Trends



Viscosity Condition From New Oil Specification



Comments & Recommendation

Wear and contaminants are stable. Recommend monitor trend at next oil sample.

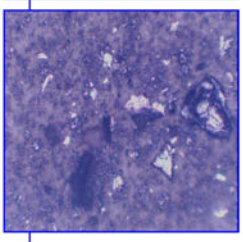
FILTER TECHNOLOGY

Oil Test

Machine ID:	Swing	**SampleID:**	OIL-000113
Component Name:	Gearbox	**Date Sampled:**	07 April 2003
Manufacturer:	P & H	**Machine Hrs:**	
Model:	2800 XPA	**Oil Hrs:**	
Site:	Camberwell Coal	**Filtered Oil Hrs:**	
Maintenance Division:	201 - P & H 2800 XPA Shovel	**Filter Hrs:**	

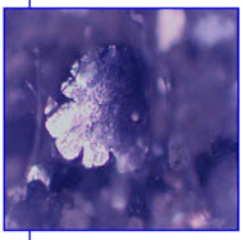
Element Condition

Filter Element saturated with contaminants, wear debris indicating that the element had reached the end of its useful life.



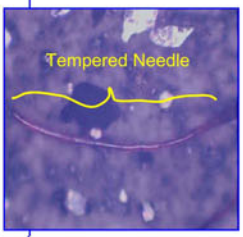
Contaminant @ 100x

Overview. Moderate levels of solid contaminants, wear debris and dust. The presence of contaminants (dust \ dirt) can cause increased wear. Filtering out contamination particles helps reduce wear and can increase the suitablity of the oil for continued use.



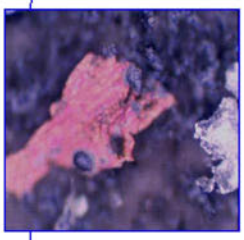
Laminar @ 100x

Laminar Particle 400um in size: These particles are formed by the passage of a wear particle through a rolling contact. Laminar particles may be generated throughout the life of a bearing, but at the onset of fatigue spalling, the quantity generated increases. An increasing quantity of laminar particles in addition to spherical wear is indicative of rolling-bearing fatigue microcracks.



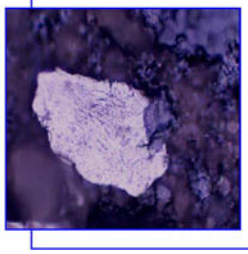
Sliding @ 200x

Tempered Needle wear. Needle wear - Sliding wear particles which have split along the sliding lines. Sliding Wear - generated by metal to metal contact and appears as lines on the metal surface. This occurs mainly in compartments such as gearboxes where gear teeth may not be meshing correctly.



Tempered @ 500x

Tempered wear particles indicate over heating of the compartment due to excessive load \ lubricant breakdown. The particle pictured is a 150um fatigue chunk.



Fatigue @ 200x

Fatigue Wear - 300im. Results when cracks develop in the component surface allowing the generation and removal of particles. Leading causes of fatigue wear include insufficient lubrication, lubricant contamination, and component fatigue.

Comments A variety of wear types and dust conatminants were observed. It appears that the filter is effectivley trapping particulates from 2um and above.