HI-SPEED INDUSTRIAL SERVICE

MILLINGTON, TN

November 23, 2020

AECI Dell Power

Subject: November vibration service

Most of the machines surveyed were found to be in good condition with the exception of the following:

QualiTest® uses a four step rating system for defects.

Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue to normally monitor.

Class II: Defect (s) present that may cause problem in long term (2-6 months.). Repair during normal maintenance scheduling. Continue to monitor.

Class III; Defect (s) present that may cause failure in short term (less than 2 months.). This should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.

Class IV; Defect (s) present that makes continued reliability unpredictable, and possibility of secondary damage is high. Repairs should be made ASAP. An unscheduled shutdown should be considered for repairs

Hi-Speed **Industrial Service** tests and inspects industrial machinery and equipment and makes recommendations concerning maintenance and repairs based on its experience in the field of industrial repair and maintenance. The information contained herein is provided as an opinion only, not as a guaranty or warranty of the matters discussed herein.

This completes our assessment of your equipment for this survey. Thank you for your business and don't hesitate to call if you have any comments or questions.

Sincerely,

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Detailed Defects

Starting motor/Gearbox unit
We still suspect some wear in the gearbox but cannot at this time call for replacement of this unit. Running speed harmonics/sidebands can be seen in some measurements. Overall acceleration in the gearbox exceeds 10 g's RMS. Perform oil analysis to assist in defect classification.
Rated a Class II Defect at this time.

Jacking Oil Pump 1
Data for this pump clearly indicates what looks to be bearing issues. Non-synchronous vibration peaks have multiple sidebands in this unit also. Could be a piston or vane pass if so equipped and gear driven. Inspect the coupling if installed. We do recommend replacement as time allows. **Rated a Class III Defect.**

Jacking Oil Pump 2
Strong non-synchronous peaks suggest pump bearing defects. Replace as time allows. **Rated a Class II Defect.**

Lube Oil Vapor Extractor Fan 2
The vibration was high last year. Now it is extremely excessive. Inspect for loose fasteners, cracked support structure, or build up or damage on the fan wheel. Motor bearings fits could be loose also, but we do not see any harmonics od the fundamental. Clean the wheel and trim balance before returning to service. **Rated a Class IV Defect**

Observations

Air Compressor
This reciprocating air compressor is still generating strong levels of axial vibration in the motor. Inspect the unit belts and sheaves for wear and alignment. Also inspect the motor base for stress cracks and loose or missing fasteners.
Rated a Class II Defect.

Lube Oil Vapor Extractor Fan 1
Motor still has elevated acceleration in the inboard motor bearing as well as a sharp increase in the fundamental shaft speed vibration. Inspect for defects in and around the fan motor. Clean the fan wheel and trim balance soon. **Rated a Class III Defect.**

Lube Oil Cooler Fan 1
Vibration is up in the motor bearings. No immediate issue yet. **Rated a Class I Defect.**

Abbreviated Last Measurement Summary

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Database: ESSEX.rbm
Area: POWER PLANT
Report Date: 23-Nov-20 14:02

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
4F - STARTING MOTOR	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.047 In/Sec	.425 G-s
MIH - MOTOR INBOARD HORIZONTAL	.076 In/Sec	.492 G-s
MIA - MOTOR INBOARD AXIAL	.080 In/Sec	.100 G-s
EIA - EQIUPMENT INBOARD AXIAL	.226 In/Sec	9.105 G-s
EIH - ERQUIPMENT INBOARD HORIZONTAL	.118 In/Sec	10.53 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.188 In/Sec	2.949 G-s
MOV - MOTOR OUTBOARD VERTICAL	.047 In/Sec	.318 G-s
MIV - MOTOR INBOARD VERTICAL	.061 In/Sec	.087 G-s
EIV - EQUIPMENT INBOARD VERTICAL	.164 In/Sec	4.859 G-s
EOV - EQUIPMENT OUTBOARD VERTICAL	.186 In/Sec	3.688 G-s
2H - LUBE OIL PUMP 1	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.089 In/Sec	.616 G-s
MIH - MOTOR INBOARD HORIZONTAL	.034 In/Sec	.263 G-s
MIA - MOTOR INBOARD AXIAL	.044 In/Sec	.378 G-s
MOV - MOTOR OUTBOARD VERTICAL	.105 In/Sec	.530 G-s
MIV - MOTOR INBOARD VERTICAL	.047 In/Sec	.489 G-s
2M - LUBE OIL PUMP 2	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.074 In/Sec	.412 G-s
MIH - MOTOR INBOARD HORIZONTAL	.030 In/Sec	.571 G-s
MIA - MOTOR INBOARD AXIAL	.056 In/Sec	.515 G-s
MOV - MOTOR OUTBOARD VERTICAL	.111 In/Sec	.513 G-s
MIV - MOTOR INBOARD VERTICAL	.033 In/Sec	.453 G-s
7J - JACKING OIL PUMP 1	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.159 In/Sec	.333 G-s
MIH - MOTOR INBOARD HORIZONTAL	.239 In/Sec	2.443 G-s
MIA - MOTOR INBOARD AXIAL	.193 In/Sec	2.022 G-s
PIA - PUMP INBOARD AXIAL	.238 In/Sec	1.707 G-s
PIH - PUMP INBOARD HORIZONTAL	.242 In/Sec	2.347 G-s
POH - PUMP OUTBOARD HORIZONTAL	.392 In/Sec	1.754 G-s
7M - JACKING OIL PUMP 2	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.236 In/Sec	1.136 G-s
MIH - MOTOR INBOARD HORIZONTAL	.337 In/Sec	.711 G-s
MIA - MOTOR INBOARD AXIAL	.258 In/Sec	1.012 G-s
PIA - PUMP INBOARD AXIAL	.205 In/Sec	.961 G-s

PIH - PUMP INBOARD HORIZONTAL	.271 In/Sec	1.334 G-s
POH - PUMP OUTBOARD HORIZONTAL	.521 In/Sec	1.007 G-s

8C - LUBE OIL COOLER FAN 1	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.147 In/Sec	.723 G-s
MIH - MOTOR INBOARD HORIZONTAL	.150 In/Sec	.946 G-s
MIA - MOTOR INBOARD AXIAL	.136 In/Sec	.947 G-s
MOV - MOTOR OUTBOARD VERTICAL	.137 In/Sec	.784 G-s
MIV - MOTOR INBOARD VERTICAL	.181 In/Sec	.698 G-s

8F - LUBE OIL COOLER FAN 2	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.151 In/Sec	.170 G-s
MIH - MOTOR INBOARD HORIZONTAL	.119 In/Sec	.333 G-s
MIA - MOTOR INBOARD AXIAL	.151 In/Sec	.338 G-s
MOV - MOTOR OUTBOARD VERTICAL	.126 In/Sec	.255 G-s
MIV - MOTOR INBOARD VERTICAL	.131 In/Sec	.232 G-s

8J - LUBE OIL VAPOR EXTRACTOR 1	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.390 In/Sec	1.014 G-s
MIH - MOTOR INBOARD HORIZONTAL	.208 In/Sec	.854 G-s
MIA - MOTOR INBOARD AXIAL	.275 In/Sec	.925 G-s
MOV - MOTOR OUTBOARD VERTICAL	.772 In/Sec	.975 G-s
MIV - MOTOR INBOARD VERTICAL	1.026 In/Sec	2.395 G-s

8M - LUBE OIL VAPOR EXTRACTOR 2	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.764 In/Sec	.095 G-s
MIH - MOTOR INBOARD HORIZONTAL	.625 In/Sec	.156 G-s
MIA - MOTOR INBOARD AXIAL	.198 In/Sec	.070 G-s
MOV - MOTOR OUTBOARD VERTICAL	2.458 In/Sec	.129 G-s
MIV - MOTOR INBOARD VERTICAL	2.715 In/Sec	.377 G-s

1G - TURNING GEAR	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.121 In/Sec	.079 G-s
MIH - MOTOR INBOARD HORIZONTAL	.116 In/Sec	.074 G-s
MIA - MOTOR INBOARD AXIAL	.076 In/Sec	.037 G-s
EIA - EQIUPMENT INBOARD AXIAL	.058 In/Sec	.122 G-s
EIH - ERQUIPMENT INBOARD HORIZONTAL	.081 In/Sec	.238 G-s
EOH - EQUIPMENT OUTBOARD HORIZONTAL	.105 In/Sec	.229 G-s

2M DC - EMERGENCY LUBE OIL PUMP	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.237 In/Sec	.188 G-s
MIH - MOTOR INBOARD HORIZONTAL	.038 In/Sec	.064 G-s
MIA - MOTOR INBOARD AXIAL	.069 In/Sec	.151 G-s
MOV - MOTOR OUTBOARD VERTICAL	.282 In/Sec	.052 G-s
MIV - MOTOR INBOARD VERTICAL	.051 In/Sec	.059 G-s

AIRCOMP - RECIPROCATING AIR COMPRESSOR	(20-Nov-20)	
	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.483 In/Sec	.074 G-s
MIH - MOTOR INBOARD HORIZONTAL	.499 In/Sec	.084 G-s
MIA - MOTOR INBOARD AXIAL	1.556 In/Sec	.050 G-s

FIA - FAN INBOARD AXIAL	.169 In/Sec	.458 G-s
FIH - FAN INBOARD HORIZONTAL	.138 In/Sec	.522 G-s
FOH - FAN OUTBOARD HORIZONTAL	.172 In/Sec	.450 G-s
MOV - MOTOR OUTBOARD VERTICAL	.979 In/Sec	.083 G-s
MIV - MOTOR INBOARD VERTICAL	1.069 In/Sec	.135 G-s
FIV - FAN INBOARD VERTICAL	.350 In/Sec	.409 G-s
FOV - FAN OUTBOARD VERTICAL	.471 In/Sec	.443 G-s

PUMP1LEFT - HYDRAULIC PUMP 1 LEFT (20-Nov-20)

	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.034 In/Sec	.193 G-s
MIH - MOTOR INBOARD HORIZONTAL	.020 In/Sec	.126 G-s
MIA - MOTOR INBOARD AXIAL	.038 In/Sec	.050 G-s
PIA - PUMP INBOARD AXIAL	.040 In/Sec	.316 G-s
MOV - MOTOR OUTBOARD VERTICAL	.079 In/Sec	.080 G-s
MIV - MOTOR INBOARD VERTICAL	.040 In/Sec	.251 G-s

PUMP2RIGHT - HYDRAULIC PUMP 2 RIGHT (20-Nov-20)

	OVERALL LEVEL	1-20 KHz
MOH - MOTOR OUTBOARD HORIZONTAL	.063 In/Sec	.270 G-s
MIH - MOTOR INBOARD HORIZONTAL	.023 In/Sec	.364 G-s
MIA - MOTOR INBOARD AXIAL	.042 In/Sec	.507 G-s
MOV - MOTOR OUTBOARD VERTICAL	.049 In/Sec	.067 G-s
MIV - MOTOR INBOARD VERTICAL	.033 In/Sec	.182 G-s

Clarification Of Vibration Units:

Acc	-->	G-s	RMS
Vel	-->	In/Sec	PK