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August 16, 2024

North Shelby Plant Millington, TN

The following is a summary of findings from the August 2024 monthly vibration survey at the North Shelby site.

QualiTest® uses a four-step rating system for defects.

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

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

<u>Class III</u>: 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.

**<u>Class IV</u>**; 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.



301 Flare Blower CLASS II



## **Observations:**

Data above is the motor outboard horizontal. There appear to be several harmonics of a non-synchronous frequency (3.089 orders of rpm) present in the spectra that line up with outer race defect fundamental and its harmonics. This is indication of bearing defects in the motor.

## **Recommendations:**

Motor should be replaced in the next few months. We are monitoring this closely.

# Rinse Compressor CLASS II



## **Observations:**

Drive motor data shows some high frequency vibration. Motor is also making a squealing type noise. The last reading showed amplitude to be 2.3 g's. Spectral data shows a noise floor 1500-5000 hz range. Peak to peak waveform amplitude is 15 g's.

## **Recommendations:**

Vibration characteristics indicate a lube issue or bearing wear. Motor likely needs attention during next extended shutdown. We are monitoring this closely. Rated as a **CLASS II** defect for now.

Database:	Clean Energy.rbm
Area:	millington plant

MEASUREMENT	POINT	OVERALL LEVEL	hfd / vhfd
301 FLARE	- 301 FLARE BLOWER	(16	-Aug-24)
501 11111	JUI IMAG BIONEI	OVERALL LEVEL	1K-20KHz
MOH		076 In/Sec	1 208 G-s
MON		265 Tr/Sec	215 G-s
мтн		096 Tr/Sec	1 019 6-8
MIII		172 Tr/Sec	214 G-s
MTA		044 Tr/Sec	.214 G 3
MIA ETU		160 Tr/Sec	.430 G-S
EIA		.160 11/560	.324 G-S
EIV			.403 G-S
EIA		.044 In/Sec	.122 G-s
EOH		.086 In/Sec	.383 G-s
EOV		.266 In/Sec	.235 G-s
TX301 FAN	- TX301 AFTERCOOLE	R FAN (16	-Aug-24)
		OVERALL LEVEL	1K-20KHz
MOH		.035 In/Sec	.690 G-s
MIH		.037 In/Sec	.671 G-s
FIH		.014 In/Sec	.019 G-s
FOH		.018 In/Sec	.030 G-s
RINSE COMP	- RINSE COMPRESSOR	(16	-Aug-24)
		OVERALL LEVEL	IK-ZUKHZ
MOH		.118 In/Sec	2.271 G-s
MIH		.097 In/Sec	2.334 G-s
MIA		.116 In/Sec	.308 G-s
IIH		.074 In/Sec	.889 G-s
IIA		.155 In/Sec	.179 G-s
IOH		.109 In/Sec	.547 G-s
OIH		.083 In/Sec	.942 G-s
OIA		.111 In/Sec	.171 G-s
OOH		.112 In/Sec	.827 G-s
MAC COMP	WACHUM COMPRESS	ND (16	·
VAC COMP	- VACUUM COMPRESSO	OVERALL LEVEL	1K-20KHz
мон			$1 147 C_{-8}$
мтш		.100 IN/Sec	1 356 C-c
MIN		057 Tr/Sec	1.330 G-S
MIA			.236 G-S
110			.570 G-S
		.062 In/Sec	.123 G-s
TOH		.117 In/Sec	.766 G-s
COOLFAN1	- COOLING FAN 1	(16	-Aug-24)
		OVERALL LEVEL	1K-20KHz
MOH		.030 In/Sec	.649 G-s
MOV		.052 In/Sec	.161 G-s
MTH		.027 In/Sec	.636 G-s
MTV		032 In/Sec	132 G-s
МТА		022 Tn/Sec	114 G-s
		.022 111, 560	.114 0 5
COOLFAN2	- COOLING FAN 2	(16	-Aug-24)
		OVERALL LEVEL	1K-20KHz
MOH		.042 In/Sec	.524 G-s
MOV		.059 In/Sec	.103 G-s
MIH		.058 In/Sec	.639 G-s
MIV		.079 In/Sec	.169 G-s
MIA		.067 In/Sec	.239 G-s
EIH		.046 In/Sec	.244 G-s
EIV		.072 In/Sec	.091 G-s
EIA		.107 In/Sec	.095 G-s
EOH		.066 In/Sec	.127 G-s

EOV	.075 In/Se	c .079 G-s
101A COMP	- 101A FEED COMPRESSOR	(16-Aug-24)
	OVERALL LEV	ET. 1K-20KH7
MOH		
MOH		.2/4 G-S
MIH	.144 In/Se	c .250 G-s
MIA	.104 In/Se	c .317 G-s
IIH	.281 In/Se	c 2.256 G-s
IIA	.421 In/Se	c 1.969 G-s
IOH	.281 In/Se	c 1.714 G-s
0TH	328 Tn/Se	c 1 647 C-s
	162 Tr/Se	
01A	.102 11/50	1.300 G-S
ООН	.118 In/Se	c 2.735 G-s
HX132A FAN	- HX132A GAS OIL COOLER FAN	(16-Aug-24)
	OVERALL LEV	EL 1K-20KHz
EIH	.044 In/Se	c.099 G-s
EOH	.068 In/Se	c.097 G-s
451 <b>A DIIMD</b>	- 451 A VACCIIM DIIMP	$(16 - \lambda_{11} - 24)$
45IA FOMP	ASIA VACCOM FOME	(10  Aug  24)
	OVERALL LEV.	EL IK-ZUKHZ
MOH	.0/1 1n/Se	c .356 G-s
MOV	.070 In/Se	c.292 G-s
MIH	.094 In/Se	c.280 G-s
MIV	.117 In/Se	c.427 G-s
MTA	056 Tn/Se	c .234 G-s
 770	209 Tr/So	279 6-8
	.209 III/Se	279 G-S
E10	.120 11/50	.080 G-S
EIA	.096 In/Se	c .123 G-s
EOH	.150 In/Se	c .391 G-s
EOV	.137 In/Se	c .171 G-s
HX453A FAN	- HX453A VAC PUMP OIL COOL FAN	(16-Aug-24)
	OVERALL LEV	EL 1K-20KHz
MOH	.195 In/Se	c .140 G-s
мтн	143 Tn/Se	095 6-8
MIII	.145 11/56	
451B PUMP	- 451B VACCIIM PIIMP	(16 - Aug - 24)
451D 10M	ASID VICCOM IOMI	$1K = 20KH_{\pi}$
NOU		
MOH	.051 In/Se	2 .4// G-S
MOV	.095 In/Se	c .093 G-s
MIH	.066 In/Se	c.432 G-s
MIV	.100 In/Se	c .160 G-s
MIA	.040 In/Se	c .113 G-s
EIH	.240 In/Se	c .164 G-s
EIV	.193 In/Se	c .265 G-s
—— ГТЛ	1/1 Tr/So	193 C-s
EIN	201 Tr/Se	
EOH		./12 G-S
EOV	.228 IN/Se	C .10/G-S
HX453B FAN	- HX453B VAC PUMP OIL COOL FAN	(16-Aug-24)
	OVERALL LEV	EL 1K-20KHz
MOH	.173 In/Se	c.245 G-s
MIH	.120 In/Se	c .134 G-s
451C PIIMP	- 451C VACCIIM PIIMP	(16-Aug-24)
1010 10111	OVEDALL LEV	1K - 20KH = 2
MOH		
MOH	.075 IN/Se	2 .504 G-S
MOV	.0/4 In/Se	c .095 G-s
MIH	.096 In/Se	c .614 G-s
MIV	.124 In/Se	c .189 G-s
MIA	.053 In/Se	c .144 G-s
ETH	147 Tn/Se	G
ET17	116 Tr/00	$-212 C_{-}$
	.110 IN/Se	
EIA	.0/9 In/Se	.U98 G-S
EOH	.144 In/Se	c.659 G-s
EOV	.155 In/Se	c .141 G-s
HX453C FAN	- HX453C VAC PUMP OIL COOL FAN	(16-Aug-24)
	OVERALL LEV	EL 1K-20KHz

MOH	.113	In/Sec .347	G-s
MIH	.083	In/Sec .203	G-s
451D PUMP - 45	51D VACCUM PUMP	(16-Aug-24)	•
	OVERA	LL LEVEL 1K-20	(Hz
MOH	.061	In/Sec 1.603	G-s
MOV	.074	In/Sec .387	G-s
MIH	.069	In/Sec 1.373	G-s
MIV	.063	In/Sec .215	G-s
MIA	.033	In/Sec .317	G-s
EIH	.219	In/Sec .202	G-s
EIV	.156	In/Sec .109	G-s
EIA	.076	In/Sec .112	G-s
EOH	.176	In/Sec 1.447	G-s
EOV	.188	In/Sec .115	G-s
HX453D FAN - HX	K453D VAC PUMP OIL CO	OL FAN (16-Aug-24)	1
	OVERA	LL LEVEL 1K-20	(Hz
MOH	.206	In/Sec .100	G-s
MIH	.214	In/Sec .114	G-s
506B COMP - 50	6B PRODUCT COMPRESSO	R (16-Aug-24)	
	OVERA	LL LEVEL 1K-20	(Hz
MOH	.046	In/Sec .274	G-s
MIH	.075	In/Sec .202	G-s
MIA	.058	In/Sec .229	G-s
IIH	.159	In/Sec .663	G-s
IIA	.134	In/Sec 1.058	G-s
IOH	.214	In/Sec 1.491	G-s
OIH	.268	In/Sec .955	G-s
OIA	.119	In/Sec .918	G-s
OOH	.218	In/Sec 1.644	G-s
Clarification Of N	Vibration Units:		
Acc> (	G-s RMS		
Vel> 1	In/Sec PK		

As always, it has been a pleasure to serve North Shelby-Archaea Energy. If there are any comments or questions, do not hesitate to contact us.

Sincerely,

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Kevin W. Maxwell

ISO Certified Vibration Analyst, Category III



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