HI-SPEED INDUSTRIAL SERVICE QualiTest® Diagnostics

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June 21, 2024

North Shelby Plant
Millington, TN

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

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

Defects

Rinse Compressor

Drive motor data still shows some 1-20 Khz vibration. The last reading showed amplitude to be 2.5 g's. Spectral data shows a noise floor starting around the 1500 hz range. This may be a lube issue or early stage bearing wear. For now, ensure motor bearings have clean adequate amounts of grease. We are monitoring this closely. Rated as a **CLASS I** defect for now.

Cooling Fan 2 (new belt driven cooling fan)

The 37 hz vibration was present this survey. This appears to be 4 x fan rpm. May be blade pass if fan has 4 blades. Could also be resonance. There are also some signs of bearing wear beginning to show in fan spectra. May be due to style of bearing not allowing for axial load due to configuration of the fan wheel/shaft. We are monitoring this closely. Rated as a **CLASS I** defect.

101 A Feed Compressor

Compressor has elevated 1 x rpm vibration throughout the compressor. This may be load related but could also be a coupling or shaft issue. Check couplings and fasteners as time allows. Rated as a **CLASS II** Defect.

101-B Feed Compressor

Equipment was not in service during this survey; however, the following still applies: Compressor data shows some high frequency acceleration amplitude with noise floor. Peaks in spectral data suggest possible wear of internal compressor components. We are watching this closely. Rated as a **CLASS I** defect.

Abbreviated Last Measurement Summary

Database: Clean Energy.rbm
Area: millington plant

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
301 FLARE - 301 FLARE BLOWER	(17-Jun-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.065 In/Sec	1.704 G-s
MOV	.151 In/Sec	.309 G-s
MIH	.078 In/Sec	1.145 G-s
MIV	.095 In/Sec	.118 G-s
MIA	.030 In/Sec	.297 G-s
EIH	.099 In/Sec	.294 G-s
EIV	.071 In/Sec	.430 G-s
EIA	.075 In/Sec	.137 G-s
EOH	.095 In/Sec	.413 G-s
EOV	.195 In/Sec	.547 G-s
RINSE COMP - RINSE COMPRESSOR	(17-Jun-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.117 In/Sec	2.546 G-s
MIH	.064 In/Sec	1.917 G-s

MIA	.067 In/Sec	.216 G-s
IIH	.068 In/Sec	.938 G-s
IIA	.137 In/Sec	.179 G-s
IOH	.094 In/Sec	.590 G-s
OIH	.074 In/Sec	.848 G-s
OIA	.096 In/Sec	.150 G-s
OOH	.080 In/Sec	.862 G-s

VAC COMP - VACUUM COMPRESSOR (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.118 In/Sec	1.122 G-s
MIH	.095 In/Sec	2.032 G-s
MIA	.070 In/Sec	.209 G-s
IIH	.073 In/Sec	.468 G-s
IIA	.066 In/Sec	.078 G-s
IOH	.107 In/Sec	.882 G-s
OIH	.100 In/Sec	.750 G-s
OIA	.061 In/Sec	.197 G-s
OOH	.091 In/Sec	1.191 G-s

COOLFAN1 - COOLING FAN 1 (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.058 In/Sec	.938 G-s
MOV	.132 In/Sec	.163 G-s
MIH	.039 In/Sec	.699 G-s
MIV	.049 In/Sec	.165 G-s
MIA	.049 In/Sec	.135 G-s

COOLFAN2 - COOLING FAN 2 (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.392 In/Sec	.609 G-s
MOV	.188 In/Sec	.098 G-s
MIH	.288 In/Sec	.611 G-s
MIV	.189 In/Sec	.206 G-s
MIA	.261 In/Sec	.202 G-s
EIH	.450 In/Sec	.509 G-s
EIV	.173 In/Sec	.361 G-s
EIA	.193 In/Sec	.314 G-s
EOH	.586 In/Sec	.363 G-s
EOV	.142 In/Sec	.288 G-s

101A COMP - 101A FEED COMPRESSOR (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.166 In/Sec	.258 G-s
MIH	.172 In/Sec	.253 G-s
MIA	.118 In/Sec	.264 G-s
IIH	.350 In/Sec	1.138 G-s
IIA	.454 In/Sec	1.351 G-s
IOH	.307 In/Sec	1.332 G-s
OIH	.388 In/Sec	1.035 G-s
OIA	.354 In/Sec	4.204 G-s
OOH	.146 In/Sec	1.074 G-s

HX132A FAN - HX132A GAS OIL COOLER FAN (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
EIH	.049 In/Sec	.049 G-s
EOH	.074 In/Sec	.092 G-s

451A PUMP - 451A VACCUM PUMP (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.082 In/Sec	.518 G-s
MOV	.081 In/Sec	.268 G-s
MIH	.105 In/Sec	.333 G-s
MIV	.135 In/Sec	.429 G-s
MIA	.048 In/Sec	.113 G-s
EIH	.213 In/Sec	.365 G-s
EIV	.146 In/Sec	.141 G-s
EIA	.116 In/Sec	.102 G-s
EOH	.230 In/Sec	.394 G-s
EOV	.158 In/Sec	.141 G-s

HX453A FAN - HX453A VAC PUMP OIL COOL FAN (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.199 In/Sec	.158 G-s
MIH	.125 In/Sec	.090 G-s

451B PUMP - 451B VACCUM PUMP (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.052 In/Sec	.513 G-s
MOV	.068 In/Sec	.125 G-s
MIH	.067 In/Sec	.444 G-s
MIV	.069 In/Sec	.166 G-s
MIA	.040 In/Sec	.122 G-s
EIH	.186 In/Sec	.192 G-s
EIV	.160 In/Sec	.193 G-s
EIA	.137 In/Sec	.175 G-s
EOH	.202 In/Sec	.734 G-s
EOV	.217 In/Sec	.138 G-s

HX453B FAN - HX453B VAC PUMP OIL COOL FAN (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.160 In/Sec	.215 G-s
MIH	.110 In/Sec	.152 G-s

451C PUMP - 451C VACCUM PUMP (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.081 In/Sec	.768 G-s
MOV	.082 In/Sec	.195 G-s
MIH	.093 In/Sec	.382 G-s
MIV	.141 In/Sec	.096 G-s
MIA	.062 In/Sec	.067 G-s
EIH	.147 In/Sec	.958 G-s
EIV	.113 In/Sec	.167 G-s
EIA	.114 In/Sec	.234 G-s
EOH	.142 In/Sec	.545 G-s
EOV	.167 In/Sec	.089 G-s

HX453C FAN - HX453C VAC PUMP OIL COOL FAN (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.092 In/Sec	.263 G-s
MIH	.082 In/Sec	.162 G-s

451D PUMP - 451D VACCUM PUMP (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.063 In/Sec	1.070 G-s
MOV	.068 In/Sec	.314 G-s
MIH	.097 In/Sec	1.158 G-s
MIV	.067 In/Sec	.238 G-s
MIA	.038 In/Sec	.327 G-s
EIH	.175 In/Sec	.619 G-s
EIV	.115 In/Sec	.240 G-s
EIA	.106 In/Sec	.328 G-s
EOH	.156 In/Sec	.270 G-s
EOV	.206 In/Sec	.067 G-s

HX453D FAN - HX453D VAC PUMP OIL COOL FAN (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.245 In/Sec	.121 G-s
MIH	.176 In/Sec	.074 G-s

506B COMP - 506B PRODUCT COMPRESSOR (17-Jun-24)

	OVERALL LEVEL	1K-20KHz
MOH	.049 In/Sec	.242 G-s
MIH	.066 In/Sec	.356 G-s
MIA	.058 In/Sec	.190 G-s
IIH	.156 In/Sec	.685 G-s
IIA	.147 In/Sec	1.067 G-s
IOH	.214 In/Sec	1.670 G-s
OIH	.266 In/Sec	1.065 G-s
OIA	.151 In/Sec	1.445 G-s

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              OOH                      .232 In/Sec      1.282 G-s

       HX507B FAN - HX507B GAS COOL FAN           (17-Jun-24)
                                     OVERALL LEVEL     1K-20KHz
              MOH                     .101 In/Sec       .046 G-s
              MIH                     .136 In/Sec       .082 G-s

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   Clarification Of Vibration Units:
      Acc       -->  G-s       RMS
      Vel       -->  In/Sec    PK
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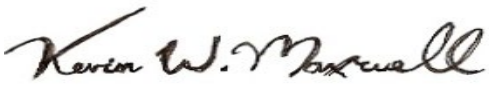
As always, it has been a pleasure to serve North Shelby-Archaea Energy. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



ISO Certified Vibration Analyst, Category III

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