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April 30, 2024

North Shelby Plant
Millington, TN

The following is a summary of findings from the April 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 elevated 1-20 Khz. amplitude. The last reading showed amplitude to be 3 g's. Baseline amplitude was 1.3 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.

Vacuum Compressor
This month's data on the outboard (ODE) of the compressor shows some elevated vibration at the high frequency range. Waveform shows some slight impacting at 4 x rpm which is lobe pass of the compressor. This may be process related but could also be an internal issue in compressor. We will monitor this closely. Rated as a **CLASS I** defect.

Cooling Fan 2 (new belt driven cooling fan)
This is our first collection of this equipment. Data shows a dominant vibration at 37 hz. in the motor and fan. Fan speed was slow, so this peak is not 1 x rpm. The 37 hz. peak could be a harmonic of fan speed such as blade pass. We need to know the number of blades on the fan to help determine cause of this vibration. For now, it is recommend ed to perform a visual inspection of the fan assembly. Rated as a **CLASS I** 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.

506 B Product Compressor
Motor data continues to show defects are present in motor bearings. Motor will need to be swapped out as soon as practical. Rated as a **CLASS III** defect.

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                Abbreviated Last Measurement Summary
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          Database:  Clean Energy.rbm
          Area:      millington plant

MEASUREMENT POINT            OVERALL LEVEL       HFD / VHFD
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301 FLARE  - 301 FLARE BLOWER              (24-Apr-24)
                              OVERALL LEVEL     1K-20KHz
       MOH                     .067 In/Sec      1.062 G-s
       MOV                     .214 In/Sec       .295 G-s
       MIH                     .094 In/Sec      1.279 G-s
       MIV                     .139 In/Sec       .173 G-s
       MIA                     .024 In/Sec       .318 G-s
       EIH                     .131 In/Sec       .350 G-s
       EIV                     .062 In/Sec       .361 G-s
       EIA                     .099 In/Sec       .147 G-s
       EOH                     .102 In/Sec       .387 G-s
       EOV                     .220 In/Sec       .403 G-s

RINSE COMP - RINSE COMPRESSOR              (24-Apr-24)
                              OVERALL LEVEL     1K-20KHz
       MOH                     .084 In/Sec      3.240 G-s
       MIH                     .089 In/Sec      2.533 G-s
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MIA	.060 In/Sec	.354 G-s
IIH	.074 In/Sec	.719 G-s
IIA	.104 In/Sec	.164 G-s
IOH	.094 In/Sec	.722 G-s
OIH	.064 In/Sec	.569 G-s
OIA	.086 In/Sec	.114 G-s
OOH	.086 In/Sec	.789 G-s

VAC COMP - VACUUM COMPRESSOR (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.091 In/Sec	1.201 G-s
MIH	.100 In/Sec	1.887 G-s
MIA	.065 In/Sec	.247 G-s
IIH	.101 In/Sec	.680 G-s
IIA	.065 In/Sec	.162 G-s
IOH	.123 In/Sec	.808 G-s
OIH	.077 In/Sec	.846 G-s
OIA	.054 In/Sec	.244 G-s
OOH	.103 In/Sec	4.021 G-s

COOLFAN1 - COOLING FAN 1 (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.033 In/Sec	.514 G-s
MOV	.041 In/Sec	.268 G-s
MIH	.038 In/Sec	.501 G-s
MIV	.019 In/Sec	.098 G-s
MIA	.024 In/Sec	.143 G-s

COOLFAN2 - COOLING FAN 2 (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.472 In/Sec	1.254 G-s
MOV	.186 In/Sec	.150 G-s
MIH	.296 In/Sec	.906 G-s
MIV	.216 In/Sec	.217 G-s
MIA	.355 In/Sec	.235 G-s
EIH	.172 In/Sec	.721 G-s
EIV	.511 In/Sec	.196 G-s
EIA	.159 In/Sec	.113 G-s
EOH	.188 In/Sec	.270 G-s
EOV	.695 In/Sec	.092 G-s

101A COMP - 101A FEED COMPRESSOR (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.209 In/Sec	.310 G-s
MIH	.153 In/Sec	.251 G-s
MIA	.079 In/Sec	.294 G-s
IIH	.184 In/Sec	1.015 G-s
IIA	.390 In/Sec	1.389 G-s
IOH	.225 In/Sec	1.078 G-s
OIH	.117 In/Sec	2.907 G-s
OIA	.304 In/Sec	.907 G-s
OOH	.133 In/Sec	1.106 G-s

HX132A FAN - HX132A GAS OIL COOLER FAN (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
EIH	.065 In/Sec	.048 G-s
EOH	.077 In/Sec	.104 G-s

451A PUMP - 451A VACCUM PUMP (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.088 In/Sec	.782 G-s
MOV	.092 In/Sec	.250 G-s
MIH	.110 In/Sec	.403 G-s
MIV	.138 In/Sec	.573 G-s
MIA	.056 In/Sec	.120 G-s
EIH	.221 In/Sec	.200 G-s
EIV	.129 In/Sec	.091 G-s
EIA	.105 In/Sec	.078 G-s
EOH	.175 In/Sec	.497 G-s
EOV	.166 In/Sec	.104 G-s

HX453A FAN - HX453A VAC PUMP OIL COOL FAN (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.187 In/Sec	.140 G-s
MIH	.132 In/Sec	.083 G-s

451B PUMP - 451B VACCUM PUMP (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.043 In/Sec	.398 G-s
MOV	.065 In/Sec	.116 G-s
MIH	.060 In/Sec	.447 G-s
MIV	.098 In/Sec	.130 G-s
MIA	.064 In/Sec	.120 G-s
EIH	.178 In/Sec	.485 G-s
EIV	.149 In/Sec	.150 G-s
EIA	.131 In/Sec	.149 G-s
EOH	.181 In/Sec	.559 G-s
EOV	.179 In/Sec	.142 G-s

HX453B FAN - HX453B VAC PUMP OIL COOL FAN (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.154 In/Sec	.205 G-s
MIH	.120 In/Sec	.153 G-s

451C PUMP - 451C VACCUM PUMP (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.094 In/Sec	.393 G-s
MOV	.101 In/Sec	.081 G-s
MIH	.111 In/Sec	.516 G-s
MIV	.144 In/Sec	.173 G-s
MIA	.073 In/Sec	.103 G-s
EIH	.153 In/Sec	.690 G-s
EIV	.098 In/Sec	.194 G-s
EIA	.099 In/Sec	.158 G-s
EOH	.152 In/Sec	.921 G-s
EOV	.166 In/Sec	.182 G-s

HX453C FAN - HX453C VAC PUMP OIL COOL FAN (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.154 In/Sec	.441 G-s
MIH	.141 In/Sec	.165 G-s

451D PUMP - 451D VACCUM PUMP (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.082 In/Sec	1.278 G-s
MOV	.080 In/Sec	.318 G-s
MIH	.089 In/Sec	1.780 G-s
MIV	.075 In/Sec	.237 G-s
MIA	.062 In/Sec	.824 G-s
EIH	.167 In/Sec	.433 G-s
EIV	.134 In/Sec	.172 G-s
EIA	.124 In/Sec	.136 G-s
EOH	.169 In/Sec	.529 G-s
EOV	.153 In/Sec	.189 G-s

HX453D FAN - HX453D VAC PUMP OIL COOL FAN (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.241 In/Sec	.128 G-s
MIH	.165 In/Sec	.089 G-s

506B COMP - 506B PRODUCT COMPRESSOR (24-Apr-24)

	OVERALL LEVEL	1K-20KHz
MOH	.137 In/Sec	1.492 G-s
MIH	.179 In/Sec	6.883 G-s
MIA	.096 In/Sec	3.074 G-s
IIH	.196 In/Sec	.525 G-s
IIA	.159 In/Sec	1.531 G-s
IOH	.244 In/Sec	1.639 G-s
OIH	.227 In/Sec	1.565 G-s
OIA	.141 In/Sec	1.529 G-s

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            OOH                      .234 In/Sec      1.737 G-s

      HX507B FAN - HX507B GAS COOL FAN           (24-Apr-24)
                                    OVERALL LEVEL     1K-20KHz
            MOH                      .100 In/Sec       .077 G-s
            MIH                      .130 In/Sec       .111 G-s

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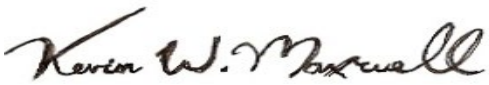
As always, it has been a pleasure to serve North Shelby-Archaea Energy. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



ISO Certified Vibration Analyst, Category III

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