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November 15, 2023

South Shelby RNG
Memphis, TN

The following is a summary of findings from the monthly vibration survey that was performed on November 15, 2023.

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

C-551B Vacuum Compressor B

The compressor outboard end still shows some acceleration with high frequency noise floor in the spectra. This may be process load related but could also be signs of internal compressor issues. For now ,ensure lube system is operating properly and ensure compressor parameters are within normal ranges. This is being monitored closely. Rated as a **CLASS I** defect.

C-0600 A Feed Gas Compressor

Compressor vibration remains very high. Compressor spectral data indicates excessive shaft movement and internal defects of compressor. The compressor should be replaced ASAP. Rated as a **CLASS IV** defect.

C-0600 B Feed Gas Compressor

Compressor vertical data continues to show some dominant 1 x, 4 and 8 x male rotor rpm vibration. Internal clearance issue or some other process or loading issue may be causing the 4-x rpm vibration and harmonics of 4 x that also seen in the compressor data. Inlet piping is also showing an increase in vibration this survey. Well over 1 ips overall which is considered high amplitude. We will continue to monitor closely. Rated as a **CLASS II** defect.

C-0600 C Feed Gas Compressor

Motor continues to have higher than normal 1 x motor rpm vibration. Compressor data shows high harmonic vibrations that are related to 1 x male rotor and 4 x rpm of the male rotor. For now, we recommend performing a hot alignment on the unit. Ensure motor does not have soft foot condition. Inspect coupling hubs and element also. Rated as a **CLASS II** defect.

BLR-0200 A, B, C, and D LFG Blowers

These blowers have high amplitudes of acceleration (high frequency vibrations). Blower outboard axials are typically the highest amplitudes and may be process load related. Multiple harmonics at what appears to be 8 x blower rpm are present and is dominant in blower data. Amplitudes are as high as 60 g's peak to peak; however, this is likely a characteristic of this blowers' sliding vanes. We will continue to monitor closely. Rated as **CLASS I** defects for now.

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                    Abbreviated Last Measurement Summary
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              Database:  South Shelby RNG.rbm
              Area:      SOUTH SHELBY PLANT
              Route No.  1:  SOUTH SHELBY

MEASUREMENT POINT              OVERALL LEVEL       HFD / VHFD
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C-551B     - C-551B VACUUM COMPRESSOR B    (15-Nov-23)
                                OVERALL LEVEL     1K-20KHz
         MOH                      .066 In/Sec      1.179 G-s
         MOV                      .051 In/Sec       .469 G-s
         MIH                      .108 In/Sec      2.286 G-s
         MIV                      .088 In/Sec       .303 G-s
         MIA                      .085 In/Sec       .439 G-s
         CIA                      .255 In/Sec      1.264 G-s
         CIH                      .224 In/Sec      3.884 G-s
         CIV                      .437 In/Sec       .981 G-s
         COH                      .262 In/Sec      5.934 G-s
         COV                      .148 In/Sec      1.222 G-s
         COA                      .145 In/Sec      1.567 G-s
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C-551A - C-551A VACUUM COMPRESSOR A (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.070 In/Sec	2.709 G-s
MOV	.065 In/Sec	.322 G-s
MIH	.121 In/Sec	1.023 G-s
MIV	.082 In/Sec	.471 G-s
MIA	.069 In/Sec	.408 G-s
CIA	.271 In/Sec	.665 G-s
CIH	.296 In/Sec	3.220 G-s
CIV	.467 In/Sec	.494 G-s
COH	.366 In/Sec	4.829 G-s
COV	.189 In/Sec	.952 G-s
COA	.170 In/Sec	1.109 G-s

C-601B - C-601B N2 RECYCLE COMP B (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.067 In/Sec	.405 G-s
MOV	.035 In/Sec	.189 G-s
MIH	.108 In/Sec	.851 G-s
MIV	.033 In/Sec	.216 G-s
MIA	.035 In/Sec	.177 G-s
CIA	.254 In/Sec	.547 G-s
CIH	.173 In/Sec	2.119 G-s
CIV	.100 In/Sec	2.242 G-s
COH	.150 In/Sec	1.709 G-s
COV	.161 In/Sec	.636 G-s
COA	.148 In/Sec	.490 G-s

C-601A - C-601A N2 RECYCLE COMP A (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.042 In/Sec	.532 G-s
MOV	.029 In/Sec	.271 G-s
MIH	.088 In/Sec	.802 G-s
MIV	.036 In/Sec	.315 G-s
MIA	.044 In/Sec	.182 G-s
CIA	.147 In/Sec	.373 G-s
CIH	.095 In/Sec	1.594 G-s
CIV	.119 In/Sec	.368 G-s
COH	.113 In/Sec	2.251 G-s
COV	.097 In/Sec	.554 G-s
COA	.100 In/Sec	.803 G-s

C-0600A - C-0600A FEED GAS COMP A (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.262 In/Sec	.838 G-s
MOV	.277 In/Sec	.156 G-s
MIH	.370 In/Sec	.939 G-s
MIV	.279 In/Sec	.293 G-s
MIA	.255 In/Sec	.244 G-s
CIA	1.005 In/Sec	2.714 G-s
CIH	1.373 In/Sec	9.183 G-s
CIV	1.215 In/Sec	2.372 G-s
COH	.908 In/Sec	5.839 G-s
COV	1.510 In/Sec	2.391 G-s
COA	.629 In/Sec	1.953 G-s
P1	.771 In/Sec	.875 G-s

C-0600B - C-0600B FEED GAS COMP B (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.168 In/Sec	.546 G-s
MOV	.121 In/Sec	.075 G-s
MIH	.158 In/Sec	.346 G-s
MIV	.129 In/Sec	.136 G-s
MIA	.049 In/Sec	.130 G-s
CIA	.275 In/Sec	.706 G-s
CIH	.327 In/Sec	4.444 G-s
CIV	.384 In/Sec	.415 G-s
COH	.360 In/Sec	2.137 G-s
COV	.409 In/Sec	.352 G-s
COA	.144 In/Sec	.775 G-s

P1		.977 In/Sec	.722 G-s

C-0600C - C-0600C FEED GAS COMP C (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.488 In/Sec	.349 G-s
MOV	.257 In/Sec	.066 G-s
MIH	.495 In/Sec	.724 G-s
MIV	.201 In/Sec	.147 G-s
MIA	.098 In/Sec	.227 G-s
CIA	.636 In/Sec	.903 G-s
CIH	.443 In/Sec	2.575 G-s
CIV	.669 In/Sec	.813 G-s
COH	.433 In/Sec	2.114 G-s
COV	.797 In/Sec	.977 G-s
COA	.713 In/Sec	1.013 G-s
P1	.625 In/Sec	1.088 G-s

BLR-0200A - BLR-0200A LFG BLOWER A (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.124 In/Sec	.731 G-s
MOV	.097 In/Sec	.257 G-s
MIH	.053 In/Sec	.877 G-s
MIV	.200 In/Sec	.172 G-s
MIA	.123 In/Sec	.249 G-s
BIA	.113 In/Sec	1.794 G-s
BIH	.289 In/Sec	9.566 G-s
BIV	.322 In/Sec	1.730 G-s
BOH	.289 In/Sec	10.42 G-s
BOV	.469 In/Sec	1.910 G-s
BOA	.135 In/Sec	2.068 G-s

BLR-0200B - BLR-0200B LFG BLOWER B (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.152 In/Sec	.893 G-s
MOV	.135 In/Sec	.188 G-s
MIH	.135 In/Sec	.858 G-s
MIV	.173 In/Sec	.192 G-s
MIA	.074 In/Sec	.229 G-s
BIA	.159 In/Sec	1.435 G-s
BIH	.255 In/Sec	5.462 G-s
BIV	.280 In/Sec	1.577 G-s
BOH	.344 In/Sec	10.58 G-s
BOV	.289 In/Sec	2.194 G-s
BOA	.176 In/Sec	1.709 G-s

BLR-0200C - BLR-0200C LFG BLOWER C (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.145 In/Sec	.910 G-s
MOV	.145 In/Sec	.191 G-s
MIH	.149 In/Sec	1.084 G-s
MIV	.241 In/Sec	.186 G-s
MIA	.111 In/Sec	.251 G-s
BIA	.149 In/Sec	1.715 G-s
BIH	.314 In/Sec	8.223 G-s
BIV	.286 In/Sec	1.693 G-s
BOH	.378 In/Sec	6.642 G-s
BOV	.384 In/Sec	1.223 G-s
BOA	.221 In/Sec	1.455 G-s

C-1300 - C-1300 SALES GAS COMP STG 1 (15-Nov-23)

	OVERALL LEVEL	1K-20KHz
MOH	.064 In/Sec	.440 G-s
MOV	.102 In/Sec	.061 G-s
MIH	.071 In/Sec	.529 G-s
MIV	.342 In/Sec	.137 G-s
MIA	.226 In/Sec	.208 G-s
CIA	.210 In/Sec	.927 G-s
CIH	.082 In/Sec	1.374 G-s
CIV	.221 In/Sec	.664 G-s
COH	.155 In/Sec	1.764 G-s

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            COV                      .374 In/Sec      1.295 G-s
            COA                      .162 In/Sec       .814 G-s

      C-1304     - C-1304 SALES GAS COMP STG 2   (15-Nov-23)
                                   OVERALL LEVEL     1K-20KHz
            MOH                      .145 In/Sec      1.505 G-s
            MOV                      .072 In/Sec      1.431 G-s
            MIH                      .120 In/Sec      1.161 G-s
            MIV                      .086 In/Sec       .812 G-s
            MIA                      .097 In/Sec       .317 G-s
            CIA                      .120 In/Sec       .401 G-s
            CIH                      .148 In/Sec      1.281 G-s
            CIV                      .112 In/Sec       .232 G-s
            COH                      .197 In/Sec       .580 G-s
            COV                      .121 In/Sec       .168 G-s
            COA                      .120 In/Sec       .185 G-s

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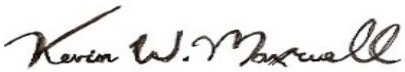
As always, it has been a pleasure to serve South Shelby RNG. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



ISO Certified Vibration Analyst, Category III

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