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December 20, 2023

South Shelby RNG
Memphis, TN

The following is a summary of findings from the monthly vibration survey that was performed on December 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 shows some up and down 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 still 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-Dec-23)
                                OVERALL LEVEL     1K-20KHz
       MOH                       .074 In/Sec      2.115 G-s
       MOV                       .074 In/Sec       .481 G-s
       MIH                       .119 In/Sec      1.662 G-s
       MIV                       .113 In/Sec       .436 G-s
       MIA                       .075 In/Sec       .349 G-s
       CIA                       .309 In/Sec       .705 G-s
       CIH                       .195 In/Sec      3.858 G-s
       CIV                       .269 In/Sec       .543 G-s
       COH                       .211 In/Sec      3.939 G-s
       COV                       .201 In/Sec       .814 G-s
       COA                       .150 In/Sec      1.105 G-s
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C-551A - C-551A VACUUM COMPRESSOR A (15-Dec-23)

	OVERALL LEVEL	1K-20KHz
MOH	.060 In/Sec	2.593 G-s
MOV	.071 In/Sec	.581 G-s
MIH	.113 In/Sec	1.186 G-s
MIV	.086 In/Sec	.536 G-s
MIA	.081 In/Sec	.442 G-s
CIA	.278 In/Sec	.998 G-s
CIH	.282 In/Sec	5.141 G-s
CIV	.355 In/Sec	.971 G-s
COH	.303 In/Sec	4.725 G-s
COV	.229 In/Sec	1.135 G-s
COA	.222 In/Sec	1.135 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.130 In/Sec	.359 G-s
MOV	.053 In/Sec	.185 G-s
MIH	.125 In/Sec	.550 G-s
MIV	.047 In/Sec	.141 G-s
MIA	.050 In/Sec	.151 G-s
CIA	.249 In/Sec	.586 G-s
CIH	.205 In/Sec	2.152 G-s
CIV	.352 In/Sec	.325 G-s
COH	.132 In/Sec	2.831 G-s
COV	.100 In/Sec	.641 G-s
COA	.147 In/Sec	.715 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.051 In/Sec	.673 G-s
MOV	.037 In/Sec	.300 G-s
MIH	.089 In/Sec	1.010 G-s
MIV	.035 In/Sec	.343 G-s
MIA	.034 In/Sec	.195 G-s
CIA	.179 In/Sec	.671 G-s
CIH	.116 In/Sec	1.778 G-s
CIV	.186 In/Sec	.329 G-s
COH	.127 In/Sec	1.361 G-s
COV	.121 In/Sec	.711 G-s
COA	.105 In/Sec	.579 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.197 In/Sec	.784 G-s
MOV	.161 In/Sec	.107 G-s
MIH	.194 In/Sec	.462 G-s
MIV	.162 In/Sec	.181 G-s
MIA	.202 In/Sec	.134 G-s
CIA	.948 In/Sec	1.701 G-s
CIH	1.061 In/Sec	6.686 G-s
CIV	1.090 In/Sec	1.783 G-s
COH	.916 In/Sec	4.291 G-s
COV	1.354 In/Sec	1.684 G-s
COA	.732 In/Sec	1.552 G-s
P1	.843 In/Sec	.928 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.237 In/Sec	.643 G-s
MOV	.185 In/Sec	.074 G-s
MIH	.195 In/Sec	.812 G-s
MIV	.137 In/Sec	.337 G-s
MIA	.074 In/Sec	.238 G-s
CIA	.339 In/Sec	.694 G-s
CIH	.363 In/Sec	4.425 G-s
CIV	.445 In/Sec	.292 G-s
COH	.312 In/Sec	2.075 G-s
COV	.578 In/Sec	.317 G-s
COA	.225 In/Sec	.739 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.470 In/Sec	.471 G-s
MOV	.325 In/Sec	.093 G-s
MIH	.479 In/Sec	.761 G-s
MIV	.179 In/Sec	.294 G-s
MIA	.161 In/Sec	.196 G-s
CIA	.662 In/Sec	.884 G-s
CIH	.461 In/Sec	2.008 G-s
CIV	.754 In/Sec	1.245 G-s
COH	.402 In/Sec	2.478 G-s
COV	.932 In/Sec	.995 G-s
COA	.624 In/Sec	.911 G-s
P1	.571 In/Sec	1.288 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.079 In/Sec	.787 G-s
MOV	.113 In/Sec	.250 G-s
MIH	.094 In/Sec	.643 G-s
MIV	.146 In/Sec	.108 G-s
MIA	.090 In/Sec	.268 G-s
BIA	.140 In/Sec	1.988 G-s
BIH	.280 In/Sec	9.777 G-s
BIV	.369 In/Sec	2.290 G-s
BOH	.357 In/Sec	10.52 G-s
BOV	.300 In/Sec	2.410 G-s
BOA	.155 In/Sec	1.818 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.273 In/Sec	.993 G-s
MOV	.235 In/Sec	.207 G-s
MIH	.209 In/Sec	.943 G-s
MIV	.313 In/Sec	.221 G-s
MIA	.118 In/Sec	.342 G-s
BIA	.167 In/Sec	1.546 G-s
BIH	.300 In/Sec	6.469 G-s
BIV	.371 In/Sec	1.437 G-s
BOH	.361 In/Sec	10.65 G-s
BOV	.326 In/Sec	1.758 G-s
BOA	.151 In/Sec	1.672 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.211 In/Sec	.876 G-s
MOV	.168 In/Sec	.212 G-s
MIH	.279 In/Sec	.762 G-s
MIV	.322 In/Sec	.154 G-s
MIA	.075 In/Sec	.173 G-s
BIA	.156 In/Sec	1.838 G-s
BIH	.393 In/Sec	10.09 G-s
BIV	.341 In/Sec	2.067 G-s
BOH	.340 In/Sec	7.995 G-s
BOV	.336 In/Sec	2.346 G-s
BOA	.153 In/Sec	1.782 G-s

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

	OVERALL LEVEL	1K-20KHz
MOH	.075 In/Sec	.525 G-s
MOV	.130 In/Sec	.071 G-s
MIH	.062 In/Sec	.615 G-s
MIV	.327 In/Sec	.265 G-s
MIA	.152 In/Sec	.085 G-s
CIA	.273 In/Sec	1.165 G-s
CIH	.355 In/Sec	8.955 G-s
CIV	.291 In/Sec	.694 G-s
COH	.153 In/Sec	2.389 G-s
COV	.195 In/Sec	1.423 G-s

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            COA                      .191 In/Sec       .801 G-s
            P1                       .142 In/Sec      1.517 G-s

      C-1304     - C-1304 SALES GAS COMP STG 2   (15-Dec-23)
                                    OVERALL LEVEL     1K-20KHz
            MOH                      .158 In/Sec       .950 G-s
            MOV                      .076 In/Sec      1.228 G-s
            MIH                      .197 In/Sec      1.179 G-s
            MIV                      .094 In/Sec       .818 G-s
            MIA                      .126 In/Sec       .324 G-s
            CIA                      .121 In/Sec       .663 G-s
            CIH                      .169 In/Sec      1.991 G-s
            CIV                      .104 In/Sec       .190 G-s
            COH                      .212 In/Sec       .559 G-s
            COV                      .118 In/Sec       .187 G-s
            COA                      .139 In/Sec       .175 G-s
            2SH                      .148 In/Sec       .411 G-s
            2SV                      .242 In/Sec       .243 G-s
            2SA                      .286 In/Sec       .265 G-s
            3SH                      .151 In/Sec       .712 G-s
            3SV                      .181 In/Sec       .144 G-s
            3SA                      .224 In/Sec       .162 G-s

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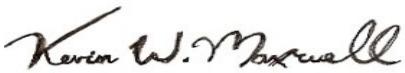
As always, it has been a pleasure to serve South Shelby RNG. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



ISO Certified Vibration Analyst, Category III

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