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June 7, 2021

South Shelby RNG
Memphis, TN

The following is a summary of findings from the monthly vibration survey that was performed on June 3, 2021. Please let us know if there are any questions or comments.

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

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.

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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Email: kwilliam@gohispeed.com

Defects

C-0600 B Feed Gas Compressor

Compressor is showing 1/3 harmonics of the higher rpm rotor fundamental (1 x rpm). This indicates some type of internal fit looseness. Unit is also still experiencing some 1 x motor horizontal vibration. Internal clearance issue or some other loading issue may be causing the 4 x rpm and harmonics thereof also seen in the compressor data. We will continue to monitor closely. Rated as a **CLASS I** defect.

C-0600 C Feed Gas Compressor

Acceleration amplitudes seemed to be lower this month. Motor still has a slightly higher than normal 1 x rpm vibration in the horizontal direction DE and ODE. Compressor also has high vibrations that are related to 4 x the speed of the male rotor. Compressor vibrations were higher this month. We will continue to monitor these issues closely. Rated as a **CLASS I** defect for now.

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

These blowers have high amplitudes of acceleration (high frequency vibrations). Amplitudes are around the same as last survey. 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 range from 3 to nearly 40 g's peak to peak which seems very high for newer equipment; however, this is possibly a characteristic of this blowers' sliding vanes. Rated as **CLASS I** defects for now.

C-1300 Sales Gas Compressor Stage 1

The compressor vertical vibration is lower this survey after modifying the base. There is a slight increase in 1 x motor rpm vibration. We would like to inspect the coupling, coupling orientation, perform motor soft foot check, and recheck alignment during the next down time. Rated as a **CLASS I** defect for now.

C-1300 Sales Gas Compressor Stage 2

Overall vibration increased some this survey. The high vibration seen previously was possibly due to a natural frequency coinciding with a forcing frequency from the compressor causing resonance. We are possibly planning on performing some other vibration testing with the VFD in local control so we can determine what frequencies may be causing the vibrations seen recently. Rated as a **CLASS I** defect 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
               Report Date:  07-Jun-21   08:24

      MEASUREMENT POINT            OVERALL LEVEL       HFD / VHFD
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      C-551B     - C-551B VACUUM COMPRESSOR B    (03-Jun-21)
                                   OVERALL LEVEL     1K-20KHz
             MOH                     .077 In/Sec       .559 G-s
             MOV                     .048 In/Sec       .553 G-s
             MIH                     .117 In/Sec       .600 G-s
             MIV                     .071 In/Sec       .556 G-s
             MIA                     .080 In/Sec       .483 G-s
             CIA                     .235 In/Sec      2.491 G-s
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	CIH	.257 In/Sec	3.253 G-s
	CIV	.284 In/Sec	1.662 G-s
	COH	.399 In/Sec	5.228 G-s
	COV	.269 In/Sec	3.592 G-s
	COA	.266 In/Sec	3.578 G-s

C-551A - C-551A VACUUM COMPRESSOR A (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.093 In/Sec	.876 G-s
MOV	.054 In/Sec	.538 G-s
MIH	.107 In/Sec	.263 G-s
MIV	.090 In/Sec	.628 G-s
MIA	.089 In/Sec	.450 G-s
CIA	.265 In/Sec	3.236 G-s
CIH	.335 In/Sec	4.555 G-s
CIV	.184 In/Sec	1.778 G-s
COH	.224 In/Sec	3.059 G-s
COV	.300 In/Sec	3.992 G-s
COA	.384 In/Sec	5.128 G-s

C-601B - C-601B N2 RECYCLE COMP B (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.076 In/Sec	.556 G-s
MOV	.040 In/Sec	.783 G-s
MIH	.097 In/Sec	.530 G-s
MIV	.040 In/Sec	.482 G-s
MIA	.039 In/Sec	.700 G-s
CIA	.192 In/Sec	2.653 G-s
CIH	.144 In/Sec	1.211 G-s
CIV	.109 In/Sec	1.477 G-s
COH	.134 In/Sec	1.945 G-s
COV	.127 In/Sec	1.309 G-s
COA	.123 In/Sec	1.258 G-s

C-601A - C-601A N2 RECYCLE COMP A (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.042 In/Sec	.616 G-s
MOV	.051 In/Sec	.860 G-s
MIH	.087 In/Sec	.644 G-s
MIV	.052 In/Sec	.917 G-s
MIA	.059 In/Sec	1.048 G-s
CIA	.131 In/Sec	1.287 G-s
CIH	.138 In/Sec	1.542 G-s
CIV	.156 In/Sec	2.424 G-s
COH	.152 In/Sec	1.005 G-s
COV	.103 In/Sec	1.540 G-s
COA	.117 In/Sec	1.825 G-s

C-0600A - C-0600A FEED GAS COMP A (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.226 In/Sec	.970 G-s
MOV	.192 In/Sec	1.400 G-s
MIH	.159 In/Sec	.493 G-s
MIV	.173 In/Sec	.470 G-s
MIA	.120 In/Sec	1.009 G-s
CIA	.241 In/Sec	2.199 G-s
CIH	.196 In/Sec	1.459 G-s
CIV	.218 In/Sec	2.101 G-s
COH	.168 In/Sec	1.961 G-s
COV	.280 In/Sec	1.409 G-s
COA	.262 In/Sec	2.057 G-s
P1	.163 In/Sec	.676 G-s
P2	.129 In/Sec	.531 G-s
P3	.385 In/Sec	.689 G-s
P4	.114 In/Sec	.831 G-s
P5	.208 In/Sec	.549 G-s
P6	.427 In/Sec	1.035 G-s
P7	.271 In/Sec	.650 G-s
P8	.093 In/Sec	.788 G-s
P9	.182 In/Sec	.478 G-s

P10	.049 In/Sec	.426 G-s
P11	.073 In/Sec	.387 G-s
P12	.170 In/Sec	.340 G-s
P13	.203 In/Sec	.461 G-s
P14	.263 In/Sec	1.523 G-s
2SL	1.005 In/Sec	.847 G-s
2SW	.554 In/Sec	.691 G-s
2SR	.452 In/Sec	.797 G-s
2RW	.172 In/Sec	.779 G-s
VSI	.419 In/Sec	.252 G-s
VLW	.247 In/Sec	.297 G-s
VSL	.300 In/Sec	.213 G-s
VRW	.205 In/Sec	.328 G-s

C-0600B - C-0600B FEED GAS COMP B (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.289 In/Sec	1.285 G-s
MOV	.199 In/Sec	1.407 G-s
MIH	.231 In/Sec	.515 G-s
MIV	.158 In/Sec	.781 G-s
MIA	.186 In/Sec	1.128 G-s
CIA	.555 In/Sec	2.990 G-s
CIH	.457 In/Sec	4.098 G-s
CIV	.446 In/Sec	4.490 G-s
COH	.436 In/Sec	1.936 G-s
COV	.466 In/Sec	3.210 G-s
COA	.432 In/Sec	2.145 G-s
P1	.501 In/Sec	.615 G-s
P2	.313 In/Sec	1.396 G-s
P3	.794 In/Sec	3.038 G-s
P4	.255 In/Sec	1.622 G-s
P5	1.053 In/Sec	1.488 G-s
P6	1.009 In/Sec	2.318 G-s
P7	.237 In/Sec	1.691 G-s
P8	.402 In/Sec	2.007 G-s
P9	.885 In/Sec	1.367 G-s
P10	.193 In/Sec	1.103 G-s
P11	.146 In/Sec	1.083 G-s
P12	.257 In/Sec	.548 G-s
P13	.523 In/Sec	1.309 G-s
P14	1.076 In/Sec	1.777 G-s
VLL	.806 In/Sec	.440 G-s
VRL	.416 In/Sec	.359 G-s
VLW	.661 In/Sec	.561 G-s
VRW	.569 In/Sec	.477 G-s

C-0600C - C-0600C FEED GAS COMP C (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.337 In/Sec	1.581 G-s
MOV	.184 In/Sec	1.480 G-s
MIH	.260 In/Sec	.787 G-s
MIV	.146 In/Sec	.648 G-s
MIA	.156 In/Sec	1.842 G-s
CIA	.440 In/Sec	2.979 G-s
CIH	.348 In/Sec	3.055 G-s
CIV	.275 In/Sec	3.553 G-s
COH	.330 In/Sec	2.170 G-s
COV	.377 In/Sec	3.082 G-s
COA	.384 In/Sec	4.946 G-s
P1	.333 In/Sec	.781 G-s
P2	.518 In/Sec	.589 G-s
P3	.430 In/Sec	1.525 G-s
P4	.173 In/Sec	.864 G-s
P5	.837 In/Sec	1.419 G-s
P6	.562 In/Sec	1.666 G-s
P7	.254 In/Sec	1.191 G-s
P8	.330 In/Sec	1.532 G-s
P9	.445 In/Sec	1.494 G-s
P10	.174 In/Sec	.849 G-s
P11	.340 In/Sec	.646 G-s

P12	.234 In/Sec	.557 G-s
P13	.329 In/Sec	1.044 G-s
P14	.301 In/Sec	1.264 G-s
VSL	.399 In/Sec	.481 G-s
SRL	.269 In/Sec	.219 G-s
SLW	.405 In/Sec	.428 G-s
RSW	.545 In/Sec	.256 G-s

BLR-0200A - BLR-0200A LFG BLOWER A (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.103 In/Sec	1.182 G-s
MOV	.097 In/Sec	1.076 G-s
MIH	.356 In/Sec	6.267 G-s
MIV	.144 In/Sec	1.447 G-s
MIA	.091 In/Sec	1.046 G-s
BIA	.789 In/Sec	12.76 G-s
BIH	.842 In/Sec	13.06 G-s
BIV	.765 In/Sec	10.33 G-s
BOH	.586 In/Sec	10.38 G-s
BOV	1.062 In/Sec	18.57 G-s
BOA	1.002 In/Sec	15.68 G-s

BLR-0200B - BLR-0200B LFG BLOWER B (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.125 In/Sec	1.298 G-s
MOV	.059 In/Sec	.524 G-s
MIH	.136 In/Sec	1.861 G-s
MIV	.159 In/Sec	1.577 G-s
MIA	.102 In/Sec	1.337 G-s
BIA	.404 In/Sec	7.058 G-s
BIH	.618 In/Sec	9.039 G-s
BIV	.629 In/Sec	8.321 G-s
BOH	.713 In/Sec	12.18 G-s
BOV	.504 In/Sec	8.263 G-s
BOA	1.107 In/Sec	13.68 G-s

BLR-0200C - BLR-0200C LFG BLOWER C (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.133 In/Sec	1.871 G-s
MOV	.098 In/Sec	.656 G-s
MIH	.146 In/Sec	2.230 G-s
MIV	.155 In/Sec	2.107 G-s
MIA	.073 In/Sec	.801 G-s
BIA	1.684 In/Sec	23.73 G-s
BIH	.449 In/Sec	8.361 G-s
BIV	.748 In/Sec	12.31 G-s
BOH	.884 In/Sec	14.31 G-s
BOV	.900 In/Sec	17.76 G-s
BOA	.890 In/Sec	14.77 G-s

C-1300 - C-1300 SALES GAS COMP STG 1 (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.086 In/Sec	.727 G-s
MOV	.237 In/Sec	2.442 G-s
MIH	.085 In/Sec	.561 G-s
MIV	.288 In/Sec	.563 G-s
MIA	.137 In/Sec	1.322 G-s
CIA	.253 In/Sec	1.534 G-s
CIH	.164 In/Sec	1.307 G-s
CIV	.294 In/Sec	1.602 G-s
COH	.315 In/Sec	1.207 G-s
COV	.254 In/Sec	1.215 G-s
COA	.265 In/Sec	1.136 G-s

C-1304 - C-1304 SALES GAS COMP STG 2 (03-Jun-21)

	OVERALL LEVEL	1K-20KHz
MOH	.161 In/Sec	.435 G-s
MOV	.085 In/Sec	.396 G-s
MIH	.193 In/Sec	.465 G-s
MIV	.121 In/Sec	.176 G-s

MIA	.106 In/Sec	.347 G-s
CIA	.251 In/Sec	.647 G-s
CIH	.230 In/Sec	.527 G-s
CIV	.106 In/Sec	.817 G-s
COH	.252 In/Sec	.286 G-s
COV	.129 In/Sec	.556 G-s
COA	.145 In/Sec	.774 G-s
FHL	.467 In/Sec	.121 G-s
FHW	.300 In/Sec	.130 G-s

Clarification Of Vibration Units:

Acc --> G-s RMS

Vel --> In/Sec PK