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August 31, 2022

South Shelby RNG
Memphis, TN

The following is a summary of findings from the August 2022 monthly vibration survey that was performed on August 31, 2022.

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 A Feed Gas Compressor

Higher than average 1 x rpm vibration is still present in the compressor section. This may be due to soft foot or some other issue such as piping strain. Compressor piping was noticed to have some high vibration this survey. For now, ensure all fasteners are tight and ensure shims under compressor feet are not loose. Perform a hot alignment check as well. Ensure piping does not have strain. Rated as a **CLASS II** defect.

C-0600 B Feed Gas Compressor

Compressor vertical data is still showing some dominant 4-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. We will continue to monitor closely. Rated as a **CLASS I** defect.

C-0600 C Feed Gas Compressor

Motor has had an increase in 1 x rpm vibration. Compressor continues to have high vibrations that are related to 4 x the speed of the male rotor. For now, we recommend performing a hot alignment on the unit. Ensure motor does not have soft foot condition. 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 still 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 which is very high; however, this is likely a characteristic of this blowers' sliding vanes. We will continue to monitor closely. Rated as **CLASS I** defects for now.

BLR-0200 D LFG Blower

Unit was down but the following still applies: Motor data shows signs of bearing defects in the DE motor bearing. Amplitudes have increased to alarm levels. Motor should be replaced soon. Rated as a **CLASS III** defect.

C-1300 Sales Gas Compressor Stage 2

Overall vibration continues to be lower than past data shows. In the past there has been an up and down vibration that was likely due to a natural frequency coinciding with a forcing frequency from the compressor causing resonance. For now, we still recommend on performing some other vibration testing with the VFD in local control so we can determine what frequencies may be causing the higher vibrations. 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
               Report Date:  31-Aug-22   16:16

      MEASUREMENT POINT            OVERALL LEVEL       HFD / VHFD
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      C-551B     - C-551B VACUUM COMPRESSOR B    (31-Aug-22)
                                   OVERALL LEVEL     1K-20KHz
             MOH                     .090 In/Sec      1.285 G-s
             MOV                     .084 In/Sec      1.078 G-s
             MIH                     .102 In/Sec      1.530 G-s
             MIV                     .094 In/Sec      1.094 G-s
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	MIA	.083 In/Sec	.814 G-s
	CIA	.176 In/Sec	1.877 G-s
	CIH	.213 In/Sec	3.688 G-s
	CIV	.358 In/Sec	1.609 G-s
	COH	.262 In/Sec	6.006 G-s
	COV	.229 In/Sec	2.440 G-s
	COA	.202 In/Sec	2.076 G-s

C-551A - C-551A VACUUM COMPRESSOR A (31-Aug-22)

		OVERALL LEVEL	1K-20KHz
	MOH	.062 In/Sec	1.542 G-s
	MOV	.066 In/Sec	1.039 G-s
	MIH	.110 In/Sec	.728 G-s
	MIV	.065 In/Sec	.704 G-s
	MIA	.066 In/Sec	.607 G-s
	CIA	.239 In/Sec	2.506 G-s
	CIH	.235 In/Sec	3.840 G-s
	CIV	.344 In/Sec	2.648 G-s
	COH	.363 In/Sec	6.188 G-s
	COV	.232 In/Sec	2.551 G-s
	COA	.260 In/Sec	2.632 G-s

C-601B - C-601B N2 RECYCLE COMP B (31-Aug-22)

		OVERALL LEVEL	1K-20KHz
	MOH	.082 In/Sec	.582 G-s
	MOV	.032 In/Sec	.249 G-s
	MIH	.090 In/Sec	.754 G-s
	MIV	.050 In/Sec	.209 G-s
	MIA	.055 In/Sec	.192 G-s
	CIA	.169 In/Sec	1.820 G-s
	CIH	.130 In/Sec	1.712 G-s
	CIV	.128 In/Sec	1.247 G-s
	COH	.107 In/Sec	2.505 G-s
	COV	.126 In/Sec	1.433 G-s
	COA	.113 In/Sec	1.244 G-s

C-601A - C-601A N2 RECYCLE COMP A (31-Aug-22)

		OVERALL LEVEL	1K-20KHz
	MOH	.052 In/Sec	.669 G-s
	MOV	.031 In/Sec	.272 G-s
	MIH	.099 In/Sec	.900 G-s
	MIV	.036 In/Sec	.407 G-s
	MIA	.033 In/Sec	.308 G-s
	CIA	.106 In/Sec	.871 G-s
	CIH	.101 In/Sec	1.297 G-s
	CIV	.118 In/Sec	.740 G-s
	COH	.108 In/Sec	3.693 G-s
	COV	.108 In/Sec	1.498 G-s
	COA	.108 In/Sec	1.347 G-s

C-0600A - C-0600A FEED GAS COMP A (31-Aug-22)

		OVERALL LEVEL	1K-20KHz
	MOH	.173 In/Sec	.451 G-s
	MOV	.203 In/Sec	.135 G-s
	MIH	.171 In/Sec	.498 G-s
	MIV	.100 In/Sec	.221 G-s
	MIA	.048 In/Sec	.193 G-s
	CIA	.422 In/Sec	.528 G-s
	CIH	.677 In/Sec	1.764 G-s
	CIV	.770 In/Sec	1.013 G-s
	COH	.592 In/Sec	4.219 G-s
	COV	.687 In/Sec	.711 G-s
	COA	.450 In/Sec	.903 G-s

C-0600B - C-0600B FEED GAS COMP B (31-Aug-22)

		OVERALL LEVEL	1K-20KHz
	MOH	.184 In/Sec	.443 G-s
	MOV	.126 In/Sec	.258 G-s
	MIH	.221 In/Sec	.516 G-s
	MIV	.190 In/Sec	.450 G-s

MIA	.142 In/Sec	.350 G-s
CIA	.378 In/Sec	1.476 G-s
CIH	.486 In/Sec	3.626 G-s
CIV	.513 In/Sec	1.134 G-s
COH	.443 In/Sec	3.687 G-s
COV	.669 In/Sec	.603 G-s
COA	.487 In/Sec	.727 G-s

C-0600C - C-0600C FEED GAS COMP C (31-Aug-22)

	OVERALL LEVEL	1K-20KHz
MOH	.386 In/Sec	.334 G-s
MOV	.220 In/Sec	.406 G-s
MIH	.450 In/Sec	.636 G-s
MIV	.148 In/Sec	.247 G-s
MIA	.150 In/Sec	.264 G-s
CIA	.512 In/Sec	2.681 G-s
CIH	.336 In/Sec	1.993 G-s
CIV	.437 In/Sec	2.529 G-s
COH	.328 In/Sec	2.889 G-s
COV	.633 In/Sec	1.245 G-s
COA	.555 In/Sec	1.042 G-s

BLR-0200A - BLR-0200A LFG BLOWER A (31-Aug-22)

	OVERALL LEVEL	1K-20KHz
MOH	.156 In/Sec	.983 G-s
MOV	.123 In/Sec	.481 G-s
MIH	.119 In/Sec	1.375 G-s
MIV	.277 In/Sec	.413 G-s
MIA	.092 In/Sec	.556 G-s
BIA	.211 In/Sec	4.150 G-s
BIH	.509 In/Sec	14.33 G-s
BIV	.438 In/Sec	3.602 G-s
BOH	.522 In/Sec	14.96 G-s
BOV	.382 In/Sec	4.155 G-s
BOA	.223 In/Sec	3.195 G-s

BLR-0200B - BLR-0200B LFG BLOWER B (31-Aug-22)

	OVERALL LEVEL	1K-20KHz
MOH	.334 In/Sec	.806 G-s
MOV	.228 In/Sec	.426 G-s
MIH	.195 In/Sec	.904 G-s
MIV	.256 In/Sec	.275 G-s
MIA	.067 In/Sec	.330 G-s
BIA	.213 In/Sec	2.945 G-s
BIH	.385 In/Sec	8.567 G-s
BIV	.333 In/Sec	2.826 G-s
BOH	.438 In/Sec	11.55 G-s
BOV	.362 In/Sec	3.285 G-s
BOA	.212 In/Sec	2.848 G-s

BLR-0200C - BLR-0200C LFG BLOWER C (31-Aug-22)

	OVERALL LEVEL	1K-20KHz
MOH	.141 In/Sec	1.018 G-s
MOV	.139 In/Sec	.337 G-s
MIH	.182 In/Sec	1.344 G-s
MIV	.228 In/Sec	.319 G-s
MIA	.051 In/Sec	.480 G-s
BIA	.294 In/Sec	5.243 G-s
BIH	.448 In/Sec	12.23 G-s
BIV	.391 In/Sec	4.776 G-s
BOH	.618 In/Sec	11.23 G-s
BOV	.383 In/Sec	2.920 G-s
BOA	.246 In/Sec	2.476 G-s

C-1300 - C-1300 SALES GAS COMP STG 1 (31-Aug-22)

	OVERALL LEVEL	1K-20KHz
MOH	.091 In/Sec	.653 G-s
MOV	.100 In/Sec	.168 G-s
MIH	.071 In/Sec	.396 G-s
MIV	.251 In/Sec	.402 G-s

MIA	.111 In/Sec	.255 G-s
CIA	.320 In/Sec	1.148 G-s
CIH	.239 In/Sec	4.730 G-s
CIV	.340 In/Sec	.858 G-s
COH	.145 In/Sec	2.733 G-s
COV	.323 In/Sec	.756 G-s
COA	.225 In/Sec	1.177 G-s

C-1304 - C-1304 SALES GAS COMP STG 2 (31-Aug-22)

	OVERALL LEVEL	1K-20KHz
MOH	.124 In/Sec	.787 G-s
MOV	.079 In/Sec	1.473 G-s
MIH	.097 In/Sec	.814 G-s
MIV	.077 In/Sec	1.110 G-s
MIA	.098 In/Sec	.396 G-s
CIA	.084 In/Sec	.332 G-s
CIH	.141 In/Sec	.431 G-s
CIV	.090 In/Sec	.306 G-s
COH	.186 In/Sec	.425 G-s
COV	.124 In/Sec	.464 G-s
COA	.115 In/Sec	.290 G-s

Clarification Of Vibration Units:

Acc	-->	G-s	RMS
Vel	-->	In/Sec	PK