



QualiTest® Diagnostics

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January 4, 2022

South Shelby RNG
Memphis, TN

The following is a summary of findings from the monthly vibration survey that was performed on January 3, 2022. 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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Defects

C-0600 A Feed Gas Compressor

Compressor still has elevated 1 x input rpm vibration. Overall amplitude at the CIV is .7 ips. On average CIV has been around .45 to .5 ips. This may be due to soft foot or some other base issue. For now, ensure all fasteners are tight and ensure shims under compressor feet are not loose. Grout may be separating due to high vibration. And could also be contributing to this vibration. Rated as a **CLASS II** defect.

C-0600 B Feed Gas Compressor

Compressor data still shows some 4 x male rotor rpm 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

Compressor continues to have high vibrations that are related to 4 x the speed of the male rotor. 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

Overall velocity vibration has decreased some this survey on all 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 70 to 80 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

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 II** defect.

C-1300 Sales Gas Compressor Stage 2

Overall vibration was much lower this survey. The up and down vibration is likely due to a natural frequency coinciding with a forcing frequency from the compressor causing resonance. We recommend 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.

Abbreviated Last Measurement Summary

Database: South Shelby RNG.rbm
Area: SOUTH SHELBY PLANT

| MEASUREMENT POINT | OVERALL LEVEL | HFD / VHFD |
|-------------------------------------|---------------|------------|
| ----- | ----- | ----- |
| C-551B - C-551B VACUUM COMPRESSOR B | (03-Jan-22) | |
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .073 In/Sec | .628 G-s |
| MOV | .064 In/Sec | .355 G-s |
| MIH | .107 In/Sec | 1.145 G-s |
| MIV | .115 In/Sec | .490 G-s |
| MIA | .083 In/Sec | .900 G-s |
| CIA | .298 In/Sec | 1.083 G-s |
| CIH | .149 In/Sec | 2.635 G-s |
| CIV | .314 In/Sec | 1.233 G-s |
| COH | .197 In/Sec | 5.081 G-s |

| | | |
|---|---------------|-----------|
| COV | .202 In/Sec | 1.432 G-s |
| COA | .187 In/Sec | 2.855 G-s |
| C-551A - C-551A VACUUM COMPRESSOR A (03-Jan-22) | | |
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .065 In/Sec | .368 G-s |
| MOV | .076 In/Sec | .404 G-s |
| MIH | .097 In/Sec | .680 G-s |
| MIV | .075 In/Sec | .562 G-s |
| MIA | .069 In/Sec | .542 G-s |
| CIA | .242 In/Sec | .928 G-s |
| CIH | .204 In/Sec | 2.690 G-s |
| CIV | .302 In/Sec | 1.162 G-s |
| COH | .262 In/Sec | 4.294 G-s |
| COV | .369 In/Sec | 2.033 G-s |
| COA | .199 In/Sec | 1.936 G-s |
| C-601B - C-601B N2 RECYCLE COMP B (03-Jan-22) | | |
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .095 In/Sec | .866 G-s |
| MOV | .041 In/Sec | .174 G-s |
| MIH | .095 In/Sec | .502 G-s |
| MIV | .042 In/Sec | .130 G-s |
| MIA | .054 In/Sec | .077 G-s |
| CIA | .097 In/Sec | 1.069 G-s |
| CIH | .106 In/Sec | 2.535 G-s |
| CIV | .077 In/Sec | 1.838 G-s |
| COH | .169 In/Sec | 2.161 G-s |
| COV | .106 In/Sec | 1.224 G-s |
| COA | .087 In/Sec | 1.263 G-s |
| C-601A - C-601A N2 RECYCLE COMP A (03-Jan-22) | | |
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .048 In/Sec | .737 G-s |
| MOV | .022 In/Sec | .150 G-s |
| MIH | .072 In/Sec | .763 G-s |
| MIV | .047 In/Sec | .318 G-s |
| MIA | .044 In/Sec | .389 G-s |
| CIA | .093 In/Sec | 1.988 G-s |
| CIH | .079 In/Sec | 1.892 G-s |
| CIV | .099 In/Sec | .817 G-s |
| COH | .098 In/Sec | 2.086 G-s |
| COV | .136 In/Sec | 1.363 G-s |
| COA | .093 In/Sec | 1.079 G-s |
| C-0600A - C-0600A FEED GAS COMP A (03-Jan-22) | | |
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .136 In/Sec | .298 G-s |
| MOV | .113 In/Sec | .083 G-s |
| MIH | .156 In/Sec | .190 G-s |
| MIV | .176 In/Sec | .127 G-s |
| MIA | .087 In/Sec | .138 G-s |
| CIA | .456 In/Sec | .764 G-s |
| CIH | .529 In/Sec | 2.929 G-s |
| CIV | .902 In/Sec | .691 G-s |
| COH | .334 In/Sec | 1.365 G-s |
| COV | .671 In/Sec | 1.071 G-s |
| COA | .298 In/Sec | .675 G-s |
| C-0600B - C-0600B FEED GAS COMP B (03-Jan-22) | | |
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .209 In/Sec | .791 G-s |
| MOV | .070 In/Sec | .206 G-s |
| MIH | .130 In/Sec | .544 G-s |
| MIV | .228 In/Sec | .537 G-s |
| MIA | .102 In/Sec | .485 G-s |
| CIA | .290 In/Sec | .512 G-s |
| CIH | .328 In/Sec | 3.578 G-s |
| CIV | .460 In/Sec | .732 G-s |
| COH | .344 In/Sec | 2.224 G-s |

| | | |
|-----|-------------|----------|
| COV | .464 In/Sec | .613 G-s |
| COA | .186 In/Sec | .751 G-s |

C-0600C - C-0600C FEED GAS COMP C (03-Jan-22)

| | | |
|-----|---------------|-----------|
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .271 In/Sec | .352 G-s |
| MOV | .134 In/Sec | .083 G-s |
| MIH | .264 In/Sec | .357 G-s |
| MIV | .173 In/Sec | .288 G-s |
| MIA | .107 In/Sec | .323 G-s |
| CIA | .616 In/Sec | .749 G-s |
| CIH | .481 In/Sec | 2.430 G-s |
| CIV | .876 In/Sec | .808 G-s |
| COH | .516 In/Sec | 2.703 G-s |
| COV | .544 In/Sec | 1.494 G-s |
| COA | .332 In/Sec | 1.379 G-s |

BLR-0200A - BLR-0200A LFG BLOWER A (03-Jan-22)

| | | |
|-----|---------------|-----------|
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .076 In/Sec | .601 G-s |
| MOV | .074 In/Sec | .235 G-s |
| MIH | .071 In/Sec | 1.275 G-s |
| MIV | .126 In/Sec | .371 G-s |
| MIA | .073 In/Sec | .433 G-s |
| BIA | .204 In/Sec | 3.934 G-s |
| BIH | .380 In/Sec | 13.92 G-s |
| BIV | .384 In/Sec | 4.378 G-s |
| BOH | .394 In/Sec | 12.18 G-s |
| BOV | .352 In/Sec | 4.339 G-s |
| BOA | .202 In/Sec | 3.343 G-s |

BLR-0200C - BLR-0200C LFG BLOWER C (03-Jan-22)

| | | |
|-----|---------------|-----------|
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .105 In/Sec | .602 G-s |
| MOV | .104 In/Sec | .334 G-s |
| MIH | .091 In/Sec | .914 G-s |
| MIV | .126 In/Sec | .339 G-s |
| MIA | .114 In/Sec | .383 G-s |
| BIA | .227 In/Sec | 4.115 G-s |
| BIH | .547 In/Sec | 13.36 G-s |
| BIV | .424 In/Sec | 5.041 G-s |
| BOH | .594 In/Sec | 12.07 G-s |
| BOV | .572 In/Sec | 3.252 G-s |
| BOA | .269 In/Sec | 2.928 G-s |

BLR-0200D - BLR-0200D LFG BLOWER D (03-Jan-22)

| | | |
|-----|---------------|-----------|
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .166 In/Sec | 1.800 G-s |
| MOV | .159 In/Sec | .836 G-s |
| MIH | .160 In/Sec | 3.545 G-s |
| MIV | .282 In/Sec | 1.105 G-s |
| MIA | .117 In/Sec | 1.535 G-s |
| BIA | .158 In/Sec | 2.551 G-s |
| BIH | .342 In/Sec | 8.028 G-s |
| BIV | .479 In/Sec | 3.130 G-s |
| BOH | .324 In/Sec | 7.739 G-s |
| BOV | .427 In/Sec | 3.023 G-s |
| BOA | .144 In/Sec | 2.721 G-s |

C-1300 - C-1300 SALES GAS COMP STG 1 (03-Jan-22)

| | | |
|-----|---------------|-----------|
| | OVERALL LEVEL | 1K-20KHz |
| MOH | .091 In/Sec | .345 G-s |
| MOV | .254 In/Sec | .133 G-s |
| MIH | .092 In/Sec | .228 G-s |
| MIV | .217 In/Sec | .227 G-s |
| MIA | .199 In/Sec | .176 G-s |
| CIA | .381 In/Sec | .522 G-s |
| CIH | .245 In/Sec | 1.105 G-s |
| CIV | .417 In/Sec | .555 G-s |

| | | |
|-----|-------------|-----------|
| COH | .203 In/Sec | 2.098 G-s |
| COV | .549 In/Sec | .487 G-s |
| COA | .358 In/Sec | .694 G-s |

C-1304 - C-1304 SALES GAS COMP STG 2 (03-Jan-22)

OVERALL LEVEL 1K-20KHz

| | | |
|-----|-------------|----------|
| MOH | .061 In/Sec | .683 G-s |
| MOV | .065 In/Sec | .736 G-s |
| MIH | .059 In/Sec | .831 G-s |
| MIV | .058 In/Sec | .760 G-s |
| MIA | .040 In/Sec | .360 G-s |
| CIA | .060 In/Sec | .155 G-s |
| CIH | .063 In/Sec | .309 G-s |
| CIV | .064 In/Sec | .151 G-s |
| COH | .078 In/Sec | .207 G-s |
| COV | .076 In/Sec | .123 G-s |
| COA | .067 In/Sec | .152 G-s |

Clarification Of Vibration Units:

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