HI-SPEED INDUSTRIAL SERVICE QualiTest® Diagnostics

7030 Ryburn Dr. Millington, TN Phone: (901) 873-5300 Fax: (901) 873-5301 www.gohispeed.com

December 17, 2024

Lanxess
Memphis, TN

The following is a summary of findings from the December 2024 quarterly vibration survey at your facility. 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

Machine Summary Table

Date Collected												
Month	5	8	1	9	11	4	8	12				
Day	3	18	10	22	16	22	21	13				
Year	22	22	23	23	23	24	24	24				
Item	Condition											
Refrigeration Compressor A						NR		NR				
Refrigeration Compressor B			NR	NR	NR	NR	NR					
East Cooling Tower Pump				NR	NR							
Middle Cooling Tower Pump	NR		NR			NR	NR	NR				
West Cooling Tower Pump		NR										
West Neutralization Pump	NR	NR	NR	NR	NR		NR					
East Neutralization Pump						NR		NR				
KOH Feed Pump												
Peroxide Feed Pump						NR						
Crystallizer Recirc Pump												
Slurry Transfer Pump												
Quench Tank Pump												
Centrifuge Feed Pump												
Caro's Acid Pump												
Scrubber Circulation Pump												
Dust Collector Blower	NA											
Quench Tank Blower												
Vent Scrubber Blower	NA											
Hold Tank Agitator	NA											
Crystallizer Agitator	NA					NR	NR	NR				
Pre-Crusher	NA											
Grinder	NA											
Brine Tank Pump	NR	NR	NR									
Two Stage Water Pump												

Abbreviated Last Measurement Summary

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Database: oxone.rbm
Station: MEMPHIS OXONE

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
REFGCOMPB - REFRIGERATION COMPRESSOR B (13-Dec-24)		
	OVERALL LEVEL	1-20 kHZ
MOH	.084 In/Sec	.355 G-s
MOV	.055 In/Sec	.146 G-s
MOA	.030 In/Sec	.102 G-s
MIH	.062 In/Sec	.294 G-s
MIV	.034 In/Sec	.060 G-s
MIA	.035 In/Sec	.109 G-s
C1H	.058 In/Sec	.452 G-s
C1V	.283 In/Sec	.194 G-s
C1A	.050 In/Sec	.159 G-s
C2H	.087 In/Sec	.944 G-s
C2V	.271 In/Sec	.109 G-s
C2A	.075 In/Sec	.254 G-s
C3H	.053 In/Sec	.376 G-s
C3V	.159 In/Sec	.187 G-s
C3A	.070 In/Sec	.152 G-s
C4H	.039 In/Sec	.817 G-s
C4V	.455 In/Sec	.135 G-s
C4A	.079 In/Sec	.205 G-s
P7	.849 In/Sec	.464 G-s
P8	.464 In/Sec	.374 G-s
P9	.793 In/Sec	.598 G-s
P10	.430 In/Sec	1.523 G-s
7371-07 - EAST COOLING TOWER PUMP (13-Dec-24)		
	OVERALL LEVEL	1-20 kHZ
11	.259 In/Sec	2.875 G-s
12	.102 In/Sec	3.974 G-s
13	.182 In/Sec	.660 G-s
14	.041 In/Sec	1.286 G-s
7371-05 - WEST COOLING TOWER PUMP (13-Dec-24)		
	OVERALL LEVEL	1-20 kHZ
11	.092 In/Sec	1.011 G-s
12	.071 In/Sec	1.727 G-s
13	.086 In/Sec	2.255 G-s
14	.067 In/Sec	2.622 G-s
X1 - WEST NEUTRALIZATION PUMP (13-Dec-24)		
	OVERALL LEVEL	1-20 kHZ
11	.062 In/Sec	.392 G-s
12	.047 In/Sec	.331 G-s
362-13 - KOH FEED PUMP (13-Dec-24)		
	OVERALL LEVEL	1-20 kHZ
11	.096 In/Sec	2.190 G-s
21	.087 In/Sec	2.476 G-s
23	.061 In/Sec	.374 G-s
71	.226 In/Sec	4.030 G-s
72	.155 In/Sec	.420 G-s
357-13 - PEROXIDE FEED PUMP (13-Dec-24)		
	OVERALL LEVEL	1-20 kHZ
11	.046 In/Sec	.116 G-s
21	.042 In/Sec	.473 G-s
23	.056 In/Sec	.035 G-s
71	.079 In/Sec	.189 G-s
72	.068 In/Sec	.081 G-s

363-06 - CRYSTALLIZER RECIRC PUMP (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.021 In/Sec	.302 G-s
21	.013 In/Sec	.288 G-s
23	.018 In/Sec	.064 G-s
71	.035 In/Sec	.119 G-s
72	.026 In/Sec	.033 G-s
81	.027 In/Sec	.079 G-s

363-07A - SLURRY TRANSFER PUMP (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.103 In/Sec	1.552 G-s
21	.087 In/Sec	1.406 G-s
23	.162 In/Sec	.423 G-s
71	.070 In/Sec	.370 G-s
72	.245 In/Sec	.073 G-s

106-01 - PUMP,#2 QUENCH TANK (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.086 In/Sec	1.166 G-s
21	.054 In/Sec	.787 G-s
23	.132 In/Sec	.113 G-s
71	.891 In/Sec	.725 G-s
72	.499 In/Sec	.448 G-s

363-13 - CENTRIFUGE FEED PUMP (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.089 In/Sec	.369 G-s
21	.081 In/Sec	.910 G-s
23	.091 In/Sec	.102 G-s
71	.071 In/Sec	.297 G-s
72	.109 In/Sec	.126 G-s

360-05 - CARO'S ACID PUMP (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.049 In/Sec	.776 G-s
21	.048 In/Sec	.531 G-s
23	.039 In/Sec	.136 G-s
71	.119 In/Sec	.232 G-s
72	.094 In/Sec	.109 G-s

363-18 - AGITATOR, HOLD TANK (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.142 In/Sec	.565 G-s
21	.100 In/Sec	.692 G-s
23	.139 In/Sec	.110 G-s
31	.133 In/Sec	1.368 G-s
32	.058 In/Sec	.441 G-s

106-08 - BLOWER, QUENCH TANK (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.316 In/Sec	1.170 G-s
12	.876 In/Sec	.483 G-s
13	.387 In/Sec	.222 G-s
21	.158 In/Sec	1.325 G-s
22	.806 In/Sec	.328 G-s
23	.446 In/Sec	.281 G-s
71	.379 In/Sec	1.629 G-s
81	.511 In/Sec	1.120 G-s

DC BLOWER - BLOWER, DUST COLLECTOR (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.064 In/Sec	1.495 G-s
12	.111 In/Sec	.230 G-s
13	.148 In/Sec	.279 G-s
21	.070 In/Sec	1.445 G-s
22	.161 In/Sec	.495 G-s
23	.212 In/Sec	.392 G-s
81	.106 In/Sec	1.358 G-s

VNTSCRBBLW - BLOWER, VENT SCRUBBER (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.137 In/Sec	1.073 G-s
12	.111 In/Sec	.521 G-s
13	.049 In/Sec	.344 G-s
21	.099 In/Sec	.898 G-s
22	.176 In/Sec	.291 G-s
23	.060 In/Sec	.593 G-s
71	.065 In/Sec	1.378 G-s
81	.130 In/Sec	1.164 G-s

370-03 - GRINDER,OXONE (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.052 In/Sec	.578 G-s
71	.203 In/Sec	.422 G-s

366-41 - SCRUBBER CIRCULATION PUMP (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.235 In/Sec	3.938 G-s
21	.230 In/Sec	4.498 G-s
23	.207 In/Sec	1.173 G-s
71	.209 In/Sec	1.036 G-s
81	.280 In/Sec	.388 G-s

7368-03 - PRECRUSHER OXONE (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
23	.123 In/Sec	.071 G-s
11	.368 In/Sec	.684 G-s
21	.339 In/Sec	.683 G-s
22	.153 In/Sec	.232 G-s
81	.412 In/Sec	.679 G-s

110-04 - BRINE TANK PUMP (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.203 In/Sec	1.018 G-s
21	.155 In/Sec	1.161 G-s
23	.105 In/Sec	.200 G-s
71	.144 In/Sec	.551 G-s
72	.180 In/Sec	.447 G-s

2STAGEWTR - TWO STAGE WATER PUMP (13-Dec-24)

	OVERALL LEVEL	1-20 kHZ
11	.061 In/Sec	.772 G-s
21	.063 In/Sec	.710 G-s
23	.087 In/Sec	.147 G-s
71	.154 In/Sec	2.657 G-s
72	.096 In/Sec	.592 G-s

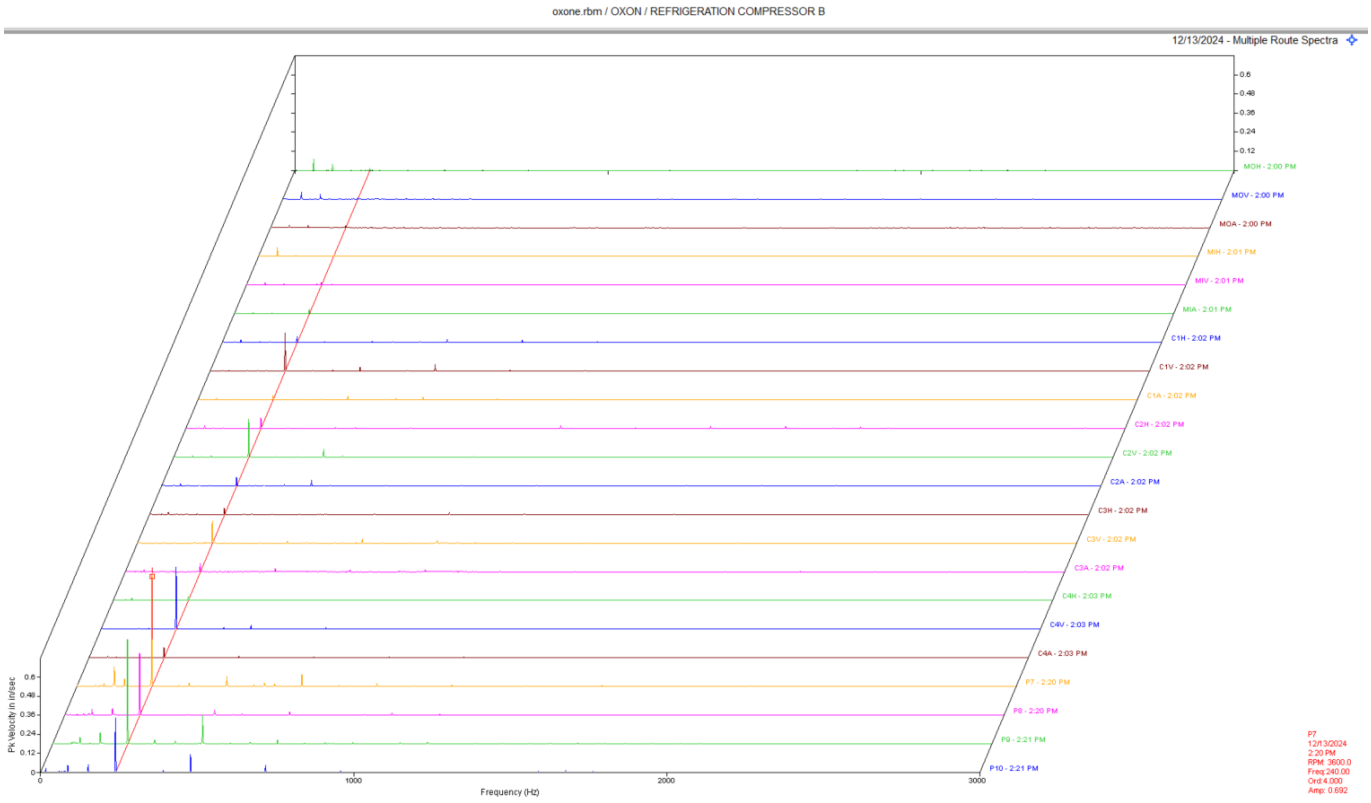
Clarification Of Vibration Units:

Acc --> G-s PK

Vel --> In/Sec PK

Vibration Analysis

Refrigeration Compressor A CLASS I



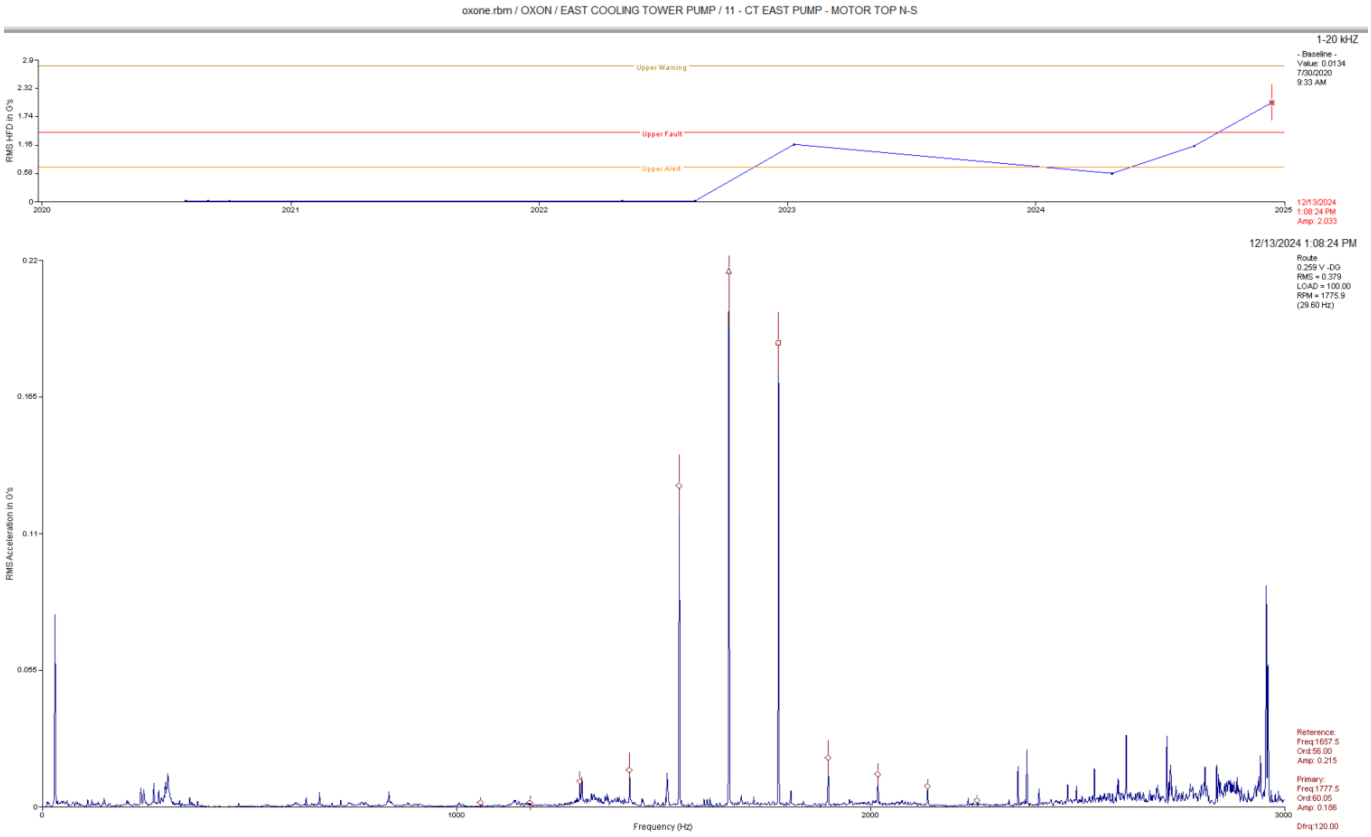
Observation:

Multi-point spectral data above shows a dominant peak at 240 HZ which is 4 x rpm. This is most likely vane pass of the compressor. P7-P10 is the inlet and outlet piping. 7-8 is top and 9-10 is bottom.

Recommendation:

The 4 x rpm vibration that can be seen in the outboard end of the compressor in the vertical direction appears to be excited by the very high vibration in the piping of the compressor. It is unclear if this is a resonance in the piping or if the vibration is being influenced by some type of flow turbulence.

East Cooling Tower Pump MOTOR CLASS I



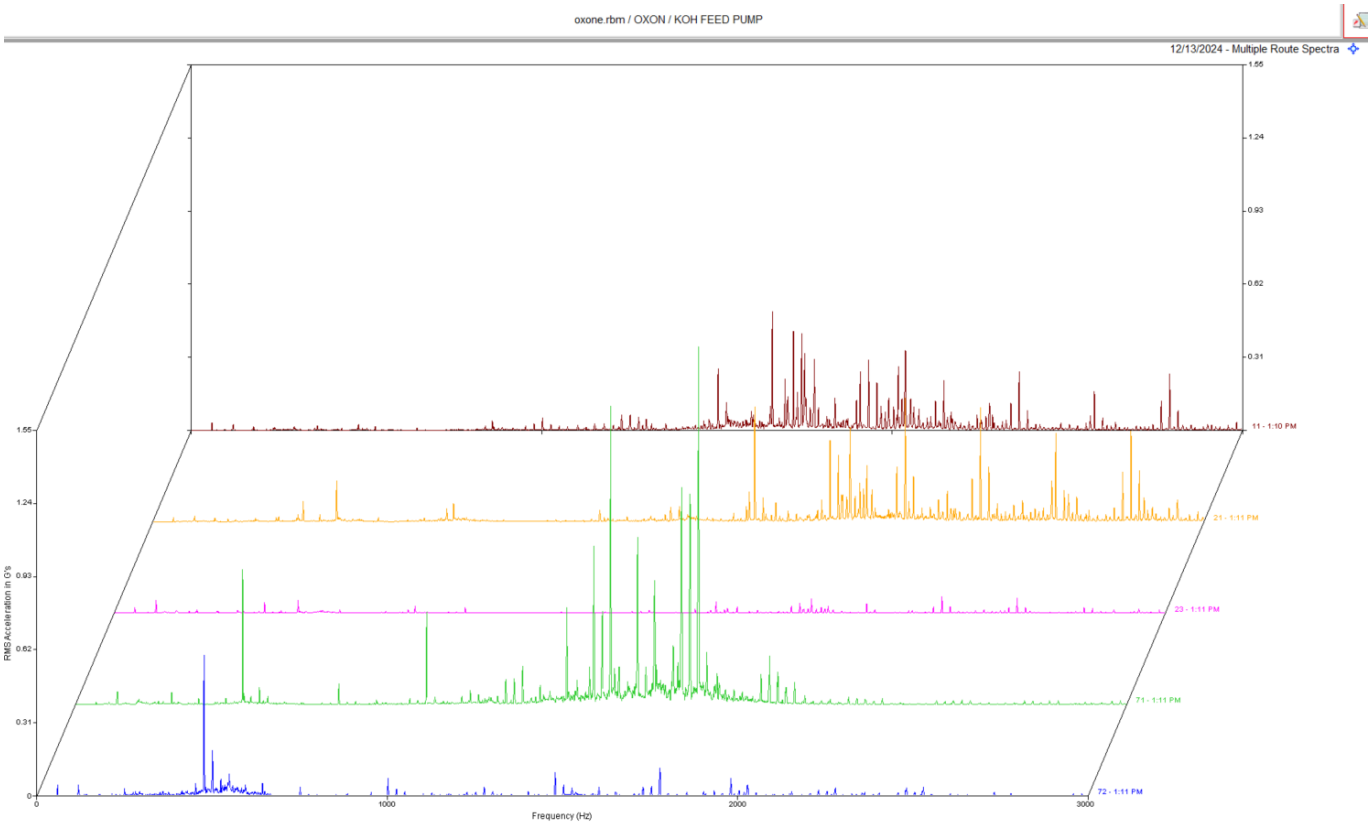
Observation:

Motor data shows a peak at 56 orders of rpm with 120 HZ. sidebands.

Recommendation:

Motor data shows an increase in high frequency amplitude. The 120 HZ. sidebands are electrical related as well. Motor may have an air gap issue or rotor issue. We will continue to monitor this closely.

KOH Feed Pump CLASS II



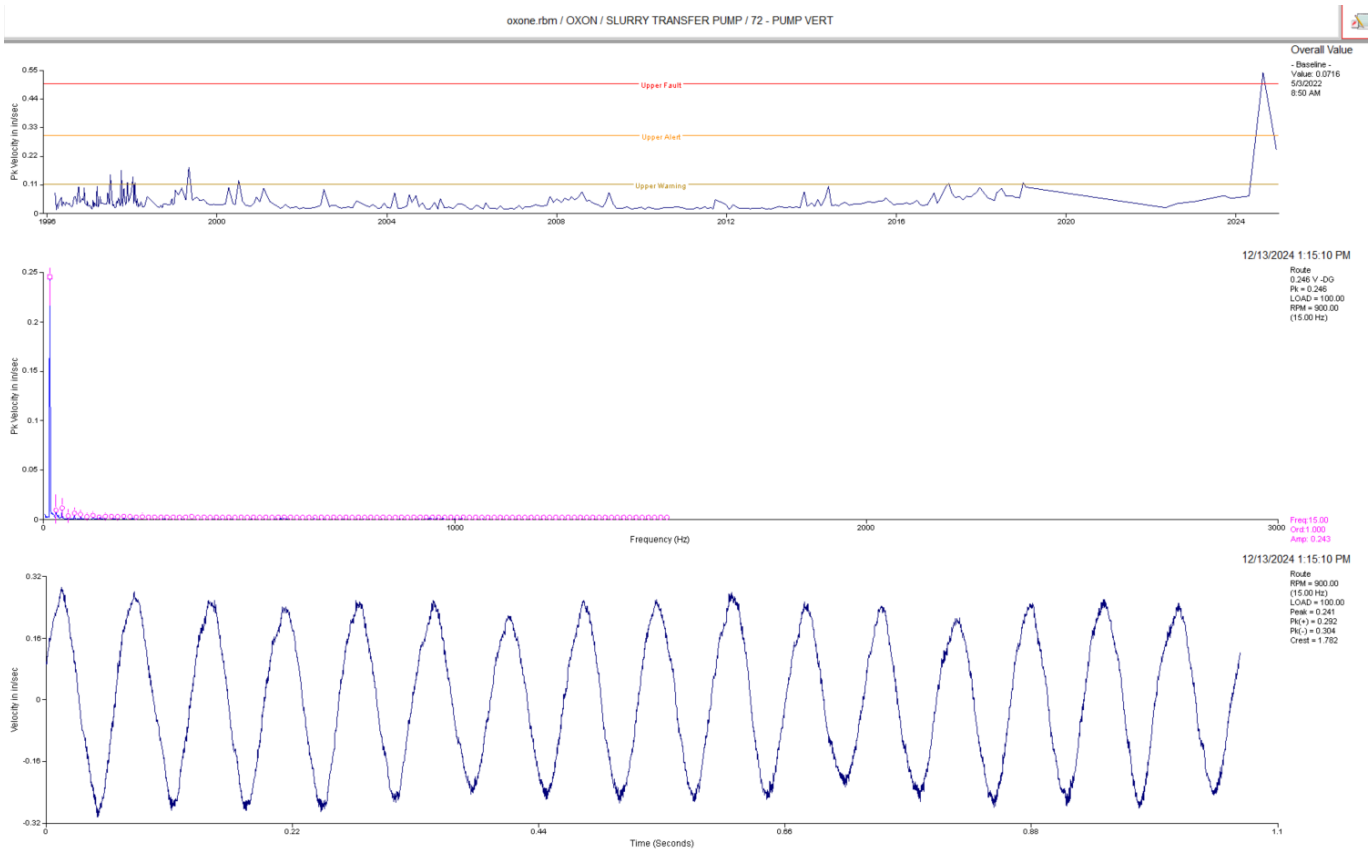
Observation:

Multi-spectral waterfall of the motor and pump shows non-synchronous peaks.

Recommendation:

Motor/Pump data shows some signs of bearing degradation. Motor and Pump will likely need attention in the next few months.

Slurry Transfer Pump CLASS II



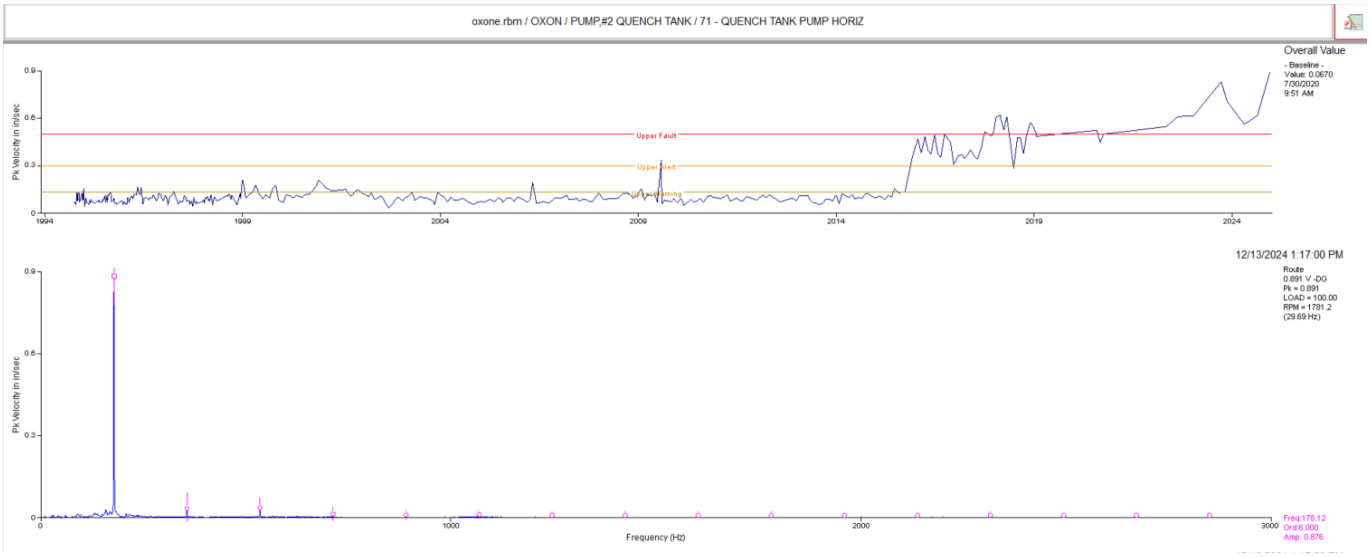
Observation:

Pump vertical trend data shows a significant increase in overall vibration amplitude. Spectral data shows a dominant 1 x rpm vibration.

Recommendation:

Pump base appears to be loose. Inspect pump base soon. Ensure all fasteners are tight and no soft base/foot exists. **Motor also has signs of bearing defects/wear. Inspect motor soon**.

Quench Tank Pump CLASS II



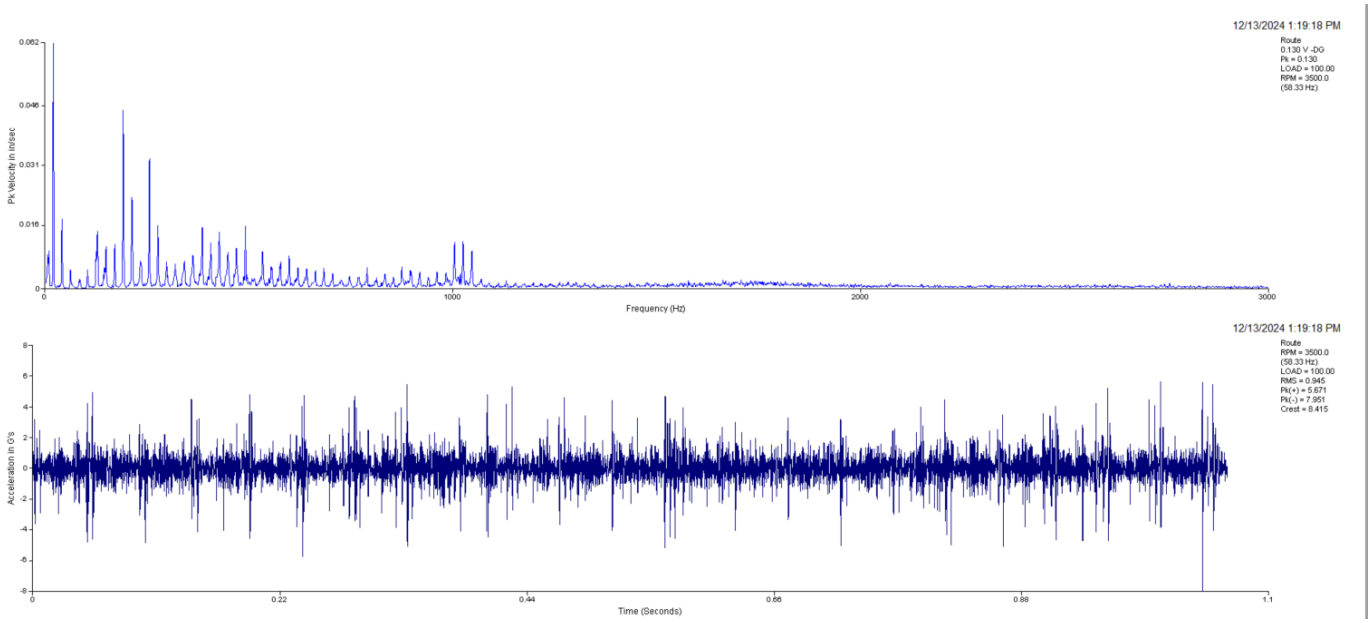
Observation:

Pump horizontal data shows a dominant vibration at 6 x rpm. Trend data shows an increase in overall vibration.

Recommendation:

If impeller has 6 vanes, then this vibration is pump vane pass and may be caused by internal pump/impeller issue or pump flow issue. Ensure pump is operating within the proper flow parameters and inspect pump/impeller as scheduling allows.

Vent Scrubber Blower CLASS II



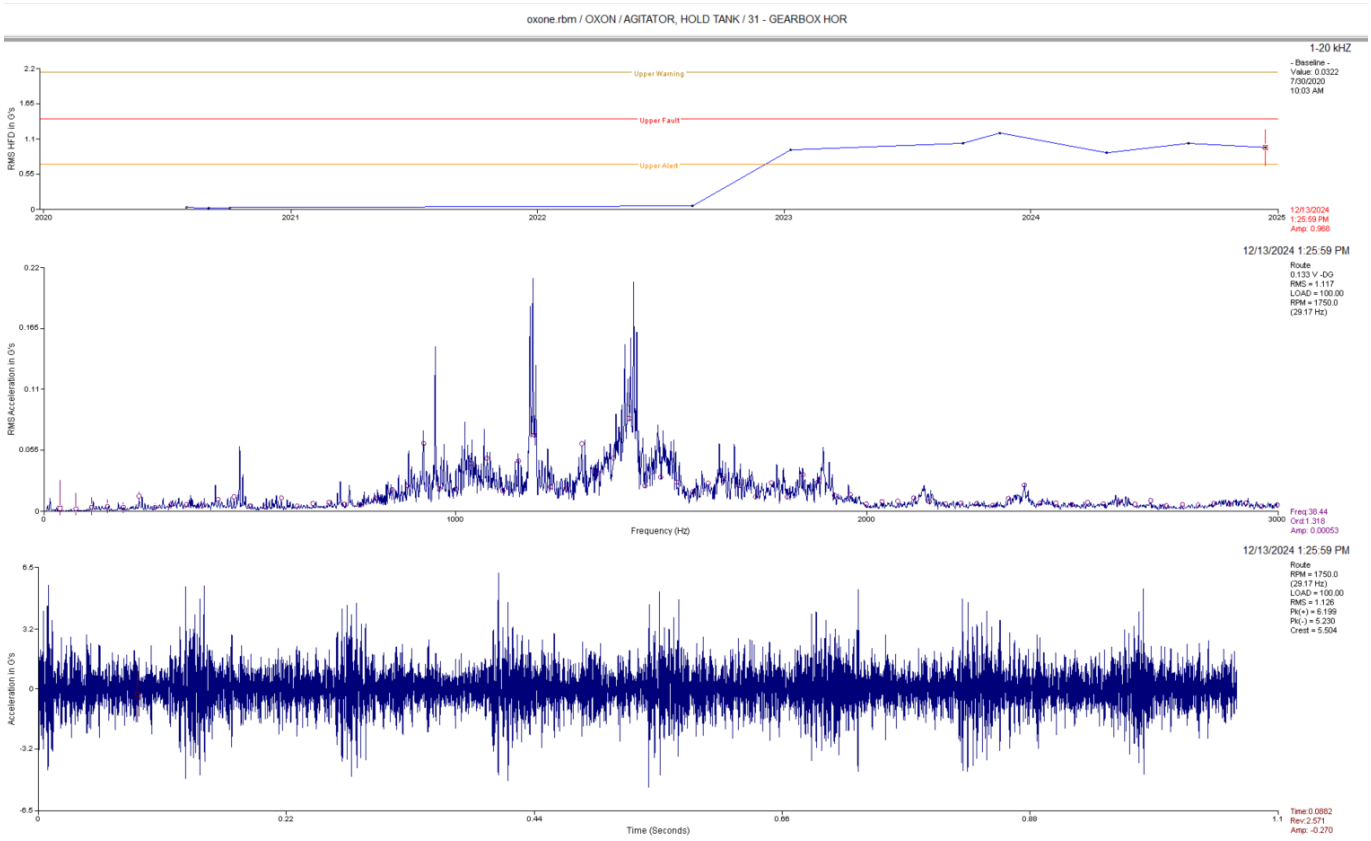
Observation:

Inboard blower data shows synchronous peaks associated bearing fit looseness/wear. Waveform data shows sharp impacting with high crest factor.

Recommendation:

Drive end blower bearing appears to have fit looseness wear. Blower needs attention as soon as scheduling allows.

Hold Tank Agitator CLASS II



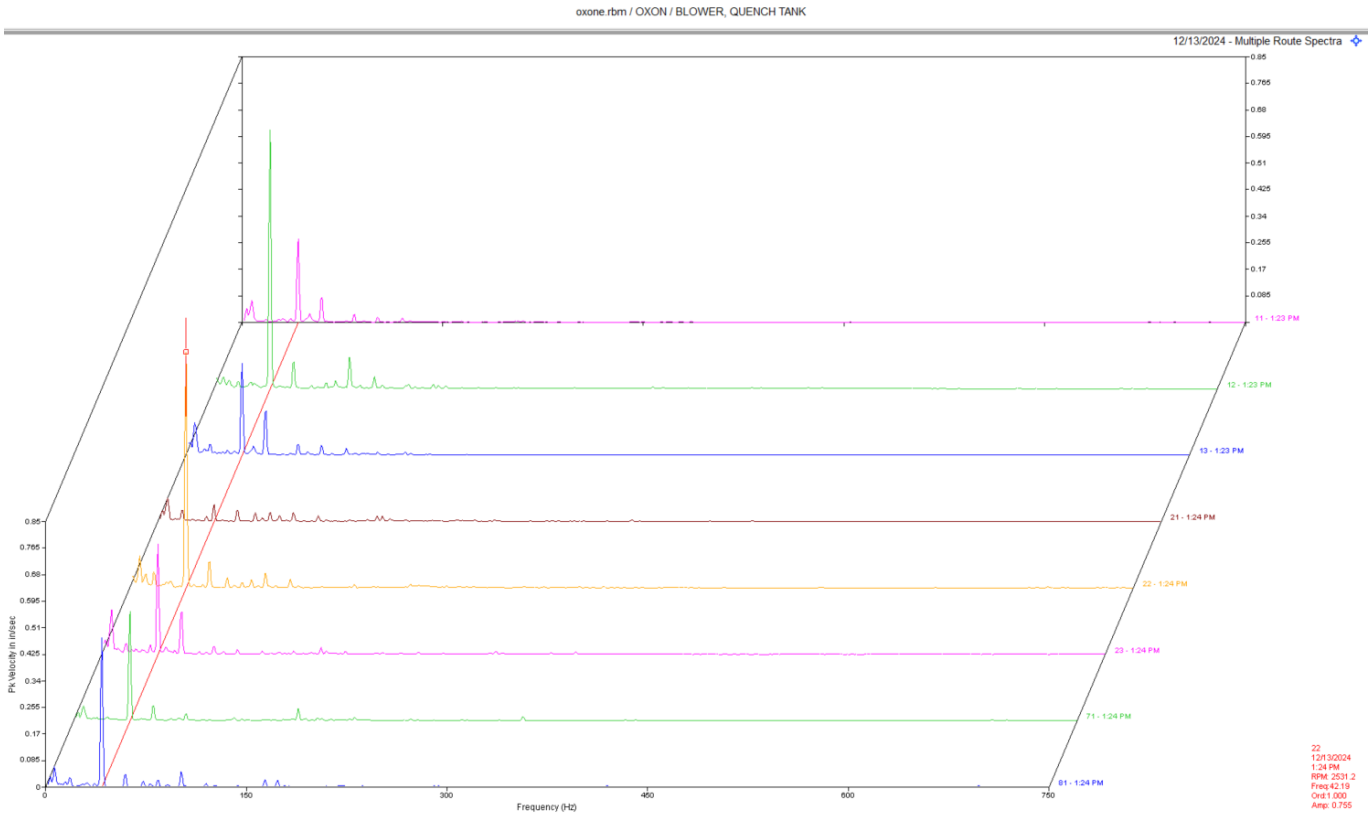
Observation:

Gearbox input side data shows random noise floor with non-synchronous and synchronous peaks associated with bearing and gear frequencies .

Recommendation:

Gearbox data is showing signs of defects and wear being apparent. Gearbox may need a fluid change and an oil analysis to help confirm severity of wear.

Quench Tank Blower CLASS II



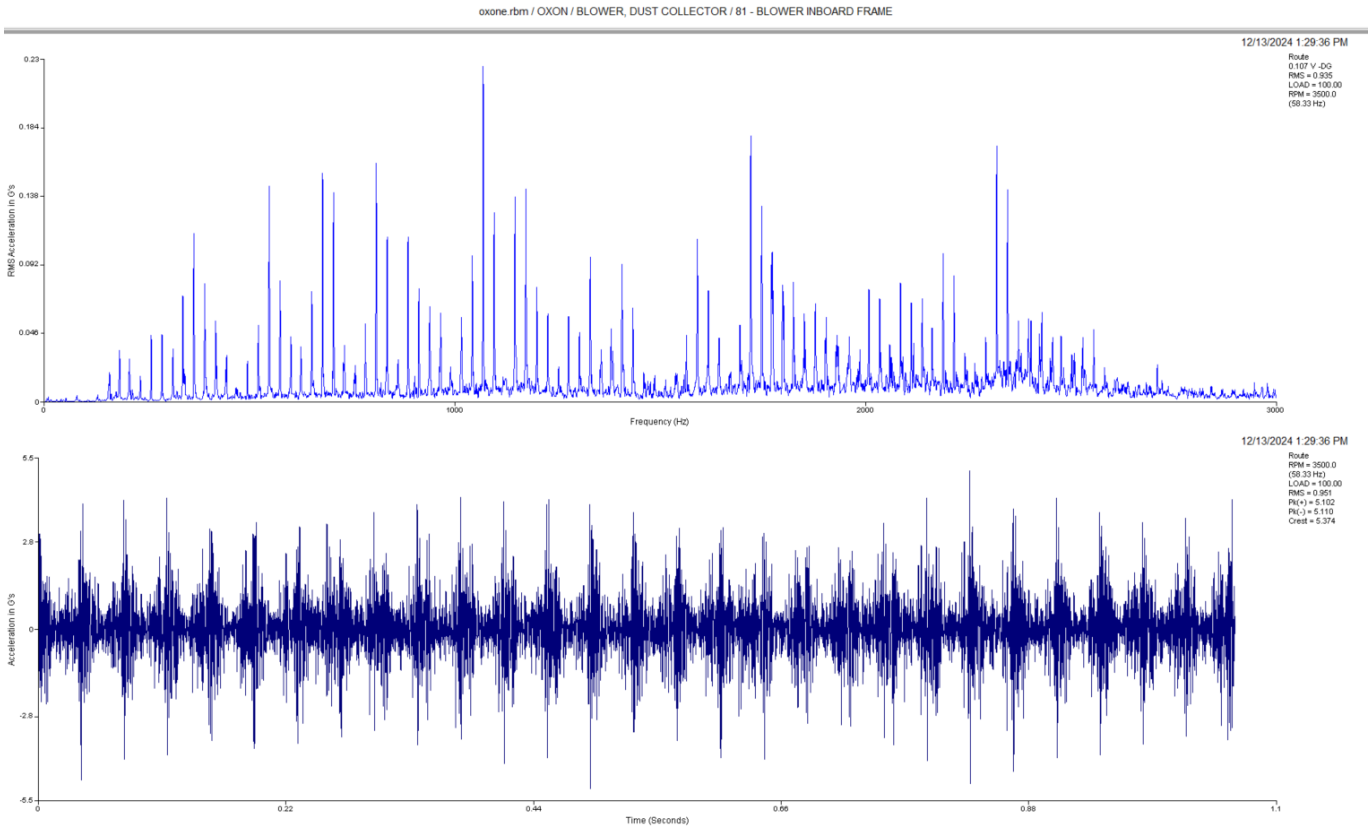
Observation:

Multipoint spectra shows a high vibration throughout the blower and motor. This peak appears to be 1 x blower rpm.

Recommendation:

Data suggests imbalance of the blower or possible sheave issue. Inspect blower wheel for buildup and or damage. Ensure sheaves are in good shape and properly aligned. Check all fasteners and ensure belts are also in good shape.

Dust Collector Blower CLASS III



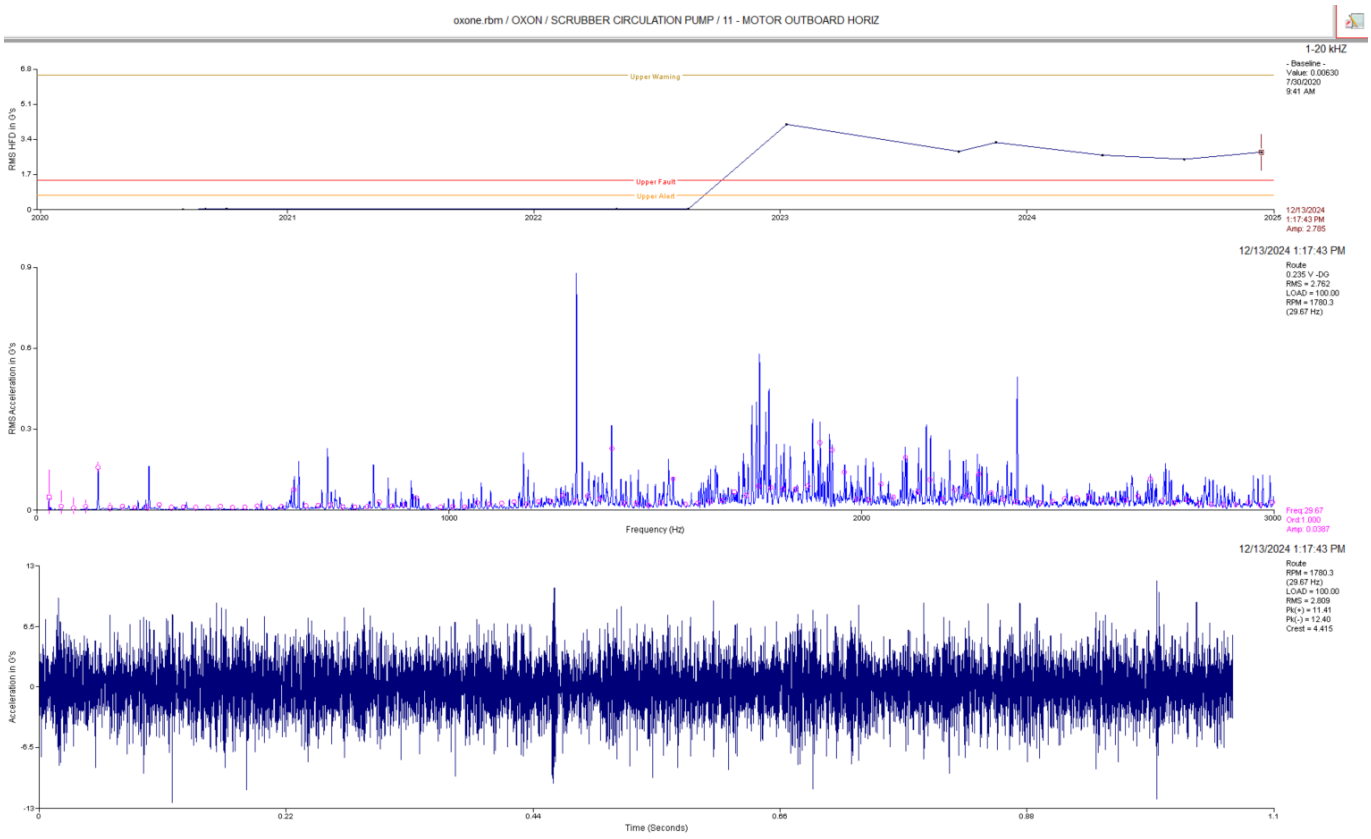
Observation:

Data the blower show excessive vibration in the blower bearings. Peaks in blower spectra are mostly synchronous which indicate excessive blower shaft and or bearing fit wear. Waveform data shows 5 g's-pk and 10 g's peak to peak with signs of impacting and pulsing.

Recommendation:

Data indicates defects/wear in the blower bearings and or blower shaft. The blower is very noisy as well and will need attention very soon.

Scrubber Circulation Pump CLASS III



Observation:

Vibration data of the motor outboard shows high amplitude acceleration and non-synchronous peaks in motor spectra. Trend shows elevated 1-20Khz acceleration amplitude.

Recommendation:

Motor bearings are showing signs of defect/wear. We are monitoring this closely. Motor should be replaced at next down time.

As always, it has been a pleasure to serve the Lanxess Oxone Memphis Plant. If there are any comments or questions, do not hesitate to contact us.

Sincerely,

ISO Certified Vibration Analyst, Category III

HI-SPEED INDUSTRIAL SERVICE

QualiTest® Diagnostics

Cell: 901-486-4565
Email: kwilliam@gohispeed.com