HI-SPEED INDUSTRIAL SERVICE QualiTest® Diagnostics

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February 18, 2025

Davorise Allen
Penn A Kem
Memphis, TN

Davorise,

The following is a summary of findings from the vibration analysis performed on February 11, 2025.

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.

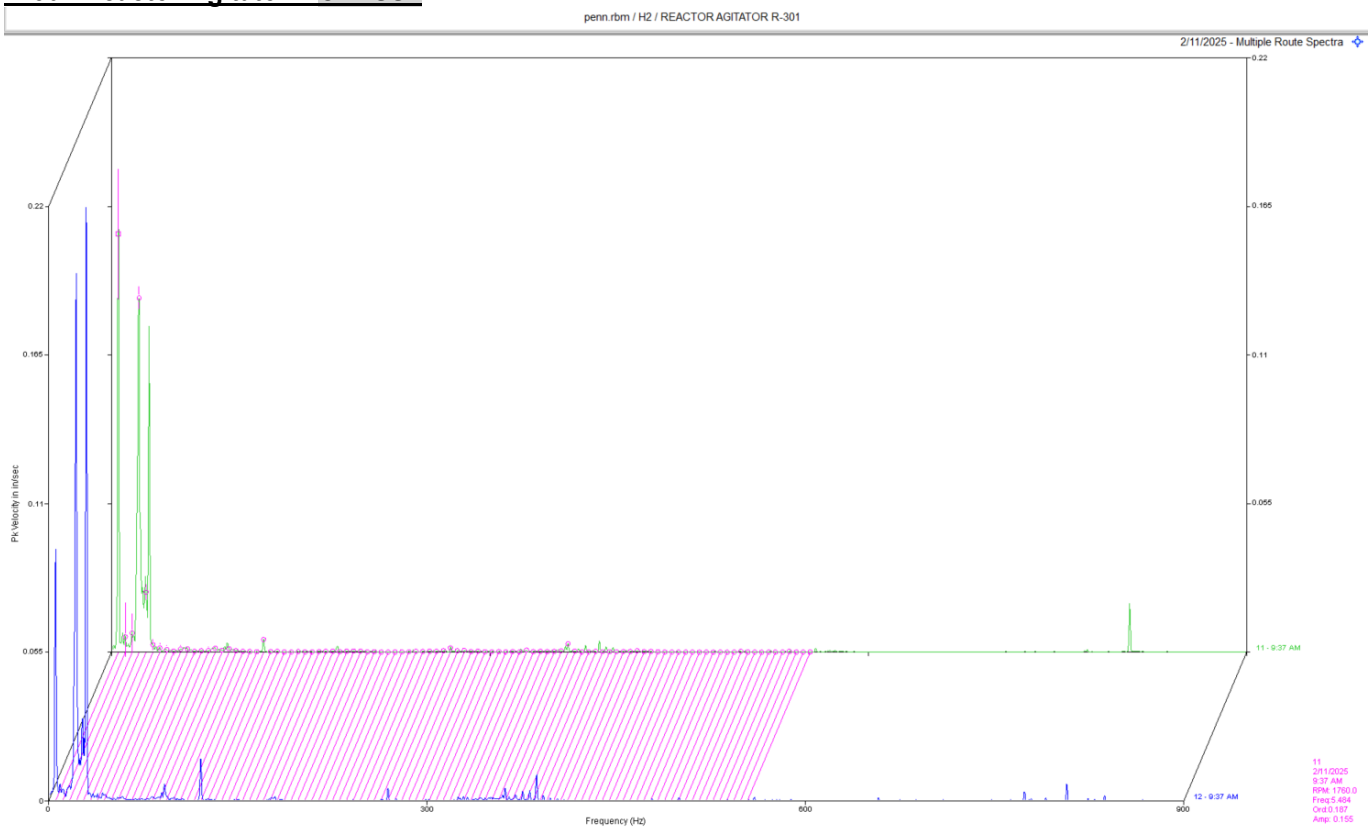
Class II: Defect (s) present that may cause problem in long term (2-6 months). Repair during normal maintenance scheduling. Continue to monitor.

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

R-301 Reactor Agitator CLASS I



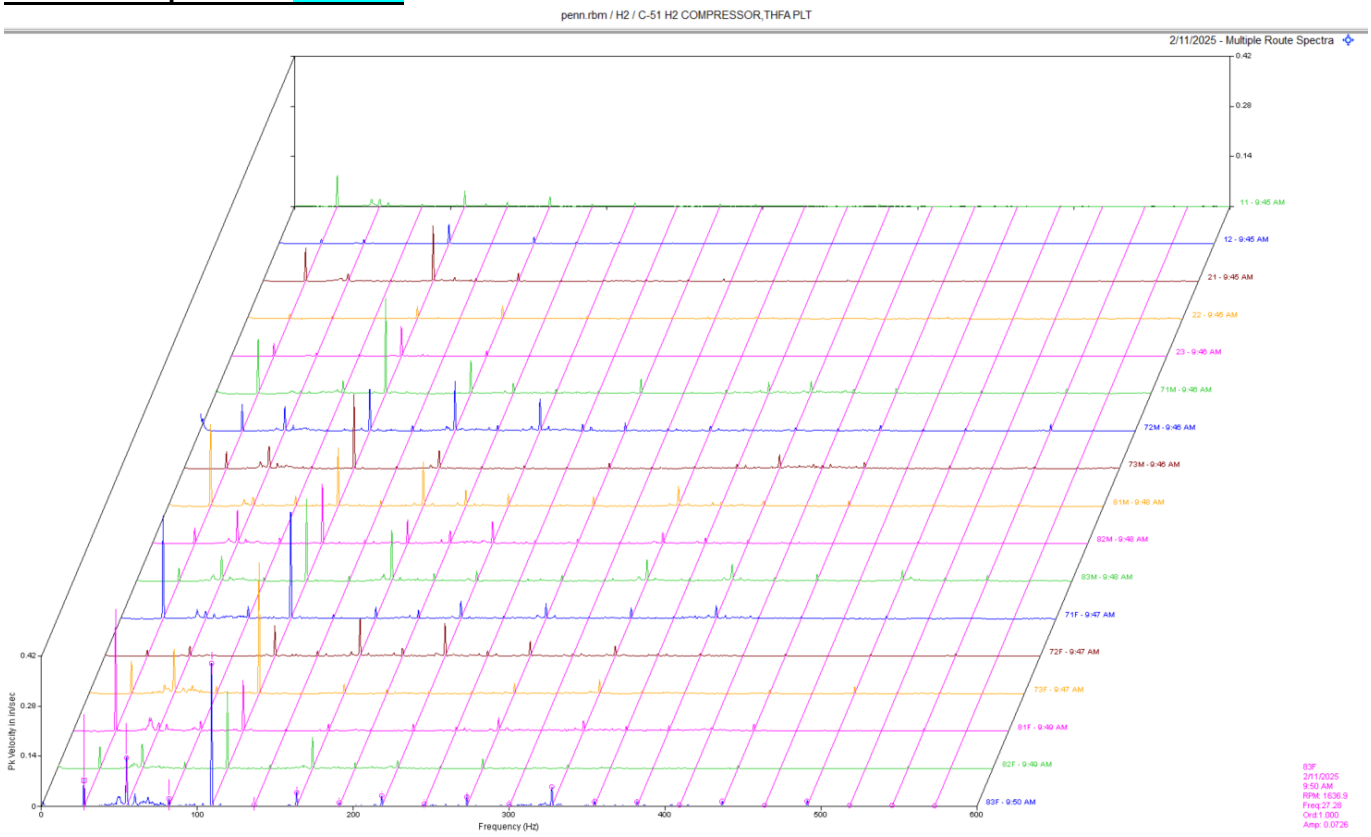
Observations:

Data above is the motor outboard horizontal and vertical (top end of the drive motor). This is where the vibration was the highest in amplitude. The three highest peaks are at 5.6 HZ , 22.4 HZ, and 29.8 HZ. The 5.6 and 22,4 HZ peaks are likely 1 x rpm and 4 x rpm of the agitator shaft if agitator shaft rpm was 336 rpm during data acquisition. The 29.8 HZ peak is likely 1 x rpm of the drive motor.

Recommendations:

The unit overall had some slightly high vibration at the top end of the motor. Amplitudes were just above the low alarm limit of .3 ips-pk. If vibration increase, then resonance may be occurring if motor speed varies due to process. Also, the level of product in the agitiator tank could also influence overall vibration. For now, it is recommended to perform a shaft deflection check on the agitator shaft using a dial indicator with a magnetic base. Shaft deflection should be .002” or less.

C-51 H2 Compressor CLASS II



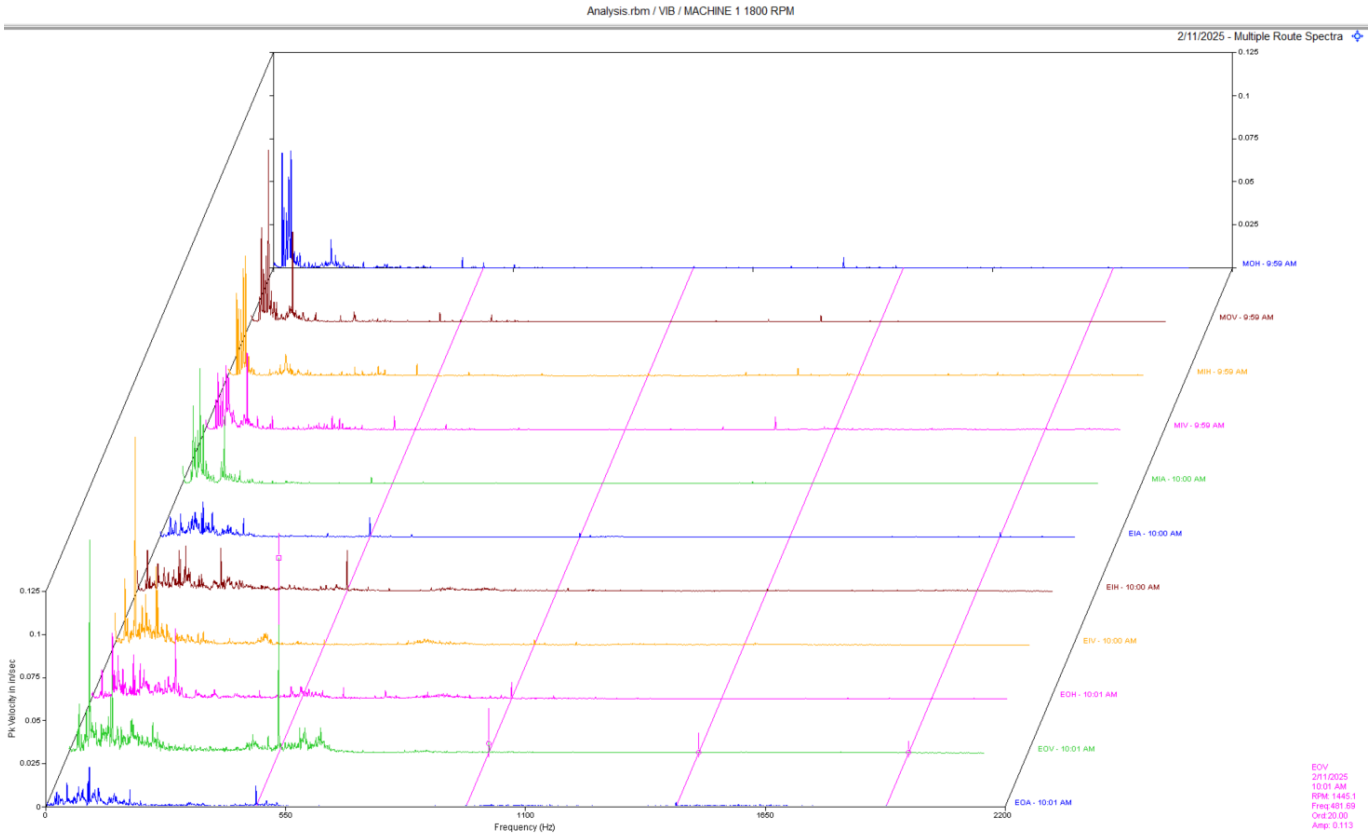
Observations:

Multi point spectra above is the motor and the compressor. Compressor has some slightly high vibration on the upper rotor (female rotor). Peaks in spectra are 1x rpm and 4 x rpm. 4 x rpm is lobe pass frequency.

Recommendations:

The high 1 and 4 x rpm vibration is associated with the rotors. Process issues may contribute to this type of vibration if there is liquid present in the system. Imbalance may also influence the 1 x rpm vibration. For now, it is recommended to ensure no liquid is present in the system.

P-905 Vacuum Pump CLASS I



Observations:

Multi point spectra above is the motor and the pump. Outboard end of the pump has some vibration at 20 x rpm. This is likely the van pass frequency of pump impeller.

Recommendations:

Motor and pump seem to have somewhat low vibrations overall. The vane pass vibration is not uncommon for this type of pump as long as amplitudes remain on the lower side. Impeller may have some slight wear or process may be influencing this vibration. Monitor as normal.

Abbreviated Last Measurement Summary

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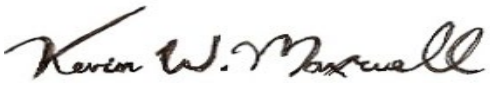
Database: penn.rbm
Station: HYDROGEN PLANT (ALL)

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
R-301 - REACTOR AGITATOR R-301 (11-Feb-25)		
	OVERALL LEVEL	
11	.284 In/Sec	
12	.341 In/Sec	
13	.189 In/Sec	
21	.169 In/Sec	
22	.195 In/Sec	
23	.071 In/Sec	
31	.108 In/Sec	
32	.119 In/Sec	
33	.055 In/Sec	
41	.128 In/Sec	
42	.101 In/Sec	
43	.043 In/Sec	
51	.047 In/Sec	
52	.036 In/Sec	
C-51 - C-51 H2 COMPRESSOR,THFA PLT (11-Feb-25)		
	OVERALL LEVEL	
11	.115 In/Sec	
12	.066 In/Sec	
21	.192 In/Sec	
22	.062 In/Sec	
23	.097 In/Sec	
71M	.353 In/Sec	
72M	.273 In/Sec	
73M	.258 In/Sec	
81M	.345 In/Sec	
82M	.251 In/Sec	
83M	.330 In/Sec	
71F	.447 In/Sec	
72F	.203 In/Sec	
73F	.428 In/Sec	
81F	.407 In/Sec	
82F	.276 In/Sec	
83F	.469 In/Sec	
M-1 - P-905 VACUUM PUMP (11-Feb-25)		
	OVERALL LEVEL	1K-20KHz
MOH	.137 In/Sec	.334 G-s
MOV	.156 In/Sec	.506 G-s
MIH	.136 In/Sec	1.051 G-s
MIV	.109 In/Sec	.408 G-s
MIA	.123 In/Sec	.687 G-s
EIA	.075 In/Sec	.356 G-s
EIH	.104 In/Sec	.387 G-s
EIV	.185 In/Sec	.281 G-s
EOH	.127 In/Sec	.353 G-s
EOV	.247 In/Sec	.412 G-s
EOA	.074 In/Sec	.467 G-s

Clarification Of Vibration Units:
Vel --> In/Sec PK

This concludes our report. As always, it has been a pleasure to serve Penn A Kem Memphis . If there are any comments or questions, do not hesitate to contact us.

Sincerely,



ISO Certified Vibration Analyst, Category III

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