HI-SPEED INDUSTRIAL SERVICE

MILLINGTON, TN

January 15, 2020

ARKEMA

Subject: January week 2 vibration service report

Weekly Equipment

Agitator, Hydrogenator C 7001-01
No legitimate vibrations were found to be above 0.138”/sec velocity peak overall for the gearbox output axial. Spectrum appears normal for unit. No action required.

A/B Concentrator Vacuum Pump 57
Overall vibrations are about the same for the outboard pump bearing and is at 0.261”/sec velocity peak, at what looks to be mostly vane pass. We must note; however, that the vibration changes constantly as the vacuum breaks, so the overall reading and the data could change significantly during a short period of time. No immediate action is required at this time. **Rated a Class I Defect**.

Flash Vacuum Pump 2130-1
Vibrations in this unit appear normal. No actions required.

Air Compressor C-201
Rotor bar vibrations dropped to 3.7 g’s RMS. The trend clearly shows that the vibrations vary considerably over time. We still believe these motors have possible weak rotor bar end connections that cause the vibrations to fluctuate higher due to loading. We will continue to monitor this unit for changes No actions required.

Air Compressor C-202
Rotor bar vibrations have dropped to under1 g RMS. The trend clearly shows that the vibrations vary considerably over time. No actions required.

Air Compressor C-203
Rotor bar vibrations have jumped up to 3.9 g’s RMS. The trend clearly shows that the vibrations vary considerably over time. We still believe these motors have possible weak rotor bar end connections that cause the vibrations to fluctuate higher due to loading. We will continue to monitor this unit for changes. No actions required.

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Air Compressor NASH A 201-08A
Vibration data shows a slight decrease in the compressor vertical bearing measurements. The overall amplitudes are at near 0.313"/sec velocity peak. Spectrum data shows two dominant peaks; shaft speed and near 20 orders. There is also an increase in the amplitude and amount of shaft speed harmonics; which could indicate mechanical looseness in the bearings or fits. Inspect for loose fasteners, especially the foot bolts, piping. Process variations could be affecting the vibrations. Some piping was seen vibrating again this month. We will keep a close eye on this unit. Ensure the unit is properly lubricated. **Rated a Class II Defect**.

D Hydrogenator Agitator 9002-10
Vibration data shows a slight change in vibrations this survey. Highest amplitude is at 0.234"/sec velocity peak for the gearbox top E/W measurement. Process variables are suspected for the change. **Still rated a Class I Defect Though.**

C Concentrator Vacuum Pump 2130-1 old
The motor axial vibration is at 0.20"/sec velocity Peak. Check the coupling and shaft alignment as time allows. **Rated a Class I Defect.**

Monthly equipment for week 2

Middle Mix Bed Pump 191-07
A 5x RPM vibration is still the dominant peak in the unit spectrum and most likely indicates wear in the unit. Recommend inspecting and repairing the pump in the near future. **Rated a Class II Defect.**

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.

This completes our assessment of your equipment for this survey. Thank you for your business and don't hesitate to call if you have any comments or questions.

Sincerely,

David W. Shook
Senior Reliability Specialist
dshook@gohispeed.com
Hi-Speed **Industrial Service**

Abbreviated Last Measurement Summary

Database: Arkema.rbm
Station: PEROXIDE
Route No. 4: ARK WK 2
Report Date: 16-Jan-20 07:30

MEASUREMENT POINT		OVERALL LEVEL	HFD / VHFD
7000-01	- AGITATOR,HYDROGENATOR C	(13-Jan-20)	
		OVERALL LEVEL	
01	- DRIVESHAFT BRG-NORTH-SOUTH	.040 In/Sec	
02	- DRIVESHAFT BRG-EAST-WEST	.041 In/Sec	
03	- DRIVESHAFT BRG-VERTICAL	.039 In/Sec	
11	- C Hydro Agitator MOTOR OB HORIZ	.043 In/Sec	
12	- C Hydro Agitator MOTOR OB VERT	.040 In/Sec	
13	- C Hydro Agitator Motor OB Axial	.040 In/Sec	
21	- C Hydro Agitator MOTOR IB HORIZ	.048 In/Sec	
22	- C Hydro Agitator MOTOR IB VERT	.043 In/Sec	
23	- C Hydro Agitator Motor IB Axial	.048 In/Sec	
31	- C Hydro Agitator GrBx In Horizon	.071 In/Sec	
32	- C Hydro Agitator GrBx In VERT	.067 In/Sec	
33	- C Hydro Agitator GrBx In Axial	.050 In/Sec	
41	- C Hydro Agitator GrBx Top Horizo	.046 In/Sec	
42	- C Hydro Agitator GrBx Top VERT	.038 In/Sec	
53	- C Hydro Agitator GrBx Top Axial	.135 In/Sec	
53L	- C Hydro Agitator GrBx Top Axial	.138 In/Sec	
57	- A/B Concentr Vac Pmp-var RPM	(13-Jan-20)	
		OVERALL LEVEL	
11	- Motor OB HOR	.050 In/Sec	
12	- Motor OB VERT	.055 In/Sec	
21	- Motor IB HOR	.077 In/Sec	
23	- Motor IB AXIAL	.057 In/Sec	
71	- Compressor IB HOR	.116 In/Sec	
81	- Compressor OB Horiz	.261 In/Sec	
83	- Compressor OB Axial	.049 In/Sec	
2130-1	- FLASH VAP VAC PUMP-var speed	(13-Jan-20)	
		OVERALL LEVEL	
11	- Motor OB HOR	.046 In/Sec	
12	- Motor OB VERT	.032 In/Sec	
21	- Motor IB HOR	.040 In/Sec	
22	- Motor IB VERT	.040 In/Sec	
23	- Motor IB AXIAL	.048 In/Sec	
71	- Compressor IB HOR	.060 In/Sec	
72	- Compressor IB VERT	.077 In/Sec	
81	- Compressor OB Horiz	.078 In/Sec	
82	- Compressor OB VERT	.096 In/Sec	
83	- Compressor OB Axial	.046 In/Sec	
C-203	- C-203 Comp	(13-Jan-20)	
		OVERALL LEVEL	1-20 KHz
11	- MOTOR OB HOR	.029 In/Sec	1.164 G-s

12	– MOTOR OB VERT	.102 In/Sec	3.921 G-s
21	– MOTOR IB HOR	.036 In/Sec	.415 G-s
22	– MOTOR IB VERT	.023 In/Sec	.253 G-s
23	– MOTOR IB AXIAL	.015 In/Sec	.101 G-s
71M	– COMP MALE SHAFT IB HOR	.046 In/Sec	
72M	– COMP MALE SHAFT IB VERT	.041 In/Sec	
73M	– COMP MALE SHAFT IB AXIAL	.057 In/Sec	
81M	– COMP MALE SHAFT OB HOR	.052 In/Sec	
82M	– COMP MALE SHAFT OB VERT	.045 In/Sec	
71F	– COMP FEMALE SHAFT IB HOR	.033 In/Sec	
72F	– COMP FEMALE SHAFT IB VERT	.050 In/Sec	
73F	– COMP FEMALE SHAFT IB AXIAL	.080 In/Sec	
81F	– COMP FEMALE SHAFT OB HOR	.049 In/Sec	
82F	– COMP FEMALE SHAFT OB VERT	.047 In/Sec	

C-201	– C-201 Comp	(13-Jan-20)	
		OVERALL LEVEL	1-20 KHz
11	– MOTOR OB HOR	.075 In/Sec	.945 G-s
12	– MOTOR OB VERT	.062 In/Sec	.961 G-s
21	– MOTOR IB HOR	.080 In/Sec	.814 G-s
22	– MOTOR IB VERT	.063 In/Sec	2.244 G-s
23	– MOTOR IB AXIAL	.104 In/Sec	3.788 G-s
71M	– COMP MALE SHAFT IB HOR	.026 In/Sec	
72M	– COMP MALE SHAFT IB VERT	.048 In/Sec	
73M	– COMP MALE SHAFT IB AXIAL	.074 In/Sec	
81M	– COMP MALE SHAFT OB HOR	.054 In/Sec	
82M	– COMP MALE SHAFT OB VERT	.052 In/Sec	
71F	– COMP FEMALE SHAFT IB HOR	.044 In/Sec	
72F	– COMP FEMALE SHAFT IB VERT	.050 In/Sec	
73F	– COMP FEMALE SHAFT IB AXIAL	.071 In/Sec	
81F	– COMP FEMALE SHAFT OB HOR	.045 In/Sec	
82F	– COMP FEMALE SHAFT OB VERT	.049 In/Sec	

C-202	– C-202 Comp	(13-Jan-20)	
		OVERALL LEVEL	1-20 KHz
11	– MOTOR OB HOR	.039 In/Sec	.699 G-s
12	– MOTOR OB VERT	.108 In/Sec	.826 G-s
21	– MOTOR IB HOR	.053 In/Sec	.376 G-s
22	– MOTOR IB VERT	.049 In/Sec	.204 G-s
23	– MOTOR IB AXIAL	.036 In/Sec	.162 G-s
71M	– COMP MALE SHAFT IB HOR	.032 In/Sec	
72M	– COMP MALE SHAFT IB VERT	.042 In/Sec	
73M	– COMP MALE SHAFT IB AXIAL	.081 In/Sec	
81M	– COMP MALE SHAFT OB HOR	.050 In/Sec	
82M	– COMP MALE SHAFT OB VERT	.059 In/Sec	
71F	– COMP FEMALE SHAFT IB HOR	.038 In/Sec	
72F	– COMP FEMALE SHAFT IB VERT	.055 In/Sec	
73F	– COMP FEMALE SHAFT IB AXIAL	.073 In/Sec	
81F	– COMP FEMALE SHAFT OB HOR	.066 In/Sec	
82F	– COMP FEMALE SHAFT OB VERT	.045 In/Sec	

new AC	– INSTRUMENT AIR COMPRESSOR	(13-Jan-20)	
		OVERALL LEVEL	1-20 KHz
11	– MOTOR OB HOR	.152 In/Sec	.585 G-s
12	– MOTOR OB VERT	.103 In/Sec	.934 G-s
13	– MOTOR OB AXIAL	.056 In/Sec	.440 G-s
21	– MOTOR IB HOR	.197 In/Sec	1.401 G-s

22	– MOTOR IB VERT	.071 In/Sec	.732 G-s
23	– MOTOR IB AXIAL	.110 In/Sec	.166 G-s
71F	– COMP FEMALE SHAFT IB HOR	.180 In/Sec	
72F	– COMP FEMALE SHAFT IB VERT	.142 In/Sec	
73F	– COMP FEMALE SHAFT IB AXIAL	.126 In/Sec	
81F	– COMP FEMALE SHAFT OB HOR	.143 In/Sec	
82F	– COMP FEMALE SHAFT OB VERT	.191 In/Sec	
83F	– COMP FEMALE SHAFT OB AXIAL	.186 In/Sec	
71M	– COMP MALE SHAFT IB HOR	.105 In/Sec	
72M	– COMP MALE SHAFT IB VERT	.124 In/Sec	
73M	– COMP MALE SHAFT IB AXIAL	.161 In/Sec	
81M	– COMP MALE SHAFT OB HOR	.156 In/Sec	
82M	– COMP MALE SHAFT OB VERT	.245 In/Sec	
83M	– COMP MALE SHAFT OB AXIAL	.177 In/Sec	

201-08A – COMPRESSOR,NASH A 201-08A (13-Jan-20)

		OVERALL LEVEL
11	– Nash Compr A Motor OB Horiz	.071 In/Sec
12	– Nash Compr A Motor OB Vertical	.094 In/Sec
13	– Nash Compr A Motor OB Axial	.169 In/Sec
21	– Nash Compr A Motor IB Horiz	.151 In/Sec
22	– Nash Compr A Motor IB VERT	.198 In/Sec
23	– Nash Compr A Motor IB AXIAL	.210 In/Sec
71	– Nash Compr A COMP IB HORIZ	.208 In/Sec
72	– Nash Compr A Compressor IB Verti	.309 In/Sec
73	– Nash Compr A COMP IB AXIAL	.187 In/Sec
81	– Nash Compr A COMP OB HORIZ	.178 In/Sec
82	– Nash Compr A Compressor OB Verti	.313 In/Sec
83	– Nash Compr A Compressor OB Axial	.165 In/Sec

9002-10 – D-HYDROGENATOR AGITATOR (13-Jan-20)

		OVERALL LEVEL
11	– MOTOR OUTBOARD HORIZONTAL	.088 In/Sec
21	– MOTOR INBOARD HORIZONTAL	.075 In/Sec
23	– motor inboard axial	.046 In/Sec
31	– GEARBOX INPUT SHAFT -HORIZONTAL	.199 In/Sec
31L	– GEARBOX INPUT SHAFT-N-S-LOW FRQ	.197 In/Sec
51	– GEARBOX TOP PLATE- E-W	.212 In/Sec
51L	– GEARBOX OUTPUT SHAFT-E-W-LOW FRQ	.213 In/Sec
52	– GEARBOX TOP PLATE- N-S	.165 In/Sec
52L	– GEARBOX OUTPUT SHAFT-E-W-LOW FRQ	.234 In/Sec
53	– GEARBOX OUTPUT SHAFT -VERTICAL	.168 In/Sec
61	– GEARBOX OUTPUT SHAFT-HORIZONTAL	.183 In/Sec
61L	– GEARBOX OUTPUT SHAFT-E-W-LOW FRQ	.179 In/Sec
81	– AGIT INTERMED BRG @ SEAL- N-S	.045 In/Sec
82	– AGIT INTERMED BRG @ SEAL- E-W	.047 In/Sec
83	– AGIT INTERMED BRG @ SEAL- VERT	.037 In/Sec

9003-01 – D-HYDRO PRIMARY FILT FD PUMP (13-Jan-20)

		OVERALL LEVEL
11	– MOTOR OUTBOARD HORIZONTAL	.057 In/Sec
21	– MOTOR INBOARD HORIZONTAL	.039 In/Sec
23	– MOTOR INBOARD AXIAL	.029 In/Sec
71	– PUMP HORIZONTAL	.113 In/Sec
72	– PUMP VERTICAL	.113 In/Sec

9001-01 – D-HYDRO SECOND. FILT FD PUMP (13-Jan-20)

		OVERALL LEVEL
11	- MOTOR OUTBOARD HORIZONTAL	.061 In/Sec
21	- MOTOR INBOARD HORIZONTAL	.049 In/Sec
23	- MOTOR INBOARD AXIAL	.075 In/Sec
71	- PUMP HORIZONTAL	.096 In/Sec
72	- PUMP VERTICAL	.082 In/Sec

192-03 - Two Stage Water Pump A-WEST (13-Jan-20)

		OVERALL LEVEL
11	- MOTOR OUTBOARD HORIZONTAL	.068 In/Sec
21	- MOTOR IB HORIZ	.059 In/Sec
23	- motor inboard axial	.040 In/Sec
71	- PUMP HORIZONTAL	.120 In/Sec
72	- PUMP VERTICAL	.055 In/Sec

191-07 - M MIX BED WATER PUMP 191-07 (13-Jan-20)

		OVERALL LEVEL
11	- Chilled H2O Pump Motor OB Horizo	.140 In/Sec
21	- Chilled H2O Pump Motor IB Horizo	.117 In/Sec
23	- MOTOR INBOARD	.048 In/Sec
71	- Chilled H2O Pump IB Horizontal	.358 In/Sec
72	- PUMP VERTICAL	.100 In/Sec

2130-1old - C Concentrator Vacuum Pump (13-Jan-20)

		OVERALL LEVEL
11	- Motor OB HOR	.062 In/Sec
21	- Motor IB HOR	.064 In/Sec
23	- Motor IB AXIAL	.208 In/Sec
71	- Compressor IB HOR	.125 In/Sec
81	- Compressor OB Horiz	.167 In/Sec
83	- Compressor OB Axial	.079 In/Sec

Clarification Of Vibration Units:

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