December 12, 2019

ARKEMA

Subject: December week 2 vibration service report

**Weekly Equipment**

**Agitator, Hydrogenator C 7001-01**

No legitimate vibrations were found to be above 0.131”/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 have increased slightly for the outboard pump bearing and is at 0.268”/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 again. No actions required.

**Air Compressor C-201**

Rotor bar vibrations jumped to just over 6 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**

Vibrations in this unit appear normal. No actions required.

**Air Compressor C-203**

Rotor bar vibrations jumped to just over 4 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 NASH 201-08**

Vibration data shows an increase in the compressor inboard bearing measurement. The overall amplitude is just under 0.3”/sec velocity peak. Spectrum shoes two dominant peaks; shaft speed and near 8 orders. We will keep a close eye on this unit. Ensure the unit gets proper lubrication in the near future. **Rated a Class I Defect**.

**D Hydrogenator Agitator 9002-10**

Vibration data shows a slight decrease in vibrations this survey. Highest amplitude is at 0.250”/sec velocity peak for the gearbox top N/S 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 0.189”/sec velocity Peak and Pump outboard axial at 0.073”; otherwise, vibrations in this unit appear normal. Check the shaft alignment only as time allows. **Rated a Class I Defect.**

**Week 2 additional equipment detailed defects**

**191-07 Middle Mix Bed Water Pump**

A 5x RPM vibration still dominates the pump data at almost 0.35”/sec velocity peak. We suspect a worm impeller and wear rings.

Inspect and replace as time allows. **Rated a Class I Defect.**

Week 2 running equipment vibration summary follows.

***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

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***Hi-Speed* Industrial Service**

 **Abbreviated Last Measurement Summary**

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 **Database: Arkema.rbm**

 **Station: PEROXIDE**

 **Route No. 4: ARK WK 2**

 **Report Date: 12-Dec-19 15:34**

 **MEASUREMENT POINT OVERALL LEVEL HFD / VHFD**

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 **7000-01 - AGITATOR,HYDROGENATOR C (11-Dec-19)**

 **OVERALL LEVEL**

 **01 - DRIVESHAFT BRG-NORTH-SOUTH .043 In/Sec**

 **02 - DRIVESHAFT BRG-EAST-WEST .047 In/Sec**

 **03 - DRIVESHAFT BRG-VERTICAL .046 In/Sec**

 **11 - C Hydro Agitator MOTOR OB HORIZ .042 In/Sec**

 **11H - MOTOR OB HORIZ - HI FREQ .041 In/Sec**

 **12 - C Hydro Agitator MOTOR OB VERT .044 In/Sec**

 **12H - MOTOR OB VERT - HI FREQ .040 In/Sec**

 **13 - C Hydro Agitator Motor OB Axial .050 In/Sec**

 **13H - MOTOR OB AXIAL - HI FREQ .045 In/Sec**

 **21 - C Hydro Agitator MOTOR IB HORIZ .043 In/Sec**

 **21H - MOTOR IB HORIZ - HI FREQ .049 In/Sec**

 **22 - C Hydro Agitator MOTOR IB VERT .048 In/Sec**

 **22H - MOTOR IB VERT - HI FREQ .049 In/Sec**

 **23 - C Hydro Agitator Motor IB Axial .053 In/Sec**

 **23H - MOTOR IB AXIAL - HI FREQ .050 In/Sec**

 **31 - C Hydro Agitator GrBx In Horizon .075 In/Sec**

 **32 - C Hydro Agitator GrBx In VERT .067 In/Sec**

 **33 - C Hydro Agitator GrBx In Axial .047 In/Sec**

 **41 - C Hydro Agitator GrBx Top Horizo .064 In/Sec**

 **42 - C Hydro Agitator GrBx Top VERT .059 In/Sec**

 **53 - C Hydro Agitator GrBx Top Axial .131 In/Sec**

 **53L - C Hydro Agitator GrBx Top Axial .110 In/Sec**

 **57 - A/B Concentr Vac Pmp-var RPM (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - Motor OB HOR .052 In/Sec**

 **OVERALL LEVEL 1-20 KHz**

 **11H - Motor OB HOR .058 In/Sec .356 G-s**

 **12 - Motor OB VERT .063 In/Sec**

 **12H - Motor OB VERT .061 In/Sec .226 G-s**

 **13 - Motor OB AXIAL .073 In/Sec**

 **21 - Motor IB HOR .072 In/Sec**

 **23 - Motor IB AXIAL .056 In/Sec**

 **71 - Compressor IB HOR .127 In/Sec**

 **81 - Compressor OB Horiz .268 In/Sec**

 **83 - Compressor OB Axial .068 In/Sec**

 **2130-1 - FLASH VAP VAC PUMP-var speed (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - Motor OB HOR .047 In/Sec**

 **12 - Motor OB VERT .030 In/Sec**

 **21 - Motor IB HOR .040 In/Sec**

 **22 - Motor IB VERT .043 In/Sec**

 **23 - Motor IB AXIAL .050 In/Sec**

 **71 - Compressor IB HOR .058 In/Sec**

 **72 - Compressor IB VERT .068 In/Sec**

 **81 - Compressor OB Horiz .076 In/Sec**

 **82 - Compressor OB VERT .080 In/Sec**

 **83 - Compressor OB Axial .050 In/Sec**

 **C-203 - C-203 Comp (Old Joy) (11-Dec-19)**

 **OVERALL LEVEL 1-20 KHz**

 **11 - MOTOR OB HOR .027 In/Sec 1.103 G-s**

 **12 - MOTOR OB VERT .147 In/Sec 4.491 G-s**

 **13 - MOTOR OB AXIAL .084 In/Sec 3.401 G-s**

 **21 - MOTOR IB HOR .028 In/Sec .596 G-s**

 **22 - MOTOR IB VERT .029 In/Sec .142 G-s**

 **23 - MOTOR IB AXIAL .047 In/Sec 1.772 G-s**

 **71M - COMP MALE SHAFT IB HOR .030 In/Sec**

 **72M - COMP MALE SHAFT IB VERT .036 In/Sec**

 **73M - COMP MALE SHAFT IB AXIAL .058 In/Sec**

 **81M - COMP MALE SHAFT OB HOR .086 In/Sec**

 **82M - COMP MALE SHAFT OB VERT .077 In/Sec**

 **83M - COMP MALE SHAFT OB AXIAL .037 In/Sec**

 **71F - COMP FEMALE SHAFT IB HOR .041 In/Sec**

 **72F - COMP FEMALE SHAFT IB VERT .054 In/Sec**

 **73F - COMP FEMALE SHAFT IB AXIAL .058 In/Sec**

 **81F - COMP FEMALE SHAFT OB HOR .044 In/Sec**

 **82F - COMP FEMALE SHAFT OB VERT .048 In/Sec**

 **C-201 - C-201 Comp (Old Centac) (11-Dec-19)**

 **OVERALL LEVEL 1-20 KHz**

 **11 - MOTOR OB HOR .069 In/Sec .630 G-s**

 **12 - MOTOR OB VERT .149 In/Sec 6.385 G-s**

 **13 - MOTOR OB AXIAL .075 In/Sec 2.657 G-s**

 **21 - MOTOR IB HOR .082 In/Sec .417 G-s**

 **22 - MOTOR IB VERT .033 In/Sec .050 G-s**

 **23 - MOTOR IB AXIAL .057 In/Sec .738 G-s**

 **71M - COMP MALE SHAFT IB HOR .035 In/Sec**

 **72M - COMP MALE SHAFT IB VERT .050 In/Sec**

 **73M - COMP MALE SHAFT IB AXIAL .075 In/Sec**

 **81M - COMP MALE SHAFT OB HOR .080 In/Sec**

 **82M - COMP MALE SHAFT OB VERT .056 In/Sec**

 **83M - COMP MALE SHAFT OB AXIAL .078 In/Sec**

 **71F - COMP FEMALE SHAFT IB HOR .043 In/Sec**

 **72F - COMP FEMALE SHAFT IB VERT .049 In/Sec**

 **73F - COMP FEMALE SHAFT IB AXIAL .056 In/Sec**

 **81F - COMP FEMALE SHAFT OB HOR .040 In/Sec**

 **82F - COMP FEMALE SHAFT OB VERT .054 In/Sec**

 **C-202 - C-202 Comp (New Location) (11-Dec-19)**

 **OVERALL LEVEL 1-20 KHz**

 **11 - MOTOR OB HOR .064 In/Sec 1.959 G-s**

 **12 - MOTOR OB VERT .100 In/Sec .416 G-s**

 **13 - MOTOR OB AXIAL .076 In/Sec 1.978 G-s**

 **21 - MOTOR IB HOR .055 In/Sec 1.163 G-s**

 **22 - MOTOR IB VERT .058 In/Sec .221 G-s**

 **23 - MOTOR IB AXIAL .036 In/Sec .293 G-s**

 **71M - COMP MALE SHAFT IB HOR .048 In/Sec**

 **72M - COMP MALE SHAFT IB VERT .048 In/Sec**

 **73M - COMP MALE SHAFT IB AXIAL .072 In/Sec**

 **81M - COMP MALE SHAFT OB HOR .047 In/Sec**

 **82M - COMP MALE SHAFT OB VERT .057 In/Sec**

 **83M - COMP MALE SHAFT OB AXIAL .080 In/Sec**

 **71F - COMP FEMALE SHAFT IB HOR .036 In/Sec**

 **72F - COMP FEMALE SHAFT IB VERT .047 In/Sec**

 **73F - COMP FEMALE SHAFT IB AXIAL .070 In/Sec**

 **81F - COMP FEMALE SHAFT OB HOR .042 In/Sec**

 **82F - COMP FEMALE SHAFT OB VERT .044 In/Sec**

 **new AC - INSTRUMENT AIR COMPRESSOR (11-Dec-19)**

 **OVERALL LEVEL 1-20 KHz**

 **11 - MOTOR OB HOR .127 In/Sec .762 G-s**

 **12 - MOTOR OB VERT .105 In/Sec 1.060 G-s**

 **13 - MOTOR OB AXIAL .073 In/Sec .666 G-s**

 **21 - MOTOR IB HOR .113 In/Sec 1.140 G-s**

 **22 - MOTOR IB VERT .076 In/Sec 1.186 G-s**

 **23 - MOTOR IB AXIAL .180 In/Sec 2.278 G-s**

 **71M - COMP MALE SHAFT IB HOR .148 In/Sec**

 **72M - COMP MALE SHAFT IB VERT .197 In/Sec**

 **73M - COMP MALE SHAFT IB AXIAL .135 In/Sec**

 **81M - COMP MALE SHAFT OB HOR .214 In/Sec**

 **82M - COMP MALE SHAFT OB VERT .194 In/Sec**

 **83M - COMP MALE SHAFT OB AXIAL .160 In/Sec**

 **71F - COMP FEMALE SHAFT IB HOR .203 In/Sec**

 **72F - COMP FEMALE SHAFT IB VERT .157 In/Sec**

 **73F - COMP FEMALE SHAFT IB AXIAL .172 In/Sec**

 **81F - COMP FEMALE SHAFT OB HOR .133 In/Sec**

 **82F - COMP FEMALE SHAFT OB VERT .241 In/Sec**

 **83F - COMP FEMALE SHAFT OB AXIAL .174 In/Sec**

 **201-08A - COMPRESSOR,NASH A 201-08A (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - Nash Compr A Motor OB Horiz .062 In/Sec**

 **12 - Nash Compr A Motor OB Vertical .077 In/Sec**

 **12H - Nash Compr A Motor OB Vertical .080 In/Sec**

 **13 - Nash Compr A Motor OB Axial .160 In/Sec**

 **21 - Nash Compr A Motor IB Horiz .102 In/Sec**

 **22 - Nash Compr A Motor IB VERT .115 In/Sec**

 **23 - Nash Compr A Motor IB AXIAL .193 In/Sec**

 **71 - Nash Compr A COMP IB HORIZ .198 In/Sec**

 **72 - Nash Compr A Compressor IB Verti .292 In/Sec**

 **72H - Nash Compr A COMP IB Vertical .295 In/Sec**

 **73 - Nash Compr A COMP IB AXIAL .185 In/Sec**

 **81 - Nash Compr A COMP OB HORIZ .161 In/Sec**

 **82 - Nash Compr A Compressor OB Verti .263 In/Sec**

 **82H - Nash Compr A COMP OB Vertical .251 In/Sec**

 **83 - Nash Compr A Compressor OB Axial .141 In/Sec**

 **83H - Nash Compr A COMP OB AXIAL .152 In/Sec**

 **9002-10 - D-HYDROGENATOR AGITATOR (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - MOTOR OUTBOARD HORIZONTAL .076 In/Sec**

 **21 - MOTOR INBOARD HORIZONTAL .063 In/Sec**

 **23 - motor inboard axial .051 In/Sec**

 **31 - GEARBOX INPUT SHAFT -HORIZONTAL .165 In/Sec**

 **31H - GEARBOX INPUT SHAFT -HORIZONTAL .219 In/Sec**

 **31L - GEARBOX INPUT SHAFT-N-S-LOW FRQ .169 In/Sec**

 **51 - GEARBOX TOP PLATE- E-W .187 In/Sec**

 **51L - GEARBOX OUTPUT SHAFT-E-W-LOW FRQ .201 In/Sec**

 **52 - GEARBOX TOP PLATE- N-S .250 In/Sec**

 **52L - GEARBOX OUTPUT SHAFT-E-W-LOW FRQ .229 In/Sec**

 **53 - GEARBOX OUTPUT SHAFT -VERTICAL .130 In/Sec**

 **61 - GEARBOX OUTPUT SHAFT-HORIZONTAL .135 In/Sec**

 **61L - GEARBOX OUTPUT SHAFT-E-W-LOW FRQ .155 In/Sec**

 **81 - AGIT INTERMED BRG @ SEAL- N-S .053 In/Sec**

 **82 - AGIT INTERMED BRG @ SEAL- E-W .042 In/Sec**

 **83 - AGIT INTERMED BRG @ SEAL- VERT .037 In/Sec**

 **9003-01 - D-HYDRO PRIMARY FILT FD PUMP (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - MOTOR OUTBOARD HORIZONTAL .028 In/Sec**

 **21 - MOTOR INBOARD HORIZONTAL .036 In/Sec**

 **23 - MOTOR INBOARD AXIAL .063 In/Sec**

 **71 - PUMP HORIZONTAL .104 In/Sec**

 **72 - PUMP VERTICAL .116 In/Sec**

 **9001-01 - D-HYDRO SECOND. FILT FD PUMP (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - MOTOR OUTBOARD HORIZONTAL .042 In/Sec**

 **21 - MOTOR INBOARD HORIZONTAL .045 In/Sec**

 **23 - MOTOR INBOARD AXIAL .049 In/Sec**

 **71 - PUMP HORIZONTAL .067 In/Sec**

 **72 - PUMP VERTICAL .046 In/Sec**

 **192-03 - Two Stage Water Pump A-WEST (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - MOTOR OUTBOARD HORIZONTAL .063 In/Sec**

 **21 - MOTOR IB HORIZ .078 In/Sec**

 **23 - motor inboard axial .054 In/Sec**

 **71 - PUMP HORIZONTAL .132 In/Sec**

 **72 - PUMP VERTICAL .058 In/Sec**

 **191-07 - M MIX BED WATER PUMP 191-07 (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - Chilled H2O Pump Motor OB Horizo .128 In/Sec**

 **21 - Chilled H2O Pump Motor IB Horizo .107 In/Sec**

 **23 - MOTOR INBOARD .057 In/Sec**

 **71 - Chilled H2O Pump IB Horizontal .324 In/Sec**

 **72 - PUMP VERTICAL .123 In/Sec**

 **2130-1old - C Concentrator Vacuum Pump (11-Dec-19)**

 **OVERALL LEVEL**

 **11 - Motor OB HOR .058 In/Sec**

 **21 - Motor IB HOR .058 In/Sec**

 **23 - Motor IB AXIAL .189 In/Sec**

 **71 - Compressor IB HOR .134 In/Sec**

 **81 - Compressor OB Horiz .144 In/Sec**

 **83 - Compressor OB Axial .073 In/Sec**

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 **Clarification Of Vibration Units:**

 **Acc --> G-s PK**

 **Vel --> In/Sec PK**