



MILLINGTON, TN

February 22, 2021

DuPont Solae
Memphis, TN

Subject: February North Plant Vibration Report

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.

7030 Ryburn Drive
Millington, TN 38053
P. 901-873-5300
F. 901-873-5301

Observations

P1 CURD

3rd Extraction NX438 0715

The drive motor is starting to show some signs of rotor bar issues. There is also quite a bit of vibration at what appears to be related to the belt frequency fundamental. Motor at the back of the unit is also showing signs of looseness. For now, inspect the belts for wear and proper tension, inspect outboard smaller motor and coupling assemblies for looseness and wear. Drive motor may need to be scheduled for replacement at the next turn around. We will monitor the rotor bar issue closely for the next few surveys. Rated as a **CLASS II** defect for now.

1st Extraction NX438 0714

Data of the back drive motor indicates defects/wear of the motor and possible wear of the coupling assembly. Repair as scheduling allows. This is rated as a **CLASS II** defect.

Concentrator #2 4495

Centrifuge bearings data shows fit looseness is present. Peakvue data also indicates an increase in non-synchronous vibration with a fundamental of 7.97 orders of the DE bearing. Peakvue amplitude skyrocketed this month from .38 g's to 4.5 g's which is very concerning. Because of the bearing looseness and increased acceleration, this is rated as a **CLASS III** defect.

Concentrator #1 4500

The back end bearing has had an increase in 1 x rpm vibration. Spectral data is also showing non-synchronous peaks which indicate bearing defects are being apparent. The smaller bearings on the back side of the centrifuge also have high vibration. Data of these smaller bearings also show a high 1 x rpm vibration with rpm harmonics. It is recommended to inspect the bearings and couplings for looseness/wear soon. Rated as a **CLASS II** defect.

C30 #1 4380

Motor data is showing some possible bearing issues in the motor. Electrical vibrations are also present but bearing issue is the main concern here. Motor needs to be scheduled for replacement. Centrifuge also has an increase in 1 x rpm and needs to be cleaned as soon as time allows. Rated as a **CLASS III** defect.

C30 #2 4381

Overall acceleration amplitudes are down slightly this month; however, motor peakvue data is still showing vibrations at 120 HZ. which is 2 x line frequency and increased harmonics of 120 Hz. This indicates an electrical issue within the motor or motor connections. Because of the recent increase of high frequency amplitude, this is still rated as a **CLASS III** defect.

2nd Extraction P5000 4340

Outboard end of centrifuge is starting to show increased axial vibration. Overall vibration is at .82 ips this month at the C2A. Dominant vibration is at 2 x rpm which indicates misaligned or cocked bearing. Rated as a **CLASS II** defect.

Extraction Tank Discharge Pump 4170

Unit has a 1x vibration in the motor with a peak of .99 in/sec peak. This is likely due to the fact that the motor is flange mounted and has no foot support. There is a base under the motor, but it appears to be for a previous design. There could also be a coupling issue. Motor needs support and inspect coupling as soon as practical. Rated as a **CLASS III** defect.

5400 Discharge Pump South 4352

Overall vibration in the pump has increased from .6 to 1.4 ips-pk. The feet bolts on the pump for this unit are loose and the pump loose to the base. It is recommended to install new bolts with hardened washers and realign unit as soon as practical. Ensure coupling does not have excessive wear. Rated as a **CLASS III** defect.

3rd Extraction NX Pump 9322

Motor has a high axial vibration. Spectral data shows the vibration to be at 2 x rpm. This could be alignment/ coupling issue. There is also an increase in acceleration of the pump. High frequency rpm harmonics are present in the pump which may indicate internal looseness. Inspect unit for these issues as scheduling allows. Rated as a **CLASS II** defect.

P1 DRYER

Cooling Ring Fan 1138

Motor has a high 1 x motor rpm axial vibration. Fan bearings appear to have fan rpm harmonics. This indicates severe looseness of the fan bearings. Fan bearings, sheaves, and belts need inspection ASAP. Rated as a **CLASS III** defect.

Northwest Blowback Fan 1041

This unit looks much better after shop balancing the wheel. There is still some vertical vibration which is likely due to the base not being anchored properly to the concrete. New anchors should be inserted and epoxied into the concrete and fastened properly. Rated as a **CLASS II** defect.

Northeast Blowback Fan 1021

Motor has elevated 1 x rpm vibration in the motor verticals. This is likely due to imbalance. It is difficult to field balance these units due to flexible base and inadequate fasteners to the concrete. It is recommended to replace fan wheel with newly dynamically balance wheel or remove this wheel and dynamically balance the wheel in shop during a downtime. Rated as a **CLASS II** defect.

South Exhaust Fan 1075

Motor inboard bearing data is showing some early to mid-stage bearing failure on the DE motor bearing. Harmonics of 3.74 orders of rpm can be seen in the peakvue and normal acceleration spectrum. Given the high ambient temperature in this area, these types of defects tend to progress quickly; therefore, we recommend scheduling this motor for replacement at the next scheduled downtime. We will monitor this closely. Rated as a **CLASS II** defect.

Southwest Blow-Back Fan 1081

Motor is starting to show some $\frac{1}{2}$ harmonics which indicate mechanical looseness either in the motor fits or fan hub fit. Base bolts being loose can also cause this type of vibration. Inspect unit for looseness as scheduling allows. Rated as a **CLASS II** defect.

P1 IDN

Vacuum Pump 4890

Pump has cavitation that is causing high acceleration. Ensure pump flow is not restricted and is operating at optimal flow. Rated as a **CLASS II** defect.

Bogey Discharge Pump 4845

Motor vibration has significantly increased this survey. Vibration is dominant at 59 Hz. in the motor. If rpm is correct in the data base this would be at 2 x rpm. Motor fasteners and coupling should be checked ASAP. Ensure motor is aligned properly. Rated as a **CLASS III** defect.

P3 FEED DRYER

Collector Aspiration Fan 3026

Fan bearing data shows some signs of bearing wear. There are also some signs of lubrication issue. For now, ensure bearings are lubricated properly and we will monitor bearing condition closely in the upcoming surveys. Rated as a **CLASS II** defect.

P3 DRYER

P1 Blender 6650

Motor has had another increase in 1 x rpm vibration. This may be caused by the coupling becoming out of balance or some other mechanical issue in the coupling. Inspect coupling assembly ASAP. Rated as a **CLASS III** defect.

Cooling Ring Fan 2448

Motor verticals are up this month quite a bit to .8 ips-pk. Vibration is at 1 x rpm of the fan or motor. It is difficult to determine which it is because the speeds are very close. For now, it is recommended to inspect the motor/base fasteners, sheaves for looseness, misalignment, and belts for proper tension and wear. Rated as a **CLASS II** defect.

North Exhaust Fan 2531

Overall amplitude was highest at FOH with an amplitude .5 ips-pk. Fan was operating at 1514 on 2/20 and 1530 rpm on 2/21 this month which appears to be near a resonant frequency that coincides with the 1 x rpm of the unit. The peakvue data is still showing some early bearing defect frequencies. Efforts need to be made to keep this fan from operating at the speed of 1450-1550 rpm to keep amplitudes down. Rated as a **CLASS II** defect.

Product Collector Fan 2558

This fan was repaired recently; however, this month's vibration data does not look good. Spectral data of the fan bearings shows several rpm harmonics present which is indicative of mechanical looseness. Bearings and shaft need to be inspected ASAP. Shaft may have excessive wear. Rated as a **CLASS III** defect.

P1 Blender Asp. Fan 6660

Blower unit appears to have some issues likely in the gearset. Unit has a high vibration at 50 x rpm with some rpm sidebands around this peak. Overall amplitude has increased significantly from .6 to 4.3 G's in the course of 5 months. Unit will most likely need to be replaced very soon. Rated as a **CLASS III** defect.

P3 IDN

IDN Tank Discharge Pump 6124

Motor data shows an increase acceleration. Motor bearings are likely defective. Replace as soon as scheduling allows. Rated as a **CLASS II** defect.

600 Bogey Discharge Pump 6266

Motor and pump are showing signs of defects with the pump having the higher amplitudes. This unit will need attention in the next months. Rated as a **CLASS II** defect.

P3 Packaging

P3 Blender

Gearbox seems noisier than normal. Data of the gearbox indicates a very high noise floor in the spectral data with some GMF vibration peaks present. There is an issue in this gearbox; however, once data had been downloaded, analyzed further, and compared to previous data, the severity of this issue isn't as high as originally anticipated. We will monitor this closely. We recommend collecting data once per week on this unit. Rated as a **CLASS II** defect.

P3 CURD

C-30 #1 0085

Motor has some high electrical related vibrations that may indicate a connection issue internally in the motor. WE will monitor the electrical vibration closely. Centrifuge also shows some imbalance with amplitude of .8 ips-pk at the inboard vertical. Rated as a **CLASS II** defect.

Concentrator #5 0283

Peak to peak amplitude is 43 G's pk to pk. Motor inboard bearing data indicates defects within the bearing. Non-synchronous peaks are present with harmonics of 5.66 orders. **Motor will need to be replaced SOON.** Centrifuge bearings have rpm harmonics in the spectral data indicating some internal looseness. Unit needs attention soon. Rated as a **CLASS IV** defect.

Concentrator #1 0279

This unit has had a strong 1 x rpm vibration for some time. Inboard horizontal is lower this month, but inboard vertical increased to over 1 ips-pk. This high vibration has caused mechanical looseness of the inboard centrifuge bearing. Because of the inboard bearing looseness, this unit will need to be replaced soon. Rated as a **CLASS III** defect.

Concentrator #2 0280

Inboard centrifuge bearing still shows a high axial vibration with 3 x rpm being dominant. This may indicate excessive shaft run-out or cocked bearing. There is some high 1 x rpm vibration present in the verticals which is likely due to imbalance of the centrifuge. Build-up may be the cause of the high 1 x rpm vibration. Rated as a **CLASS II** defect.

Concentrator #3 0281

Motor has high 1 x motor rpm vibration and also increased electrical related vibrations (rotor bar pass). Data suggests possible rotor issue. We will monitor this closely. Rated as a **CLASS II** defect.

Concentrator #4 0282

New motor has higher acceleration than a newly rebuilt motor should have. Peaks are mainly electrically related (we will monitor this closely). Centrifuge has some 1 x rpm vibration still with 2, 3, 4, x rpm smaller peaks. Bearings likely have some fit looseness. Rated as a **CLASS II** defect.

Wet-In Pump

Data of the motor and pump suggests coupling/alignment issue. Motor may also have a rotor bar issue. For now ensure all bolts are tight and check coupling for wear and unit for proper alignment. Rated as a **CLASS II** defect.

Flottweg Decanter #2 9301

Motor data shows sub-synchronous vibration that is likely 1 and 2 x belt frequency. This likely indicates a belt issue. Inspect belts and sheaves for defects, wear, misalignment as scheduling allows. Outboard centrifuge bearing is also showing signs of looseness. Rated as a **CLASS II** defect.

300T MONTHLY

300T South Grinder 6421

Motor has a high inboard axial vibration. High 1 x rpm vibration at .55 ips-pk. This may be sheave related. Ensure sheaves are aligned properly with minimal face run-out on the sheave. Rated as a **CLASS II** defect.

300T North Grinder 6417

Unit has a high 1 x rpm vibration in the motor and grinder. Grinder bearings are also showing some signs of looseness. It is recommended to go through this unit inspecting all fasteners, sheaves/belts for issues, check grinder of build-up, and check grinder bearings for looseness. This could also be caused by a material buildup/ loss of material due to a defect in the grinder. Inspect for defects and buildup. Have alignment checked if necessary. Rated as a **CLASS II** defect.

MAIN PLANT UTILITIES

Air Compressor #3 0820

After further analysis, the peaks that are close to BSF of this motor are likely the second shaft of the air end. The calculated speed of this shaft is 1964 rpm. Harmonics of this shaft mimic BSF harmonics of the motor operating at 1795 rpm. This unit does have some higher amplitudes than the other

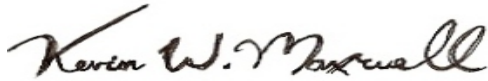
compressors; therefore, it is recommended to collect trend able vibration data on the compressor and inspect the compressor as time allows. Rated as a **CLASS II** defect.

90° Water HP Pump 2499

Unit has vibrations associated with misalignment. Ensure all foot bolts are secure, couplings are in good shape, and have an alignment performed as time allows. Rated as a **CLASS II** defect.

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

Sincerely,



Cell: 901-486-4565

Email: kwilliam@gohispeed.com