HI-SPEED INDUSTRIAL SERVICE

MILLINGTON, TN

June 8, 2021

Victor Foster
IFF
Memphis, TN

Subject: May 2021 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.

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

Observations

P1 CURD

3rd Extraction NX438 0715
Main drive motor has a high inboard vertical 1 x rpm vibration. Motor at the back of the unit is also showing signs of looseness. For now, inspect the belts for wear and proper tension, ensure all motor and motor base fasteners are tight, and inspect outboard smaller motor and coupling assemblies for looseness/wear and misalignment. Rated as a **CLASS II** defect for now.

1st Extraction NX438 0714
Motor appears to be missing the rubber isolators on the front motor feet. This is likely the cause of the high 1 x rpm vibration. **There is still a high vibration the back drive motor. Data of this motor shows looseness either in the motor or coupling. Inspect for these issues ASAP.** Rated as a **CLASS III** defect.

Concentrator #2 4495
1 x rpm vibration is slightly lower this month in the Centrifuge. Centrifuge bearing data also shows fit looseness is still present. Peakvue data also still indicates non-synchronous vibration with a fundamental of 7.97 orders of the DE bearing indicating a bearing issue in the DE. Rated as a **CLASS II** defect.

C30 #2 4381
Motor data is still showing electrical peaks in spectra. This could be an air gap issue, internal connection issue in the stator, rotor issues, or connection issue at the motor junction box. An online and offline PdMA test could help clarify this issue. We will continue to monitor this closely. Rated as a **CLASS II** defect.

1st Extraction 5400 4341
Motor DE bearing data is still showing a non-synchronous peak at 5.2 orders which is likely a harmonic of ball spin frequency. Peakvue and 1-20 kHz. are also showing increases in amplitude which are more indications of a bearing issue. It is recommended to replace the main drive motor at the earliest opportunity. Rated as a **CLASS III** defect.

Curd Pot Wet Grinder 4557
Unit remains to have 2 x rpm vibration. MIV amplitude is over 1 ips-pk. Inspect all fasteners and couplings ASAP. Rated as a **CLASS III** defect.

Extraction Tank Discharge Pump 4170
Motor continues to have a high 1 x vibration. 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.

East Extraction NX Pump 9321
Gear drive still has a high acceleration amplitudes. Gear drive appears to be defective. Replace gear drive as scheduling allows. Rated as a **CLASS II** defect.

P1 DRYER

Northwest Blowback Fan 1041
***Equipment was down this survey however, the following likely still applies*:** 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
***Equipment was down this survey however, the following likely still applies*:** Motor has elevated 1 x rpm vibration at 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.

Southwest Blow-Back Fan 1081
***Equipment was down this survey however, the following likely still applies*:** Motor is starting to show some ½ 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

Bogey Discharge Pump 4845
***Equipment was down this survey however, the following likely still applies*:** Motor vibration is lower; however, there is still 2 x rpm vibration in the motor. Motor fasteners and coupling should be checked as scheduling allows. Ensure base is properly secured and motor is aligned properly. Rated as a **CLASS II** defect.

P3 FEED DRYER

Collector Aspiration Fan 3026
Outboard fan bearing is showing a high 1 x rpm vibration that appears to fluctuate some each survey. Outboard fan bearing data shows some signs of bearing defects/wear. Bearings should be scheduled for replacement during next down time. Sheaves and belts may also be worn. Fan wheel also needs to be dynamically balanced. Rated as a **CLASS III** defect.

P3 DRYER

P1 Blender 6650
Data shows some high 1 x rpm in the motor while MIV shows a high 1 x and 2 x rpm vibration**. MOV has also increased from .9 to 2.18 ips-pk over the last month.** This is likely coupling related and/or flexible base/loose fasteners. Gearbox data shows some input rpm harmonics which indicates some looseness may be present internally in the gearbox and some gear related vibrations are also present in the gearbox. **It is highly recommended to replace coupling unit ASAP.** Because motor vibration has increased to 2 ips, this is rated as a **CLASS IV** defect.

Cooling Ring Fan 2448
Motor verticals are still showing high vertical vibration. Dominant 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 Baghouse Heater Fan 2680
The high vibrations in the fan bearings originally looked to be blade pass related. Data taken on 5/11/21 is more concise and now indicates bearing issues are present in this unit. Replace fan bearings as scheduling allows. Because of the increased amplitude over one month, this is rated as a **CLASS II** defect.

Product Collector Fan 2558
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.

P3 IDN

600 Bogey Vacuum Pump 6293
Vibration is high in the vertical direction of the motor and pump. Base is loose to the concrete which is likely the cause of the high vibration. Repair base as soon as practical and realign unit. Rated as a **CLASS III** defect.

600 Bogey Discharge Pump 6266
Motor and pump are showing signs of bearing defects and motor also has 2 x rpm vibration. Motor, pump, and couplings should be replaced during TAR. Rated as a **CLASS III** defect.

P3 Packaging

P3 Blender 2181
Motor data still shows some electrically related vibrations in the motor. This appears to be 1 x rotor bar pass frequency with 120 Hz. sidebands. This could be caused by internal rotor defects such as loose bars. We are watching this issue closely. Motor also has a 1 x rpm axial vibration that may be coupling related. As far as the gearbox goes, data still shows a high noise floor while amplitudes remain steady. We still suspect a possible gear issue. Inspect coupling and all fasteners as time allows. Rated as a **CLASS II** defect.

P3 CURD

C-30 #1 0085
Overall vibration of the centrifuge is slightly lower this month. Bowl is still showing some balance. Motor data is also showing some bearing defect frequencies present in the acceleration spectra of the motor inboard bearing. Unit needs attention soon. Rated as a **CLASS II** defect.

C-30 #3 0087
Inboard centrifuge horizontal has had a significant increase in 1 x rpm vibration. Peak amplitude is .73 ips-pk. This is likely imbalance of the centrifuge but may also be sheave related. Unit should be cleaned out and ensure sheaves are properly aligned. Rated as a **CLASS II** defect.

C-30 #4 0278
Bowl is likely out of balance. Overall vibration is near 1 ips-pk. Unit needs to be cleaned out ASAP. Rated as a **CLASS III** defect.

Concentrator #2 0097
Back-end bearings are defective and need to be replaced soon. Centrifuge also has some higher-than-normal vertical vibration. This may be structural but also is likely due to some imbalance of the centrifuge. Replace secondary bearings, clean out centrifuge, ensure couplings are in good shape, and ensure all fasteners are tight. Rated as a **CLASS III** defect.

Concentrator #3 0281
MIV remains near 1 ips-pk. Motor has high 1 x motor rpm vibration with some harmonics and electrical related vibrations (rotor bar pass) which may indicate rotor issue. Data also shows a high sub-harmonic vibration which is very concerning this survey. Online and offline PdMA testing may clarify this issue; however, we recommend that motor be swapped out at earliest opportunity. Rated as a **CLASS III** defect.

Concentrator #4 0282
New motor has higher acceleration than a newly rebuilt motor should have. Peaks are mainly electrically related. Appears to be rotor bar issue and an online and offline PdMA testing may clarify this issue. Centrifuge also has some 1 x rpm vibration still with 2, 3, 4, x rpm smaller peaks. Centrifuge bearings likely have some fit looseness. Rated as a **CLASS II** defect.

Concentrator #5 0283
High acceleration remains in the motor especially at the drive end. This appears to be electrically related. Online and offline PdMA testing may help clarify this issue. Centrifuge also has high inboard vertical vibration. High 1 x rpm peak indicates imbalance of the centrifuge. Rated as a **CLASS II** defect.

3rd Extraction 5400 0299
Centrifuge vibration is over 1.3 ips-pk. High 1 x rpm vibration suggests imbalance is present in the unit. Clean out centrifuge ASAP. Rated as a **CLASS III** defect.

5000 Desludger Discharge Pump 0291
Motor data indicates defects are present in the motor. Replace motor soon. Rated as a **CLASS III** defect.

Flottweg Decanter #1 9302
M3V has amplitude of 1 ips-pk. Vibration appears to be 1 x decanter speed. This may be sheave or belt related. Inspect sheaves and belts for wear, alignment, and ensure all fasteners are tight. Rated as a **CLASS III** defect.

Flottweg Decanter #2 9301
Outboard Decanter Bearing vibration has increased 1 x rpm vibration this month. Amplitude increased from .19 to .85 ips-pk. Unit likely needs to be cleaned and flushed. Rated as a **CLASS III** defect.

Flottweg Decanter #3 9300
Outboard Decanter Bearing vibration has amplitude over 1 ips in the vertical direction. Unit likely needs to be cleaned and flushed. Rated as a **CLASS III** defect.

Lime Slurry Pump 4714
High pump vibration was not present this survey, however, spectral data of the motor shows defects are present in the motor bearings. Pump data also shows some signs of bearing issue. Replace motor, pump, and coupling and ensure good alignment. Rated as a **CLASS II** defect.

300T MONTHLY

300T South Grinder 6421
Motor inboard axial vibration remains high. This may be sheave/structurally related. Ensure sheaves are not worn, aligned properly with minimal face run-out on the sheave and ensure belts are not worn and properly tensioned. Ensure adjustable motor base is not defective and all fasteners are tight. Motor also has some electrical vibrations. Rated as a **CLASS II** defect.

300T North Grinder 6417
1 x grinder rpm vibration in the grinder bearings has decreased some but verticals remain high at .7 ips-pk. Imbalance may still be present in the grinder assembly. It is also recommended to go through this unit inspecting all fasteners, sheaves/belts for issues. Rated as a **CLASS II** defect.

West Collector Asp Fan 7907
Motor has an increase in outboard vibration. MOV has dominant vibration is at 33 Hz with peak amplitude of 1.1 ips-pk which is very close to fan speed. For now, ensure all fasteners are tight, checks sheaves for misalignment and wear, and ensure belts are in good shape and properly tensioned. Because of the increased motor vibration, this is rated as a **CLASS III** defect.

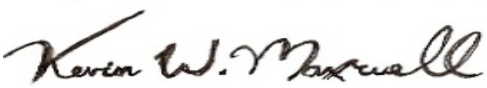
MAIN PLANT UTILITIES

Air Compressor #3 0820

Motor data shows harmonics of the driven shaft of the air end. This motor 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.

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,



HI-SPEED INDUSTRIAL SERVICE
QualiTest® Diagnostics
Cell: 901-486-4565
Email: kwilliam@gohispeed.com