HI-SPEED INDUSTRIAL SERVICE

MILLINGTON, TN

July 30, 2019

AECI Dell Power

Subject: July vibration service

Most of the machines surveyed were found to be in good condition with the exception of the following:

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.

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
Hi-Speed **Industrial Service**
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Detailed Defects

Boiler Feed Water Pump 2B

1x RPM vibration dominates several measurements in the Nelson Drive and the Pump outboard bearing housing. Shaft speed harmonics could indicate looseness and add to the vibrations. We recommend inspecting the couplings first for any damage or wear. All fasteners should also be checked for clamping torque, the structure for cracks or damaged grout, and have the alignment checked. **Rated a Class II Defect.**

Observations

LP Recirculating Pump Unit 1

Unit data shows bearing defects are present in the motor bearings. The motor will need to be changed in the future. **Rated a Class II Defect.**

LP Recirculating Pump Unit 2 Motor

High vibration above 1"/sec velocity peak in the axial most likely indicates excessive shaft misalignment and could lead to eventual motor failure, possibly within a short time frame. Bearing Fluting still is apparent, but is not the main concern here. **Rated a Class IV Defect.**

Vacuum Pump 1

The unit pump vibrations have leveled off at around 0.4"/sec velocity peak. This unit seems to be an issue when both pumps are running; allowing the pump to cavitate, which will cause undue wear in the unit. **Rated a Class II Defect.**

Cooling Tower Fan Motors 6, 8

Vibration data for the motor still shows an elevated rotor bar vibration above 3 g's RMS. No immediate action is required. **Rated a Class I Defect.**

Cooling Tower Fan Motor 7

Vibration data for the motor shows a dominant frequency of 10.5 Hz with an overall of 0.47"/sec velocity peak. We recommend a follow up structural inspection including fasteners and an alignment check. **Rated a Class II Defect.**

Cooling Tower Fan Motors

Vibration data for most of the cooling tower fan motors show a rotor bar vibration; for which the amplitude is low and not a concern to the continued health of the motor at this time. No actions are warranted **Rated a Class I Defect.**

Circulating Water Pump 1A
The pump has a 1xRPM vibration which has increased to just above 0.317”/sec velocity peak this survey. We will continue to monitor this unit for changes that might cause us to suggest service in the future.
Rated a Class I Defect.

STG Condensate Pump C
Data still shows a clean 3x RPM vibration modulating the shaft speed fundamental of about the same amplitude. The A pump is somewhat similar but small in amplitude and bias. The 3x RPM vibration has increased over time, but has not changed much recently. Ensure the pump is running near optimal point in the curve. Inspect the pump coupling and shaft as time allows. **Rated a Class 1 Defect.**

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                              Last Monitored Equipment List
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                         Database:  AECI Dell Power Plant.rbm
                               Area:      Coooling Tower
                          Report Date:  01-Aug-19   08:58
                        Report Interval:  02-Jul-19  To  01-Aug-19


                       PERIODIC VIBRATION TECHNOLOGY

                           Collected Equipment...

EQUIPMENT ID          DESCRIPTION          NUMBER OF POINTS   LATEST DATE
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CTW1        Cooling Tower Fan 1               7 OUT OF  7       24-Jul-19
CTW2        Cooling Tower Fan 2               7 OUT OF  7       24-Jul-19
CTW3        Cooling Tower Fan 3               7 OUT OF  7       24-Jul-19
CTW4        Cooling Tower Fan 4               7 OUT OF  7       24-Jul-19
CTW5        Cooling Tower Fan 5               7 OUT OF  7       24-Jul-19
CTW6        Cooling Tower Fan 6               7 OUT OF  7       24-Jul-19
CTW7        Cooling Tower Fan 7               7 OUT OF  7       24-Jul-19
CTW8        Cooling Tower Fan 8               7 OUT OF  7       24-Jul-19

                            Missed Equipment...

                       EQUIPMENT ID          DESCRIPTION
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              CTW9     Cooling Tower Fan 9               0 OUT OF  7
              CTW10    Cooling Tower Fan 10              0 OUT OF  7
              CTW11    Cooling Tower Fan 11              0 OUT OF  7
              CTW12    Cooling Tower Fan 12              0 OUT OF  7

                       Monitored Point Total =          56 OUT OF 84
                       Monitored Equipment Total =       8 OUT OF 12
                                    Last Monitored Equipment List
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                          Database:  AECI Dell Power Plant.rbm
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Area: WATER PUMPS AND VACUUM PUMPS
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

Collected Equipment...

EQUIPMENT ID	DESCRIPTION	NUMBER OF POINTS	LATEST DATE
3CW-P-001	Circ Water Pump 1A	9 OUT OF 11	24-Jul-19
3CW-P-002	Circ Water Pump 1B	9 OUT OF 11	24-Jul-19
LFAA2	LFAA 1B	9 OUT OF 11	24-Jul-19
3CW-P-004	CCW Booster Pump 2	11 OUT OF 11	24-Jul-19
0CC-P-001	CLosed Cooling Water 1	1 OUT OF 14	24-Jul-19
0CC-P-002	CLosed Cooling Water 2	14 OUT OF 14	24-Jul-19
OSW-P-001B	Service Water Pump 1B	14 OUT OF 14	24-Jul-19
ORW-P-001B	Deep Well Pump B	9 OUT OF 11	24-Jul-19
3AE-P-001	Vacuum Pump 1	14 OUT OF 14	24-Jul-19
3AE-P-002	Vacuum Pump 2	14 OUT OF 14	24-Jul-19

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
3CW-P-005	Aux Circ Water Pump	0 OUT OF 11
LFAA1	LFAA 1A	0 OUT OF 11
3CW-P-003	CCW Booster Pump 1	0 OUT OF 11
OSW-P-001A	Service Water Pump 1A	0 OUT OF 14
ORW-P-002A	Deep Well Pump A	0 OUT OF 11
ORW-P-001C	Deep Well Pump C	0 OUT OF 11
FW1	Fire Water Electric	0 OUT OF 14

Monitored Point Total = 104 OUT OF 208
Monitored Equipment Total = 10 OUT OF 17
Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: BOILER PUMPS FANS
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

Collected Equipment...

EQUIPMENT ID	DESCRIPTION	NUMBER OF POINTS	LATEST DATE
1FD-P-001A	Boiler Feed Water 1A	18 OUT OF 18	24-Jul-19
2FD-P-002B	Boiler Feed Water 2B	18 OUT OF 18	24-Jul-19
ABF	Aux Boiler Fan	7 OUT OF 7	24-Jul-19

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
1FD-P-001B	Boiler Feed Water 1B	0 OUT OF 18
2FD-P-002A	Boiler Feed Water 2A	0 OUT OF 18
3CH-P-001A	Condensate Pump A	0 OUT OF 11
3CH-P-001	Condensate Pump B	0 OUT OF 11
3CH-P-001C	Condensate PumpC	0 OUT OF 11

Monitored Point Total = 43 OUT OF 112
Monitored Equipment Total = 3 OUT OF 8

Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: CT Lube Oil Skid 1
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

Collected Equipment...

EQUIPMENT ID	DESCRIPTION	NUMBER OF POINTS	LATEST DATE
CT1	CT Lube Oil Pump 1	5 OUT OF 7	24-Jul-19
SO1	CT Seal Oil 1	7 OUT OF 7	24-Jul-19
CTHYD !	CT Hyd Pump 1	11 OUT OF 11	24-Jul-19

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
CT2	CT Lube Oil Pump 2	0 OUT OF 7
SODC	CT Seal Oil DC	0 OUT OF 7
CTHYD !1	CT Hyd Pump 2	0 OUT OF 11

Monitored Point Total = 23 OUT OF 50
Monitored Equipment Total = 3 OUT OF 6

Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: CT Lube Oil Skid 2
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

Collected Equipment...

EQUIPMENT ID	DESCRIPTION	NUMBER OF POINTS	LATEST DATE
CT1	CT Lube Oil Pump 1	5 OUT OF 7	24-Jul-19
SO1	CT Seal Oil 1	7 OUT OF 7	24-Jul-19
CTHYD !	CT Hyd Pump 1	7 OUT OF 11	24-Jul-19

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
CT2	CT Lube Oil Pump 2	0 OUT OF 7
SODC	CT Seal Oil DC	0 OUT OF 7
CTHYD !1	CT Hyd Pump 2	0 OUT OF 11

Monitored Point Total = 19 OUT OF 50
Monitored Equipment Total = 3 OUT OF 6

Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: STG Lube Oill Skid
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

Collected Equipment...

EQUIPMENT ID	DESCRIPTION	NUMBER OF POINTS	LATEST DATE
STG1	STG Lube Oil Pump 1	7 OUT OF 7	24-Jul-19
STGHyd1	STG Hyd Pump 1	11 OUT OF 11	24-Jul-19

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
STG2	STG Lube Oil Pump 2	0 OUT OF 7
STGHyd2	STG Hyd Pump 2	0 OUT OF 14

Monitored Point Total = 18 OUT OF 39
Monitored Equipment Total = 2 OUT OF 4

Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: Liquid Fuel NOX AND LP REC PUMP
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

Collected Equipment...

EQUIPMENT ID	DESCRIPTION	NUMBER OF POINTS	LATEST DATE
LP #1	LP recirc unit #1	14 OUT OF 14	24-Jul-19
LP #2	LP recirc unit #2	14 OUT OF 14	24-Jul-19

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
LFAAComp	LFAA Comp	0 OUT OF 7
LFAAPump	LFAA Pump	0 OUT OF 7
NOX	NOX Water Skid	0 OUT OF 22

Monitored Point Total = 28 OUT OF 64
Monitored Equipment Total = 2 OUT OF 5

Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: Chiller Module 1
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

No Collected Equipment...

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
TWP 101	Chiller Cooling Tower Pump 1	0 OUT OF 14
TWP 102	Chiller Cooling Tower Pump 2	0 OUT OF 14
CHWP 101	Chilled Water Pump 1	0 OUT OF 14
CHWP 102	Chilled Water Pump 2	0 OUT OF 14
Comp A	Chiller compressor Mtr. A	0 OUT OF 16
Comp Mtr B	Chiller compressor Mtr. B	0 OUT OF 15

Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: Chiller Module 2
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

Collected Equipment...

EQUIPMENT ID	DESCRIPTION	NUMBER OF POINTS	LATEST DATE
TWP 202	Chiller Cooling Tower Pump 2	10 OUT OF 14	24-Jul-19
CHWP 201	Chilled Water Pump 1	10 OUT OF 14	24-Jul-19
Comp Mtr B	Chiller compressor Mtr. B	14 OUT OF 15	24-Jul-19

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
TWP 201	Chiller Cooling Tower Pump 1	0 OUT OF 14

CHWP 202	Chilled Water Pump 2	0 OUT OF 14
Comp A	Chiller compressor Mtr. A	0 OUT OF 16

Monitored Point Total = 34 OUT OF 87
Monitored Equipment Total = 3 OUT OF 6
Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: Chiller Module 3
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

No Collected Equipment...

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
CT 1	Chiller Cooling Tower Pump 1	0 OUT OF 14
CT 2	Chiller Cooling Tower Pump 2	0 OUT OF 14
CWP!	Chilled Water Pump 1	0 OUT OF 14
CWP!1	Chilled Water Pump 2	0 OUT OF 14
Comp Mtr A	Chiller compressor Mtr. A	0 OUT OF 15
Comp Mtr B	Chiller compressor Mtr. B	0 OUT OF 15

Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
Area: OLD BOILER DO NOT USE
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

PERIODIC VIBRATION TECHNOLOGY

No Collected Equipment...

Missed Equipment...

EQUIPMENT ID	DESCRIPTION	
1FD-P-001B	Boiler Feed Water 1B	0 OUT OF 7
2FD-P-002A	Boiler Feed Water 2A	0 OUT OF 7
2FD-P-002B	Boiler Feed Water 2B	0 OUT OF 7

Last Monitored Equipment List
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Database: AECI Dell Power Plant.rbm
The Entire Database
Report Date: 01-Aug-19 08:58
Report Interval: 02-Jul-19 To 01-Aug-19

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********** OVERALL SUMMARY **********
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PERIODIC VIBRATION TECHNOLOGY

Collected Equipment...

Monitored Point Total = 325 OUT OF 694
Monitored Equipment Total = 34 OUT OF 64