EMDS
ELECTRO-MECHANICAL
DIAGNOSTIC SERVICES

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Mr. Thomas Chadwick
Indiana Government Center
302 W. Washington Street
Room E024 c/o Edwards
Indianapolis, IN 46204

November 7, 2013

Dear Mr. Chadwick,

On October 2, 2013 vibration data was collected on the equipment in your facility. The following report is a list of those machines found to be in exception and specific recommendations to correct the problems found.

On behalf of EMDS, I would like to thank you for the opportunity to be of service. If you have any questions or comments about this report, feel free to call at any time.

Sincerely,

Douglas J. Coffman

Douglas J. Coffman
Electro-Mechanical
Diagnostic Services, Inc.

Machine	Priority	Recommendations
AHU 26 Penthouse Fan Section C	2	The spectral data on the motor bearings, in both the axial and radial directions, indicates an elevated 1X turning speed vibration velocity fed back from the fan; the velocity is in excess of .6in/sec in the axial direction. Verify that all motor and fan hold down bolts are tight. Verify that the support structures and vibration isolation devices are intact and in good order. Inspect the belts and fan / motor sheaves for abnormal wear and damage; paying close attention to the fan sheave. Verify that the sheaves are properly aligned and check sheave axial and radial run out. **NOTE: This motor has had an issue for some time causing the through bolts to loosen and fall out. The source of the offending vibration needs to be corrected before significant system damage occurs.**
AHU 14 LL Section H	2	The spectral data on the fan outboard bearing indicates an elevated imbalance of 4.9 mils. The imbalance has not shown an increase however; fan life will be extended by reducing the imbalance. Clean and balance the fan to 1 mil or less.
Chill Water Pump 1 Basement DWD	2	The spectral data, on the pump outboard bearing, indicates a defect frequency and its harmonics extending into the high frequency range consistent with an outer race defect. In addition, the time domain indicates impacting in excess of 5 g's peak. Replace the pump bearings.

Machine	Priority	Recommendations
AHU 1 Supply Fan 1 Penthouse	2	The spectral data, on the motor outboard bearing in the axial direction, indicates and elevated and increasing motor 1X turning speed vibration velocity. In addition, the spectral data on the fan outboard bearing, indicates an elevated fan 2X turning speed vibration velocity. Verify that all motor, fan and fan bearing hold down bolts are tight and inspect the support structure integrity. Inspect the motor and fan sheaves for abnormal wear and damage. Check the axial and radial run out of the sheaves and verify proper motor / fan sheave alignment. Ensure that the fan belts are not over-tensioned. Verify that the fan bearings are properly aligned to the fan shaft.
AHU 1 Supply Fan 2 Penthouse	2	The spectral data continues to show an elevated 1X motor turning speed vibration velocity present on the motor bearings in both the axial and radial directions. Verify that all motor and fan hold down bolts are tight and inspect the mounting structure integrity. Verify that the vibration isolation devices are in good condition. Verify that the fan belts are not over-tensioned. Check the motor and fan sheave axial and radial run out and verify sheave alignment.
Return Fan 2A Penthouse West End	2	The spectral data on the fan bearings indicates an elevated 2X fan turning speed vibration velocity. Check the axial and radial run out of the sheaves; pay close attention to the fan sheave. Verify that the sheaves are properly aligned and that the fan belts are not over-tensioned. Verify that the fan bearings are properly aligned to the fan shaft.

Machine	Priority	Recommendations
Return Fan 2B Penthouse West End	2	The spectral data on the fan outboard bearing, in the axial direction, indicates an elevated 2X fan turning speed vibration velocity. Verify that the motor and fan sheaves are properly aligned and that the belts are not over-tensioned.
AHU 3 Supply Fan 4th Floor Library	2	The spectral data on the motor inboard bearing indicates non-synchronous harmonics extending into the high frequency range consistent with an outer race defect while the time domain indicates impacting in excess of 4g's peak. In addition the spectral data on the fan bearings indicate broad band energy consistent with a lubrication issue. Replace the motor bearings and ensure the fan bearings are properly lubricated.

Notes:

Return Fan 3B Penthouse – The spectral data on the motor outboard bearing indicates the early stages of bearing defects. The activity appears to be caused by electrical fluting. No action is warranted at this time, however the unit will remain on the watch list.

Heating Hot Water Pump 1 South Steam Room – The spectral data on the motor bearings indicates frequencies consistent with an outer race defect. The activity has increased but does not appear to warrant action at this time. Monitor the unit for increased signs of noise and heat that would indicate defect progression. The unit has been placed on the watch list.

Indiana Government Center Status Legend	Condition Summary	
		Machine OK
		Critical Problem
		Minor Problem
		Machine Out of Service - OK Last Check
		Machine Out of Service - Problem Last Check
		Machine Improved
		Overdue for Monitoring (>12 months)

Machine			Latest Recommendations
AH 1B LL E GENERATOR ROOM			
CHILL WATR PUMP A1 CHILL RM			
CHILL WATR PUMP A2 CHILL RM			
AHU 14 LL SECTION H			Clean and balance the fan
AHU 15 LL SECTION H			
CHILL WATER PUMP 1 BASEMENT DWD			Replace pump bearings
CHILL WATER PUMP 2 BASEMENT DWD			
AHU1 RETURN FAN 1 PENTHOUSE			
AHU1 RETURN FAN 2 PENTHOUSE			
AHU 1 SUPPLY FAN 1 PENTHOUSE			Sheave / alignment issues
AHU 1 SUPPLY FAN 2 PENTHOUSE			Sheave / alignment issues
CONDENSER WATR PMP22 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP23 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP24 CHILL RM			**Overdue for monitoring**
AHU 6 LL SECTION B			
AHU 5 LL SECTION B			
AHU 1 LL SECTION A			Suspect motor bearing fluting, Unit placed on the watch list.
AHU 7 LL E EXECUTIVE GARAGE			
AHU 18A 3RD FL SECT E			
AHU 18B 3RD FL SECT E			
RETURN FAN 18 3RD FL SECT E			
AHU 19A 3RD FL SECT A			
AHU 19B 3RD FL SECT A			
RETURN FAN 19 3RD FL SECT A			
AHU 20A 3RD FL SECT B			
AHU 20B 3RD FL SECT B			
RETURN FAN 20 3RD FL SECT B			
AHU 23A 3RD FL SECT F			
AHU 23B 3RD FL SECT F			
RETURN FAN 23 3RD FL SECT F			
AHU 24A 3RD FL SECT G			
AHU 24B 3RD FL SECT G			

RETURN FAN 24 3RD FL SECT G			
AHU 21A 3RD FL SECT B			
AHU 21B 3RD FL SECT B			
RETURN FAN 21 3RD FL SECT B			
AHU 22A 3RD FL SECT H			
AHU 22B 3RD FL SECT H			
RETURN FAN 22 3RD FL SECT H			
AHU 26 PENTHOUSE SECT C			Verify hold down bolts are tight, inspect sheaves and isolation devices and verify sheave alignment.
AHU 25 PENTHOUSE SECT B			
RETURN FAN 2A PENTHOUSE W END			Verify sheave alignment, verify fan bearings are aligned to the fan shaft.
RETURN FAN 2B PENTHOUSE W END			Verify sheave alignment
HEATING HWP 18 PENTHOUSE			
HEATING HWP 19 PENTHOUSE			
SUPPLY FAN 1A PENTHOUSE			
SUPPLY FAN 1B PENTHOUSE			
SUPPLY FAN 2A PENTHOUSE			
SUPPLY FAN 2B PENTHOUSE			
SUPPLY FAN 3A PENTHOUSE			
SUPPLY FAN 3B PENTHOUSE			
RETURN FAN 3A PENTHOUSE			
RETURN FAN 3B PENTHOUSE			MOH suspected electrical fluting
AH 1A LL W GENERATOR ROOM			
FIRE PUMP 1 SOUTH STEAM ROOM			
BOOSTER PUMP4 SOUTH STEAM RM			
BOOSTER PUMP5 SOUTH STEAM RM			
HEATING HWP 1 SOUTH STEAM RM			Early motor bearing defects - monitor
HEATING HWP 2 SOUTH STEAM RM			
HEATING HWP 3 SOUTH STEAM RM			
FIRE PUMP 1 NORTH STEAM ROOM			
BOOSTER PUMP1 NORTH STEAM RM			**Overdue for monitoring**
BOOSTER PUMP2 NORTH STEAM RM			**Overdue for monitoring**
AH B1 NORTH STEAM ROOM			
DATA CTR PMP1 NORTH STEAM RM			
DATA CTR PMP2 NORTH STEAM RM			**Overdue for monitoring**
DATA CTR PMP3 NORTH STEAM RM			**Overdue for monitoring**
CHWP 1 NORTH STEAM ROOM			
CHWP 2 NORTH STEAM ROOM			
CHWP 3 NORTH STEAM ROOM			
AHU 8A LL SECTION E			
AHU 12 LL SECTION G			
AHU 13 LL SECTION G			Fan access dangerous, no data
CWP-1 BASEMENT LIBRARY			
CWP-2 BASEMENT LIBRARY			.
SECONDARY PMP 1 LIB 4TH FLR			**Overdue for monitoring**
SECONDARY PMP 2 LIB 4TH FLR			**Overdue for monitoring**

AHU1 SUPPLY 4TH FLOOR LIB			
AHU1 RETURN 4TH FLOOR LIB			
AHU2 SUPPLY 4TH FLOOR LIB			
AHU2 RETURN 4TH FLOOR LIB			
AHU3 SUPPLY 4TH FLOOR LIB			Replace motor bearings / lubricate fan bearings
AHU3 RETURN 4TH FLOOR LIB			
AHU4 SUPPLY BASEMENT LIB			
AHU4 RETURN BASEMENT LIB			Suspected electrical fluting on motor bearings – watch list.
FIRE PUMP 1 HISTORICAL SOC			

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Mr. Thomas Chadwick
Indiana Government Center
302 W. Washington Street
Room E024 c/o Edwards
Indianapolis, IN 46204

April 22, 2014

Dear Mr. Chadwick,

On April 11, 2014 vibration data was collected on the equipment in your facility. The following report is a list of those machines found to be in exception and specific recommendations to correct the problems found.

On behalf of EMDS, I would like to thank you for the opportunity to be of service. If you have any questions or comments about this report, feel free to call at any time.

Sincerely,

James M. Renner
Electro-Mechanical
Diagnostic Services, Inc.

Machine	Priority	Recommendations
AHU 26 Penthouse Fan Section C	2	There is an excessive vibration on the motor at about 1014 CPM. I suspect that this is fan 1X turning speed vibration being transmitted from the fan; the velocity is in excess of .5in/sec on the motor drive end and nearly 0.4 in/sec on the outboard. The vibration in the motor axial has dropped considerably. This is likely being transferred through the support structure with some fan sheave eccentricity possible. Verify that all motor and fan hold down bolts are tight. Verify that the support structures and vibration isolation devices are not broken, damaged, or excessively worn. Check for weak springs and proper adjustment. Check the motor mounting and support for damage and loose, broken, or missing bolts; pay particular attention to the adjustment base. Inspect the fan sheave for abnormal wear and damage. Check fan sheave axial and radial run out; be sure to check run out in the sheave grooves. Verify that the sheaves are properly aligned. **NOTE: This motor has had an issue for some time causing the through bolts to loosen and fall out. The source of the offending vibration needs to be corrected before significant system damage occurs.**
AHU 14 LL Section H	2	The spectral data on the fan outboard bearing shows an increase in imbalance to nearly 6 mils. Fan life will be extended by reducing the imbalance. Clean and balance the fan to 1 mil or less.

Machine	Priority	Recommendations
Chill Water Pump 1 Basement DWD	2	The spectral data, on the pump outboard bearing, indicates a defect frequency and its harmonics extending into the high frequency range consistent with an outer race defect. In addition, the time domain contains peaks in excess of 7 g's and the drive end is now on the rise. This indicates, however slowly, that the bearing condition is slowly worsening. Replace the pump bearings.
AHU 1 Supply Fan 1 Penthouse	2	The spectral data on both motor bearings shows a considerable motor 1X turning speed vibration, even though it is a little lower than last check. In addition, the spectral data on the fan outboard bearing still indicates an elevated fan 2X turning speed vibration velocity. Verify that all motor, fan and fan bearing hold down bolts are tight and inspect the support structure integrity. Inspect the motor and fan sheaves for abnormal wear and damage. Check the axial and radial run out of the sheaves and verify proper motor / fan sheave alignment. Check fan shaft run out near each bearing. Ensure that the fan belts are not over-tensioned. Verify that the fan bearings are properly aligned to the fan shaft.
AHU 3 Supply Fan 4th Floor Library	2	The spectral data on both motor bearings indicate non-synchronous harmonics extending into the high frequency range consistent with an outer race defect while the time domain indicates impacting in excess of 4g's peak. In addition the spectral data on the fan bearings indicate broad band energy consistent with a lubrication issue. Replace the motor bearings and ensure the fan bearings are properly lubricated.

Notes:

Return Fan 3B Penthouse – The spectral data on the motor outboard bearing indicates the early stages of bearing defects. The activity appears to be caused by electrical fluting. No action is warranted at this time, however the unit will remain on the watch list.

Heating Hot Water Pump 1 South Steam Room – The spectral data on the motor bearings indicates frequencies consistent with an outer race defect, but the signature is typical of that produced by electrical fluting of bearings. The activity remains about the same and does not appear to warrant action at this time. Monitor the unit for increased signs of noise and heat that would indicate defect progression. The unit has been placed on the watch list.

Indiana Government Center Status Legend	Condition Summary
	Machine OK
	Critical Problem
	Minor Problem
	Machine Out of Service - OK Last Check
	Machine Out of Service - Problem Last Check
	Machine Improved
	Overdue for Monitoring (>12 months)

Machine			Latest Recommendations
AH 1B LL E GENERATOR ROOM			**Overdue for monitoring**
CHILL WATR PUMP A1 CHILL RM			
CHILL WATR PUMP A2 CHILL RM			
AHU 14 LL SECTION H			Clean and balance the fan
AHU 15 LL SECTION H			
CHILL WATER PUMP 1 BASEMENT DWD			Replace pump bearings
CHILL WATER PUMP 2 BASEMENT DWD			
AHU1 RETURN FAN 1 PENTHOUSE			
AHU1 RETURN FAN 2 PENTHOUSE			
AHU 1 SUPPLY FAN 1 PENTHOUSE			Sheave / alignment issues
AHU 1 SUPPLY FAN 2 PENTHOUSE			
CONDENSER WATR PMP22 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP23 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP24 CHILL RM			**Overdue for monitoring**
AHU 6 LL SECTION B			
AHU 5 LL SECTION B			
AHU 1 LL SECTION A			Suspect motor bearing fluting, Unit placed on the watch list.
AHU 7 LL E EXECUTIVE GARAGE			
AHU 18A 3RD FL SECT E			
AHU 18B 3RD FL SECT E			
RETURN FAN 18 3RD FL SECT E			
AHU 19A 3RD FL SECT A			
AHU 19B 3RD FL SECT A			Motor bearing fluting – Unit placed on watch list
RETURN FAN 19 3RD FL SECT A			
AHU 20A 3RD FL SECT B			
AHU 20B 3RD FL SECT B			
RETURN FAN 20 3RD FL SECT B			
AHU 23A 3RD FL SECT F			
AHU 23B 3RD FL SECT F			
RETURN FAN 23 3RD FL SECT F			
AHU 24A 3RD FL SECT G			
AHU 24B 3RD FL SECT G			

RETURN FAN 24 3RD FL SECT G			
AHU 21A 3RD FL SECT B			
AHU 21B 3RD FL SECT B			
RETURN FAN 21 3RD FL SECT B			
AHU 22A 3RD FL SECT H			
AHU 22B 3RD FL SECT H			
RETURN FAN 22 3RD FL SECT H			
AHU 26 PENTHOUSE SECT C			Verify hold down bolts are tight, inspect sheaves and isolation devices and verify sheave alignment.
AHU 25 PENTHOUSE SECT B			
RETURN FAN 2A PENTHOUSE W END			
RETURN FAN 2B PENTHOUSE W END			
HEATING HWP 18 PENTHOUSE			
HEATING HWP 19 PENTHOUSE			
SUPPLY FAN 1A PENTHOUSE			
SUPPLY FAN 1B PENTHOUSE			
SUPPLY FAN 2A PENTHOUSE			
SUPPLY FAN 2B PENTHOUSE			
SUPPLY FAN 3A PENTHOUSE			
SUPPLY FAN 3B PENTHOUSE			
RETURN FAN 3A PENTHOUSE			Electrical fluting both motor bearings
RETURN FAN 3B PENTHOUSE			MOH suspected electrical fluting
AH 1A LL W GENERATOR ROOM			
FIRE PUMP 1 SOUTH STEAM ROOM			
BOOSTER PUMP4 SOUTH STEAM RM			
BOOSTER PUMP5 SOUTH STEAM RM			
HEATING HWP 1 SOUTH STEAM RM			Early motor bearing defects/possible fluting - monitor
HEATING HWP 2 SOUTH STEAM RM			
HEATING HWP 3 SOUTH STEAM RM			
FIRE PUMP 1 NORTH STEAM ROOM			
BOOSTER PUMP1 NORTH STEAM RM			**Overdue for monitoring**
BOOSTER PUMP2 NORTH STEAM RM			**Overdue for monitoring**
AH B1 NORTH STEAM ROOM			
DATA CTR PMP1 NORTH STEAM RM			
DATA CTR PMP2 NORTH STEAM RM			**Overdue for monitoring**
DATA CTR PMP3 NORTH STEAM RM			**Overdue for monitoring**
CHWP 1 NORTH STEAM ROOM			
CHWP 2 NORTH STEAM ROOM			
CHWP 3 NORTH STEAM ROOM			
AHU 8A LL SECTION E			
AHU 12 LL SECTION G			
AHU 13 LL SECTION G			Fan access dangerous, no data
CWP-1 BASEMENT LIBRARY			
CWP-2 BASEMENT LIBRARY			.
SECONDARY PMP 1 LIB 4TH FLR			**Overdue for monitoring**
SECONDARY PMP 2 LIB 4TH FLR			**Overdue for monitoring**

AHU1 SUPPLY 4TH FLOOR LIB			
AHU1 RETURN 4TH FLOOR LIB			
AHU2 SUPPLY 4TH FLOOR LIB			
AHU2 RETURN 4TH FLOOR LIB			
AHU3 SUPPLY 4TH FLOOR LIB			Replace motor bearings / lubricate fan bearings
AHU3 RETURN 4TH FLOOR LIB			
AHU4 SUPPLY BASEMENT LIB			
AHU4 RETURN BASEMENT LIB			Suspected electrical fluting on motor bearings – watch list.
FIRE PUMP 1 HISTORICAL SOC			.

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Mr. Mike Carroll
Indiana Government Center
302 W. Washington Street
Room E024 c/o Edwards
Indianapolis, IN 46204

August 12, 2015

Dear Mr. Carroll,

On July 10, 2015 vibration data was collected on the equipment in your facility. The following report is a list of those machines found to be in exception and specific recommendations to correct the problems found.

On behalf of EMDS, I would like to thank you for the opportunity to be of service. If you have any questions or comments about this report, feel free to call at any time.

Sincerely,

Douglas J. Coffman

Douglas J. Coffman
Electro-Mechanical
Diagnostic Services, Inc.

Machine	Priority	Recommendations
Fire Pump 1 North Steam Room	1	The spectral data, on the pump inboard bearing, indicates non-synchronous harmonics, extending into the high frequency range, consistent with an outer race defect. The time domain indicates peaks in excess of 20g's. Bearing contamination and race defects are suspect; replace the pump bearings and ensure the bearings are routinely lubricated to prevent moisture ingress and contamination.
AHU 4 Return Fan Basement Library	1	The spectral data, on the motor bearings, indicates an elevated noise floor with non-synchronous harmonics extending into the high frequency range. In addition, the time domain indicates peak acceleration levels in excess of 10g's. Inspect the motor sheave for excessive wear and check the belts for glazing and subsequent slippage on the motor sheave. If these items are in good order, motor bearing replacement would be warranted as the Maximum Peak Acceleration trend is well above historic levels. Motor bearing electrical fluting is expected.

Machine	Priority	Recommendations
AHU 15 LL Section H	2	The spectral data, on the motor inboard and fan inboard bearings in the radial direction, indicates an elevated 2X fan turning speed velocity. In addition, the spectral data on the motor inboard bearing in the axial direction indicates sub-synchronous frequencies that are most likely related to drive belt vibration. Inspect the fan and motor sheaves for wear and damage and measure the axial and radial run out to ensure the sheaves are not cocked on the shaft; pay close attention to the fan sheave. Verify the sheaves are properly aligned. Inspect the drive belts for wear and damage, replace as required. Ensure the drive belts are not over-tensioned; ensure they are tensioned to the manufacturer's specifications.
Chill Water Pump 1 Basement DWD	2	The spectral data, on the pump outboard bearing, indicates the fundamental frequency of an outer race defect with harmonics extending into the high frequency range. In addition, the time domain contains peaks in excess of 5 g's To prevent unexpected downtime, replace the pump bearings.

Machine	Priority	Recommendations
AHU 1 Supply Fan 1 Penthouse	2	The spectral data, on both motor bearings, indicates an elevated 1X motor turning speed velocity. In addition, the spectral data on the fan outboard bearing still indicates an elevated fan 2X turning speed vibration velocity. Verify that all motor, fan and fan bearing hold down bolts are tight and inspect the support structure integrity. Inspect the motor and fan sheaves for abnormal wear and damage. Check the axial and radial run out of the sheaves and verify proper motor / fan sheave alignment. Check fan shaft run out near each bearing. Verify that the fan bearings are properly aligned to the fan shaft. Once these check are complete, release the belt tension and re-tension to the manufacture's specification; belt over-tension is in question.
AHU 1 Supply Fan 2 Penthouse	2	The spectral data, on the motor bearings in both the axial and radial directions, indicates an elevated 1X turning speed velocity; the highest value is 0.4 in/sec in the axial direction. Operating under these conditions will shorten the useful life of the motor bearings. Verify that all mounting hardware is tight and inspect the support structures for defects. Measure the axial and radial run out of the motor and fan sheaves, paying close attention to the motor sheave, to ensure the sheaves are not cocked on the shaft. Verify that the sheaves are properly aligned. Once these checks are complete, release the belt tension and re-tension to the manufacturer's specifications.

Machine	Priority	Recommendations
AHU1 LL Section A	2	The spectral data, on the motor bearings, indicates an elevated fan 1X turning speed velocity. In addition, the spectral data indicates broad banded noise while the time domain indicates high peak acceleration levels in excess of 10g's. Sheave, motor bearing electrical fluting and fan imbalance issues are present. Verify that all motor and fan mounting hardware is tight and inspect the support structures for damage. Inspect the motor and fan sheaves for wear and damage then check the axial and radial run out to ensure the shaves have not become cocked. Verify proper sheave alignment. Release the belt tension and hand roll the motor shaft checking for abnormal noise or movement. Electrical fluting is expected on the motor bearings; electrical fluted bearings can run with excessive acceleration levels for extended periods. However; if abnormal noise or movement is detected while hand rolling the motor shaft, bearing replacement would be warranted to prevent unexpected downtime. Once these checks are complete, clean and balance the fan; the current fan imbalance is 5.3 mils peak to peak.
AHU 25 Penthouse Sect B	2	The spectral data, on the motor inboard bearing, indicates an elevated 2X fan turning speed velocity in excess of 0.5in/sec. Verify that all motor and fan hold down bolts are tight and inspect the support structures for damage. Inspect the motor and fan sheaves for wear and damage and check the axial and radial run out, then verify sheave alignment. Verify the belts are not over-tensioned and that the tension is set to the manufacturer's recommendations.

Machine	Priority	Recommendations
AHU-8A LL Section E	2	The spectral data, on the motor inboard bearing, indicates a fan 2X turning speed velocity in excess of 0.64 in/sec. Verify that all motor and fan hold down bolts are tight and inspect the support structures for damage. Inspect the motor and fan sheaves for wear and damage and then measure the axial and radial run out; pay close attention to the fan sheave. Verify that the sheaves are properly aligned. Once these checks are complete, ensure the drive belts are tensioned to the manufacturer's recommendations; belt over-tension is suspect as well as a worn / cocked fan sheave.

Machine	Priority	Recommendations
AHU 3 Supply Fan 4th Floor Library	2	The spectral data, on the motor bearings in both the axial and radial directions, indicates a significant 1X motor turning speed velocity; the highest value is 0.9in/sec on the motor outboard bearing in the radial direction. The motor 1X velocity is also elevated on the fan bearings. System resonance, vibration isolator and sheave issues are suspect. Verify that all motor and fan hold down bolts are tight and inspect the support structures for defects. Inspect the vibration isolation devices for broken and bottomed out springs; replace as required. Inspect the motor and fan sheaves for wear / damage and measure the axial and radial run out; pay close attention to the motor sheave. Ensure the drive belts are not over-tensioned; tension to the manufacture's recommendations. **NOTE: Once these items are corrected, the motor bearings will need to be re-evaluated for race defects. Operation at the current vibration levels will shorten the useful life of the motor and fan bearings.**

Notes:

AHU 14 LL Section H Fan – The fan imbalance, on the fan outboard bearing, is currently 3.9 mils peak to peak. This is a little excessive; fan bearing life could be extended by cleaning and balancing the fan wheel. The unit has been placed on the watch list.

Return Fan 3B Penthouse – The spectral data on the motor outboard bearing indicates the early stages of bearing defects. The activity appears to be caused by electrical fluting. No action is warranted at this time, however the unit will remain on the watch list.

Heating Hot Water Pump 1 South Steam Room – The spectral data on the motor bearings indicates frequencies consistent with an outer race defect, but the signature is typical of that produced by electrical fluting of bearings. The activity remains about the same and does not appear to warrant action at this time. Monitor the unit for increased signs of noise and heat that would indicate defect progression. The unit has been placed on the watch list. **Not in service this survey.**

Indiana Government Center Status Legend	Condition Summary
	Machine OK
	Critical Problem
	Minor Problem
	Machine Out of Service - OK Last Check
	Machine Out of Service - Problem Last Check
	Machine Improved
	Overdue for Monitoring (>12 months)

Machine			Latest Recommendations
AH 1B LL E GENERATOR ROOM			**Overdue for monitoring**
CHILL WATR PUMP A1 CHILL RM			**Overdue for monitoring**
CHILL WATR PUMP A2 CHILL RM			**Overdue for monitoring**
AHU 14 LL SECTION H			Fan outboard imbalance at 3.9 mils – watch list see notes section.
AHU 15 LL SECTION H			Check sheave alignment inspect belts
CHILL WATER PUMP 1 BASEMENT DWD			Replace pump bearings
CHILL WATER PUMP 2 BASEMENT DWD			**Overdue for monitoring**
AHU1 RETURN FAN 1 PENTHOUSE			
AHU1 RETURN FAN 2 PENTHOUSE			
AHU 1 SUPPLY FAN 1 PENTHOUSE			Sheave / alignment issues
AHU 1 SUPPLY FAN 2 PENTHOUSE			Inspect motor mounting hardware
CONDENSER WATR PMP22 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP23 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP24 CHILL RM			**Overdue for monitoring**
AHU 6 LL SECTION B			
AHU 5 LL SECTION B			Impacting on the fan outboard bearing is developing. Unit placed on the watch list.
AHU 1 LL SECTION A			See analyst notes
AHU 7 LL E EXECUTIVE GARAGE			
AHU 18A 3RD FL SECT E			
AHU 18B 3RD FL SECT E			
RETURN FAN 18 3RD FL SECT E			
AHU 19A 3RD FL SECT A			
AHU 19B 3RD FL SECT A			Motor bearing fluting – Watch list
RETURN FAN 19 3RD FL SECT A			
AHU 20A 3RD FL SECT B			
AHU 20B 3RD FL SECT B			
RETURN FAN 20 3RD FL SECT B			
AHU 23A 3RD FL SECT F			
AHU 23B 3RD FL SECT F			
RETURN FAN 23 3RD FL SECT F			
AHU 24A 3RD FL SECT G			
AHU 24B 3RD FL SECT G			

RETURN FAN 24 3RD FL SECT G			
AHU 21A 3RD FL SECT B			
AHU 21B 3RD FL SECT B			
RETURN FAN 21 3RD FL SECT B			
AHU 22A 3RD FL SECT H			
AHU 22B 3RD FL SECT H			
RETURN FAN 22 3RD FL SECT H			
AHU 26 PENTHOUSE SECT C			Unit operating normally
AHU 25 PENTHOUSE SECT B			Sheave / alignment issues
RETURN FAN 2A PENTHOUSE W END			
RETURN FAN 2B PENTHOUSE W END			
HEATING HWP 18 PENTHOUSE			
HEATING HWP 19 PENTHOUSE			
SUPPLY FAN 1A PENTHOUSE			
SUPPLY FAN 1B PENTHOUSE			
SUPPLY FAN 2A PENTHOUSE			
SUPPLY FAN 2B PENTHOUSE			
SUPPLY FAN 3A PENTHOUSE			
SUPPLY FAN 3B PENTHOUSE			
RETURN FAN 3A PENTHOUSE			
RETURN FAN 3B PENTHOUSE			
AH 1A LL W GENERATOR ROOM			**Overdue for monitoring**
FIRE PUMP 1 SOUTH STEAM ROOM			
BOOSTER PUMP4 SOUTH STEAM RM			
BOOSTER PUMP5 SOUTH STEAM RM			**Overdue for monitoring**
HEATING HWP 1 SOUTH STEAM RM			Early motor bearing defects/possible fluting - monitor
HEATING HWP 2 SOUTH STEAM RM			
HEATING HWP 3 SOUTH STEAM RM			**Overdue for monitoring**
FIRE PUMP 1 NORTH STEAM ROOM			Replace pump bearings
BOOSTER PUMP1 NORTH STEAM RM			**Overdue for monitoring**
BOOSTER PUMP2 NORTH STEAM RM			**Overdue for monitoring**
AH B1 NORTH STEAM ROOM			
DATA CTR PMP1 NORTH STEAM RM			**Overdue for monitoring**
DATA CTR PMP2 NORTH STEAM RM			**Overdue for monitoring**
DATA CTR PMP3 NORTH STEAM RM			**Overdue for monitoring**
CHWP 1 NORTH STEAM ROOM			**Overdue for monitoring**
CHWP 2 NORTH STEAM ROOM			
CHWP 3 NORTH STEAM ROOM			
AHU 8A LL SECTION E			Sheave / alignment issues
AHU 8B LL SECTION E			Suspected resonance at the current operating speed -- Placed on the watch list.
AHU 12 LL SECTION G			
AHU 13 LL SECTION G			
CWP-1 BASEMENT LIBRARY			**Overdue for monitoring**
CWP-2 BASEMENT LIBRARY			**Overdue for monitoring**
SECONDARY PMP 1 LIB 4TH FLR			**Overdue for monitoring**
SECONDARY PMP 2 LIB 4TH FLR			**Overdue for monitoring**

AHU1 SUPPLY 4TH FLOOR LIB			
AHU1 RETURN 4TH FLOOR LIB			
AHU2 SUPPLY 4TH FLOOR LIB			
AHU2 RETURN 4TH FLOOR LIB			Impacting developing on the fan inboard bearing – Placed on the watch list.
AHU3 SUPPLY 4TH FLOOR LIB			Check mounting hardware and vibration isolators.
AHU3 RETURN 4TH FLOOR LIB			
AHU4 SUPPLY BASEMENT LIB			
AHU4 RETURN BASEMENT LIB			Inspect belts for glazing / replace motor bearings.
FIRE PUMP 1 HISTORICAL SOC			.

EMDS
ELECTRO-MECHANICAL DIAGNOSTIC SERVICES

Powered by Service, Quality and Value

Mr. Mike Carroll
Indiana Government Center
302 W. Washington Street
Room E024 c/o Edwards
Indianapolis, IN 46204

June 7, 2016

Dear Mr. Carroll,

On March 10, 2016 vibration data was collected on the equipment in your facility. The following report is a list of those machines found to be in exception and specific recommendations to correct the problems found.

On behalf of EMDS, I would like to thank you for the opportunity to be of service. If you have any questions or comments about this report, feel free to call at any time.

Sincerely,

Douglas J. Coffman

Douglas J. Coffman
Electro-Mechanical
Diagnostic Services, Inc.

Machine	Priority	Recommendations
AHU1 LL Section A	1	The spectral data, on the motor bearings, indicates increasing non-synchronous harmonics while the time domain indicates an increase in peak acceleration levels to 15g's. The motor bearings appear to have significant fluting. Replace the motor to prevent unexpected downtime. Fan imbalance is above preferred levels but has remains stable. Inspection of the fan mounting hardware and support structures is recommended. Fan balancing would extend the useful life of the fan bearings.
Fire Pump 1 North Steam Room	1	The spectral data, on the pump inboard bearing, indicates non-synchronous harmonics extending into the high frequency range consistent with an outer race defect. The time domain indicates peaks in excess of 20g's. Bearing contamination and race defects are suspect; replace the pump bearings and ensure the bearings are routinely lubricated to prevent moisture ingress and contamination.
AHU 4 Return Fan Basement Library	1	The spectral data, on the motor bearings, continues to indicate an elevated noise floor with non-synchronous harmonics extending into the high frequency range. In addition, the time domain indicates increasing peak acceleration levels that have reached 12g's. Inspect the motor sheave for excessive wear and check the belts for glazing and subsequent slippage on the motor sheave. If these items are in good order, motor bearing replacement would be recommended as the Maximum Peak Acceleration trend is well above historic levels.

Machine	Priority	Recommendations
AHU 1 Supply Fan 1 Penthouse	2	The spectral data, on both motor bearings, indicates an elevated 1X motor turning speed velocity. In addition, the spectral data on the fan outboard bearing continues to indicate an elevated fan 2X turning speed velocity. Verify that all motor, fan and fan bearing hold down bolts are tight and inspect the support structure integrity. Inspect the motor and fan sheaves for abnormal wear and damage. Check the axial and radial run out of the sheaves and verify proper motor / fan sheave alignment. Check fan shaft run out near each bearing. Verify that the fan bearings are properly aligned to the fan shaft. Once these checks are complete, release the belt tension and re-tension to the manufacture's specification; belt over-tension is in question.

Machine	Priority	Recommendations
AHU 3 Supply Fan 4th Floor Library	2	The spectral data, on the motor outboard bearing in the radial direction, continues to indicate a significant 1X motor turning speed velocity; the current value is 0.92 in/sec. The motor 1X velocity is also elevated on the fan bearings. System resonance, vibration isolator and sheave issues are suspect. Verify that all motor and fan hold down bolts are tight and inspect the support structures for defects. Inspect the vibration isolation devices for broken and bottomed out springs; replace as required. Inspect the motor and fan sheaves for wear / damage and measure the axial and radial run out; pay close attention to the motor sheave. Ensure the drive belts are not over-tensioned; tension to the manufacture's recommendations. **NOTE: Operation at the current vibration levels will shorten the useful life of the motor and fan bearings.**
Heating Hot Water Pump #3 South Steam Room	2	The 1X velocity, on the motor outboard bearing in the axial and radial directions, is elevated. Verify that all motor and pump hold down bolts are tight and inspect the support structures for defects. Inspect the coupling for abnormal wear, damage and lockup; replace components as required. Once these checks are complete, verify alignment.

Machine	Priority	Recommendations
AHU 3 Return Fan 4th Floor Library	2	The spectral data, on the motor bearings, indicates an elevated motor 1X turning speed velocity with multiple harmonics. Mechanical looseness is suspect. Verify that the mounting hardware is tight and inspect the support structures for defects.
Fire Pump #1 Historical Society	2	The spectral data, on the motor bearings in the axial direction, indicates an excessive motor turning speed velocity. Verify that all mounting hardware is tight and inspect the support structures for defects. Inspect the coupling for abnormal wear, damage and lockup; replace components as required. Once these checks are complete, verify alignment.

Indiana Government Center Status Legend	Condition Summary		
		Machine OK	
		Critical Problem	
		Minor Problem	
		Machine Out of Service - OK Last Check	
		Machine Out of Service - Problem Last Check	
		Machine Improved	
		Overdue for Monitoring (>12 months)	
Machine			Latest Recommendations
AH 1B LL E GENERATOR ROOM			**Overdue for monitoring**
CHILL WATR PUMP A1 CHILL RM			**Overdue for monitoring**
CHILL WATR PUMP A2 CHILL RM			**Overdue for monitoring**
AHU 14 LL SECTION H			
AHU 15 LL SECTION H			
CHILL WATER PUMP 1 BASEMENT DWD			Removed due to flat trends – see notes
CHILL WATER PUMP 2 BASEMENT DWD			Inspect the pump hold down bolts and support structure. – **Not in service this survey.**
AHU1 RETURN FAN 1 PENTHOUSE			
AHU1 RETURN FAN 2 PENTHOUSE			
AHU 1 SUPPLY FAN 1 PENTHOUSE			Sheave / alignment issues
AHU 1 SUPPLY FAN 2 PENTHOUSE			Unit shows improvement
CONDENSER WATR PMP22 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP23 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP24 CHILL RM			**Overdue for monitoring**
AHU 6 LL SECTION B			
AHU 5 LL SECTION B			
AHU 1 LL SECTION A			See analyst notes
AHU 7 LL E EXECUTIVE GARAGE			
AHU 18A 3RD FL SECT E			
AHU 18B 3RD FL SECT E			
RETURN FAN 18 3RD FL SECT E			
AHU 19A 3RD FL SECT A			
AHU 19B 3RD FL SECT A			**Motor bearing electrical fluting is present and has shown some increased activity. The unit remains on the watch list.**
RETURN FAN 19 3RD FL SECT A			
AHU 20A 3RD FL SECT B			
AHU 20B 3RD FL SECT B			
RETURN FAN 20 3RD FL SECT B			
AHU 23A 3RD FL SECT F			
AHU 23B 3RD FL SECT F			
RETURN FAN 23 3RD FL SECT F			
AHU 24A 3RD FL SECT G			
AHU 24B 3RD FL SECT G			

RETURN FAN 24 3RD FL SECT G			
AHU 21A 3RD FL SECT B			Bearing defects developing; most likely electrical fluting. Placed on the watch list.
AHU 21B 3RD FL SECT B			Bearing defects developing; most likely electrical fluting. Placed on the watch list.
RETURN FAN 21 3RD FL SECT B			
AHU 22A 3RD FL SECT H			
AHU 22B 3RD FL SECT H			
RETURN FAN 22 3RD FL SECT H			
AHU 26 PENTHOUSE SECT C			Fan imbalance increasing – placed on the watch list.
AHU 25 PENTHOUSE SECT B			Some minor sheave defect or alignment issues persist – the unit remains on the watch list.
RETURN FAN 2A PENTHOUSE W END			
RETURN FAN 2B PENTHOUSE W END			
HEATING HWP 18 PENTHOUSE			
HEATING HWP 19 PENTHOUSE			
SUPPLY FAN 1A PENTHOUSE			
SUPPLY FAN 1B PENTHOUSE			
SUPPLY FAN 2A PENTHOUSE			
SUPPLY FAN 2B PENTHOUSE			
SUPPLY FAN 3A PENTHOUSE			
SUPPLY FAN 3B PENTHOUSE			
RETURN FAN 3A PENTHOUSE			
RETURN FAN 3B PENTHOUSE			
AH 1A LL W GENERATOR ROOM			Unit shows improvement.
FIRE PUMP 1 SOUTH STEAM ROOM			
BOOSTER PUMP4 SOUTH STEAM RM			**Overdue for monitoring**
BOOSTER PUMP5 SOUTH STEAM RM			**Overdue for monitoring**
HEATING HWP 1 SOUTH STEAM RM			
HEATING HWP 2 SOUTH STEAM RM			**Overdue for monitoring**
HEATING HWP 3 SOUTH STEAM RM			Verify hold down bolts are tight, inspect coupling.
FIRE PUMP 1 NORTH STEAM ROOM			Replace pump bearings
BOOSTER PUMP1 NORTH STEAM RM			**Overdue for monitoring**
BOOSTER PUMP2 NORTH STEAM RM			**Overdue for monitoring**
AH B1 NORTH STEAM ROOM			**Overdue for monitoring**
DATA CTR PMP1 NORTH STEAM RM			**Overdue for monitoring**
DATA CTR PMP2 NORTH STEAM RM			**Overdue for monitoring**
DATA CTR PMP3 NORTH STEAM RM			**Overdue for monitoring**
CHWP 1 NORTH STEAM ROOM			**Overdue for monitoring**
CHWP 2 NORTH STEAM ROOM			**Overdue for monitoring**
CHWP 3 NORTH STEAM ROOM			
AHU 8A LL SECTION E			Sheave / alignment issues – out of service this survey.

AHU 8B LL SECTION E			Suspected resonance at the current operating speed – Placed on the watch list.
AHU 12 LL SECTION G			
AHU 13 LL SECTION G			
CWP-1 BASEMENT LIBRARY			
CWP-2 BASEMENT LIBRARY			
SECONDARY PMP 1 LIB 4TH FLR			**Overdue for monitoring**
SECONDARY PMP 2 LIB 4TH FLR			**Overdue for monitoring**
AHU1 SUPPLY 4TH FLOOR LIB			
AHU1 RETURN 4TH FLOOR LIB			
AHU2 SUPPLY 4TH FLOOR LIB			
AHU2 RETURN 4TH FLOOR LIB			
AHU3 SUPPLY 4TH FLOOR LIB			Check mounting hardware and vibration isolators.
AHU3 RETURN 4TH FLOOR LIB			Check mounting hardware
AHU4 SUPPLY BASEMENT LIB			
AHU4 RETURN BASEMENT LIB			Inspect belts for glazing / replace motor bearings.
FIRE PUMP 1 HISTORICAL SOC			Check mounting hardware and inspect coupling

EMDS
ELECTRO-MECHANICAL DIAGNOSTIC SERVICES

Powered by Service, Quality and Value

Mr. Mike Carroll
Indiana Government Center
302 W. Washington Street
Room E024 c/o Edwards
Indianapolis, IN 46204

December 13, 2015

Dear Mr. Carroll,

On November 10, 2015 vibration data was collected on the equipment in your facility. The following report is a list of those machines found to be in exception and specific recommendations to correct the problems found.

On behalf of EMDS, I would like to thank you for the opportunity to be of service. If you have any questions or comments about this report, feel free to call at any time.

Sincerely,

Douglas J. Coffman

Douglas J. Coffman
Electro-Mechanical
Diagnostic Services, Inc.

Machine	Priority	Recommendations
AHU1 LL Section A	1	The spectral data, on the motor bearings, indicates increasing non-synchronous harmonics while the time domain indicates an increase in peak acceleration levels to 12g's peak with distinct impacting at the non-synchronous defect rate. The motor bearings appear to have significant fluting. Motor and fan sheave defects / misalignment issues persist as well as elevated fan imbalance. Replace the motor to prevent unexpected downtime, Once the motor is replaced, inspect the sheaves for abnormal wear, measure axial and radial runout to ensure the sheaves are not cocked or worn unevenly and verify proper sheave alignment. Once these checks are complete, clean and balance the fan. **Due to the increase in electrical related activity and motor bearing defect activity, the unit has been raised to a Priority 1.**
Fire Pump 1 North Steam Room	1	The spectral data, on the pump inboard bearing, indicates non-synchronous harmonics extending into the high frequency range consistent with an outer race defect. The time domain indicates peaks in excess of 20g's. Bearing contamination and race defects are suspect; replace the pump bearings and ensure the bearings are routinely lubricated to prevent moisture ingress and contamination.

Machine	Priority	Recommendations
AHU 4 Return Fan Basement Library	1	The spectral data, on the motor bearings, indicates an elevated noise floor with non-synchronous harmonics extending into the high frequency range. In addition, the time domain indicates peak acceleration levels in excess of 8g's. Inspect the motor sheave for excessive wear and check the belts for glazing and subsequent slippage on the motor sheave. If these items are in good order, motor bearing replacement would be warranted as the Maximum Peak Acceleration trend is well above historic levels. Motor bearing electrical fluting is expected.
Chill Water Pump 1 Basement DWD	2	The spectral data, on the pump outboard bearing, indicates the fundamental frequency of an outer race defect with harmonics extending into the high frequency range. In addition, the time domain indicates impacting in excess of 5 g's. The pump inboard bearing is now showing race defects with elevated high frequency flow noise. To prevent unexpected downtime, replace the pump bearings. Verify that the inlet and outlet valves are lined up for proper operation and that the pump is operating on its curve. **NOTE: Electrical related vibration has increased on the motor. Monitor the motor for increase in noise and temperature.**

Machine	Priority	Recommendations
Chill Water Pump 2 Basement DWD	2	This unit has not been surveyed since April 2014. The pump bearings are running with an elevated 1X turning speed velocity of 0.3 in/sec. Verify that all motor and pump hold down bolts are tight and inspect the support structure for defects. If these items are in good order, inspect the coupling for abnormal wear / damage then verify alignment.
AHU 1 Supply Fan 1 Penthouse	2	The spectral data, on both motor bearings, indicates an elevated 1X motor turning speed velocity. In addition, the spectral data on the fan outboard bearing still indicates an elevated fan 2X turning speed vibration velocity. Verify that all motor, fan and fan bearing hold down bolts are tight and inspect the support structure integrity. Inspect the motor and fan sheaves for abnormal wear and damage. Check the axial and radial run out of the sheaves and verify proper motor / fan sheave alignment. Check fan shaft run out near each bearing. Verify that the fan bearings are properly aligned to the fan shaft. Once these check are complete, release the belt tension and re-tension to the manufacture's specification; belt over-tension is in question.

Machine	Priority	Recommendations
AHU 1 Supply Fan 2 Penthouse	2	The spectral data, on the motor bearings in both the axial and radial directions, indicates an elevated 1X turning speed velocity; the highest value is 0.4 in/sec in the axial direction. Operating under these conditions will shorten the useful life of the motor bearings. Verify that all mounting hardware is tight and inspect the support structures for defects. Measure the axial and radial run out of the motor and fan sheaves, paying close attention to the motor sheave, to ensure the sheaves are not cocked on the shaft. Verify that the sheaves are properly aligned. Once these checks are complete, release the belt tension and re-tension to the manufacturer's specifications.
AH1A LL W Generator Room Fan	2	The spectral data, on the motor outboard bearing in the axial direction, indicates an elevated 1X fan turning speed of 0.4in/sec. Verify that all motor and fan hold down bolts are tight and inspect the support structures for defects. If these items are in good order, check the axial and radial run out of the motor and fan sheaves; pay close attention to the fan sheave. Verify sheave alignment and ensure the drive belts are not over-tensioned.

Machine	Priority	Recommendations
AHU 3 Supply Fan 4th Floor Library	2	The spectral data, on the motor bearings in both the axial and radial directions, indicates a significant 1X motor turning speed velocity; the highest value is 0.9in/sec on the motor outboard bearing in the radial direction. The motor 1X velocity is also elevated on the fan bearings. System resonance, vibration isolator and sheave issues are suspect. Verify that all motor and fan hold down bolts are tight and inspect the support structures for defects. Inspect the vibration isolation devices for broken and bottomed out springs; replace as required. Inspect the motor and fan sheaves for wear / damage and measure the axial and radial run out; pay close attention to the motor sheave. Ensure the drive belts are not over-tensioned; tension to the manufacture's recommendations. **NOTE: Once these items are corrected, the motor bearings will need to be re-evaluated for race defects. Operation at the current vibration levels will shorten the useful life of the motor and fan bearings.**

Notes:

AHU 14 LL Section H Fan – The fan imbalance, on the fan outboard bearing, has risen to 5.2 mils peak to peak. This is a little excessive; fan bearing life could be extended by cleaning and balancing the fan wheel. The unit has been placed on the watch list.

Return Fan 3B Penthouse – The spectral data on the motor outboard bearing indicates the early stages of bearing defects. The activity appears to be caused by electrical fluting. No action is warranted at this time, however the unit will remain on the watch list.

Indiana Government Center Status Legend	Condition Summary
	Machine OK
	Critical Problem
	Minor Problem
	Machine Out of Service - OK Last Check
	Machine Out of Service - Problem Last Check
	Machine Improved
	Overdue for Monitoring (>12 months)

Machine			Latest Recommendations
AH 1B LL E GENERATOR ROOM			**Overdue for monitoring**
CHILL WATR PUMP A1 CHILL RM			**Overdue for monitoring**
CHILL WATR PUMP A2 CHILL RM			**Overdue for monitoring**
AHU 14 LL SECTION H			Fan outboard imbalance at 5.2 mils – watch list see notes section.
AHU 15 LL SECTION H			Slight misalignment / sheave issues persist; unit shows overall improvement. Moved to the watch list.
CHILL WATER PUMP 1 BASEMENT DWD			Replace pump bearings
CHILL WATER PUMP 2 BASEMENT DWD			Inspect the pump hold down bolts and support structure.
AHU1 RETURN FAN 1 PENTHOUSE			
AHU1 RETURN FAN 2 PENTHOUSE			
AHU 1 SUPPLY FAN 1 PENTHOUSE			Sheave / alignment issues
AHU 1 SUPPLY FAN 2 PENTHOUSE			Inspect motor mounting hardware
CONDENSER WATR PMP22 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP23 CHILL RM			**Overdue for monitoring**
CONDENSER WATR PMP24 CHILL RM			**Overdue for monitoring**
AHU 6 LL SECTION B			
AHU 5 LL SECTION B			
AHU 1 LL SECTION A			See analyst notes
AHU 7 LL E EXECUTIVE GARAGE			
AHU 18A 3RD FL SECT E			
AHU 18B 3RD FL SECT E			
RETURN FAN 18 3RD FL SECT E			
AHU 19A 3RD FL SECT A			
AHU 19B 3RD FL SECT A			Motor bearing fluting – Watch list
RETURN FAN 19 3RD FL SECT A			
AHU 20A 3RD FL SECT B			
AHU 20B 3RD FL SECT B			
RETURN FAN 20 3RD FL SECT B			
AHU 23A 3RD FL SECT F			
AHU 23B 3RD FL SECT F			
RETURN FAN 23 3RD FL SECT F			
AHU 24A 3RD FL SECT G			
AHU 24B 3RD FL SECT G			

RETURN FAN 24 3RD FL SECT G			
AHU 21A 3RD FL SECT B			Bearing defects developing; most likely electrical fluting. Placed on the watch list.
AHU 21B 3RD FL SECT B			Bearing defects developing; most likely electrical fluting. Placed on the watch list.
RETURN FAN 21 3RD FL SECT B			
AHU 22A 3RD FL SECT H			
AHU 22B 3RD FL SECT H			
RETURN FAN 22 3RD FL SECT H			
AHU 26 PENTHOUSE SECT C			
AHU 25 PENTHOUSE SECT B			Some minor sheave defect or alignment issues persist however; the unit shows improvement this survey. Moved to the watch list.
RETURN FAN 2A PENTHOUSE W END			
RETURN FAN 2B PENTHOUSE W END			
HEATING HWP 18 PENTHOUSE			
HEATING HWP 19 PENTHOUSE			
SUPPLY FAN 1A PENTHOUSE			
SUPPLY FAN 1B PENTHOUSE			
SUPPLY FAN 2A PENTHOUSE			
SUPPLY FAN 2B PENTHOUSE			
SUPPLY FAN 3A PENTHOUSE			
SUPPLY FAN 3B PENTHOUSE			
RETURN FAN 3A PENTHOUSE			
RETURN FAN 3B PENTHOUSE			
AH 1A LL W GENERATOR ROOM			Check hold down bolts, inspect sheaves.
FIRE PUMP 1 SOUTH STEAM ROOM			
BOOSTER PUMP4 SOUTH STEAM RM			
BOOSTER PUMP5 SOUTH STEAM RM			**Overdue for monitoring**
HEATING HWP 1 SOUTH STEAM RM			Motor bearing defects continue to increase; electrical fluting suspected – watch list.
HEATING HWP 2 SOUTH STEAM RM			
HEATING HWP 3 SOUTH STEAM RM			**Overdue for monitoring**
FIRE PUMP 1 NORTH STEAM ROOM			Replace pump bearings
BOOSTER PUMP1 NORTH STEAM RM			**Overdue for monitoring**
BOOSTER PUMP2 NORTH STEAM RM			**Overdue for monitoring**
AH B1 NORTH STEAM ROOM			
DATA CTR PMP1 NORTH STEAM RM			**Overdue for monitoring**
DATA CTR PMP2 NORTH STEAM RM			**Overdue for monitoring**
DATA CTR PMP3 NORTH STEAM RM			**Overdue for monitoring**
CHWP 1 NORTH STEAM ROOM			**Overdue for monitoring**
CHWP 2 NORTH STEAM ROOM			
CHWP 3 NORTH STEAM ROOM			
AHU 8A LL SECTION E			Sheave / alignment issues – out of service this survey.

AHU 8B LL SECTION E			Suspected resonance at the current operating speed – Placed on the watch list.
AHU 12 LL SECTION G			
AHU 13 LL SECTION G			
CWP-1 BASEMENT LIBRARY			
CWP-2 BASEMENT LIBRARY			
SECONDARY PMP 1 LIB 4TH FLR			**Overdue for monitoring**
SECONDARY PMP 2 LIB 4TH FLR			**Overdue for monitoring**
AHU1 SUPPLY 4TH FLOOR LIB			
AHU1 RETURN 4TH FLOOR LIB			Access dangerous this survey; no data taken
AHU2 SUPPLY 4TH FLOOR LIB			
AHU2 RETURN 4TH FLOOR LIB			Impacting present on the fan inboard bearing. There has been little to no change since July 2015. Remains on the watch list.
AHU3 SUPPLY 4TH FLOOR LIB			Check mounting hardware and vibration isolators.
AHU3 RETURN 4TH FLOOR LIB			
AHU4 SUPPLY BASEMENT LIB			
AHU4 RETURN BASEMENT LIB			Inspect belts for glazing / replace motor bearings.
FIRE PUMP 1 HISTORICAL SOC			