

Machine Condition Assessment Report

Bainbridge Water Authority

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Introduction

Vibration data were collected from 25 machines from January 01, 1980 to June 21, 2007. The machinery condition analysis is based on vibration measurements taken with portable digital instrumentation. The data were processed, analyzed and compiled. The repair recommendations were reviewed and edited by qualified professional vibration analysts.

This section of the report is a summary of the recommendations that were made as a result of vibration analyses. The Mandatory priority recommendations are listed first, followed by Important and Desirable priority recommendations.

The Vibration Analysis Results section contains the full rationale for the analyses.

Repair Priority Definitions

- Mandatory:** Machine failure is certain within days to weeks. Repair should be accomplished as soon as possible. Meanwhile, the machine should be secured or tested daily.
- Important:** Machine problems or failure are probable within weeks to months. Repair should be accomplished at the next convenient downtime, or in the next two to six months. Meanwhile, the machine should be tested weekly.
- Desirable:** Machine problems are probable within months to years. Repair can be deferred and scheduled based on changing fault severity over time. Meanwhile, the machine should be tested monthly.

Summary of Recommendations

MANDATORY:

Downtown Service Pump #1

MANDATORY: REPLACE MOTOR BEARINGS

IMPORTANT:

Downtown Service Pump #1

IMPORTANT: REPLACE PUMP BEARINGS

Downtown Service Pump #3

IMPORTANT: REPLACE PUMP FREE END BEARING

Main Service Pump #1

IMPORTANT: INSPECT COUPLING AND CHECK SHAFT ALIGNMENT

Service Pump #2

IMPORTANT: REPLACE MOTOR FREE END BEARING
IMPORTANT: BALANCE MOTOR

Service Pump #3

IMPORTANT: BALANCE MOTOR

Sludge Transfer Pump #4

IMPORTANT: VERIFY VALIDITY OF DATA AND ANY DIAGNOSES. RETEST UNIT IF NECESSARY.

DESIRABLE:

Aeration Blower #1

DESIRABLE: MONITOR MOTOR BEARINGS FOR INCREASED VIBRATION
DESIRABLE: MONITOR BLOWER FOR INCREASED VIBRATION
DESIRABLE: CHECK DRIVEN SHEAVE FOR RUNOUT AND ECCENTRICITY

Aeration Blower #2

DESIRABLE: MONITOR BLOWER FOR INCREASED VIBRATION

Aeration Blower #3

DESIRABLE: MONITOR BLOWER FOR INCREASED VIBRATION

Aeration Blower #4

DESIRABLE: MONITOR MOTOR FOR INCREASED VIBRATION

Aeration Blower #5

DESIRABLE: CHECK BELT FOR WEAR AND INCORRECT TENSION

Raw Water Pump #1

DESIRABLE: MONITOR MOTOR FOR INCREASED VIBRATION

Service Pump #1

DESIRABLE: OVERHAUL MOTOR

The vibration signature for this unit has changed very little from the previous test in July. The LOW priority recommendation remains the same.

Sludge Transfer Pump #1

DESIRABLE: VERIFY VALIDITY OF DATA AND ANY DIAGNOSES. RETEST UNIT IF NECESSARY.

Sludge Transfer Pump #2

DESIRABLE: VERIFY VALIDITY OF DATA AND ANY DIAGNOSES. RETEST UNIT IF NECESSARY.

Sludge Transfer Pump #3

DESIRABLE: VERIFY VALIDITY OF DATA AND ANY DIAGNOSES. RETEST UNIT IF NECESSARY.

Machinery Covered by this Report

- 1 Aeration Blower #1
- 2 Aeration Blower #2
- 3 Aeration Blower #3
- 4 Aeration Blower #4
- 5 Aeration Blower #5
- 6 Main Service Pump #1
- 7 Main Service Pump #3
- 8 Main Service Pump #4
- 9 Downtown Service Pump #1
- 10 Downtown Service Pump #2
- 11 Downtown Service Pump #3
- 12 Downtown Service Pump #4
- 13 Service Pump #1
- 14 Service Pump #2
- 15 Service Pump #3
- 16 Sludge Transfer Pump #1
- 17 Sludge Transfer Pump #2
- 18 Sludge Transfer Pump #3
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Vibration Analysis Results

Aeration Blower #1

DESIRABLE: MONITOR MOTOR BEARINGS FOR INCREASED VIBRATION
DESIRABLE: MONITOR BLOWER FOR INCREASED VIBRATION
DESIRABLE: CHECK DRIVEN SHEAVE FOR RUNOUT AND ECCENTRICITY

Acquired: 7/26/2004 9:22:32 PM Speed: 1XM = 1775 (1XW = 2160)
Maximum Level is 113 (+ 5) VdB [3A] at 12.00xW

MODERATE BLOWER LOBE WEAR
MODERATE MOTOR BEARING WEAR
MODERATE DRIVEN SHEAVE PROBLEM
SLIGHT BLOWER FREE END BALL BEARING WEAR

Aeration Blower #2

DESIRABLE: MONITOR BLOWER FOR INCREASED VIBRATION

Acquired: 7/26/2004 9:16:16 PM Speed: 1XM = 1779 (1XW = 2165)
Maximum Level is 111 (+7.8) VdB [3R] at 12xW

MODERATE BLOWER LOBE WEAR
SLIGHT BLOWER FREE END BALL BEARING WEAR

Aeration Blower #3

DESIRABLE: MONITOR BLOWER FOR INCREASED VIBRATION

Acquired: 7/26/2004 9:08:31 PM Speed: 1XM = 1777 (1XW = 2159)
Maximum Level is 119 (+17) VdB [4T] at 12x

MODERATE BLOWER LOBE WEAR

Aeration Blower #4

DESIRABLE: MONITOR MOTOR FOR INCREASED VIBRATION

Acquired: 7/26/2004 9:01:14 PM Speed: 1XM = 1772 (1XW = 2156)
Maximum Level is 111 (-3.0) VdB [2T] at 1.4xM

MODERATE MOTOR STATOR PROBLEM OR ABNORMAL ELECTRICAL LOAD
SLIGHT MOTOR BEARING WEAR
SLIGHT DRIVE BELT IRREGULARITY

Aeration Blower #5

DESIRABLE: CHECK BELT FOR WEAR AND INCORRECT TENSION

Acquired: 7/26/2004 8:54:05 PM Speed: 1XM = 1763 (1XW = 2146)
Maximum Level is 116 (+2.5) VdB [2T] at 1.3xM

MODERATE DRIVE BELT IRREGULARITY

Downtown Service Pump #1

MANDATORY: REPLACE MOTOR BEARINGS
IMPORTANT: REPLACE PUMP BEARINGS

Acquired: 7/27/2004 4:45:03 PM Speed: 1XM = 1780
Maximum Level is 113 (+12) VdB [3T] at 1.0x

EXTREME MOTOR FREE END BEARING LOOSENESS
EXTREME MOTOR DRIVE END BEARING LOOSENESS
EXTREME MOTOR THRUST BEARING PROBLEM
SERIOUS MOTOR DRIVE END BEARING WEAR
SERIOUS PUMP DRIVE END BALL BEARING WEAR
SERIOUS PUMP FREE END BALL BEARING WEAR
MODERATE MOTOR FREE END BEARING WEAR
MODERATE PUMP DRIVE END LOOSENESS OR BEARING CLEARANCE
PROBLEM

Downtown Service Pump #2

NO RECOMMENDATION

Acquired: 7/27/2004 4:27:14 PM Speed: 1XM = 1780
Maximum Level is 99 (-1.9) VdB [2T] at 1.0x

Downtown Service Pump #3

IMPORTANT: REPLACE PUMP FREE END BEARING

Acquired: 7/27/2004 4:34:21 PM Speed: 1XM = 1781
Maximum Level is 106 (-1.3) VdB [3T] at 2.0x

SERIOUS PUMP FREE END BALL BEARING WEAR
MODERATE PUMP DRIVE END BALL BEARING WEAR

Downtown Service Pump #4

NO RECOMMENDATION

Acquired: 7/27/2004 4:54:45 PM Speed: 1XM = 1782
Maximum Level is 108 (+0.76) VdB [4T] at 1.0x

Facility Overview

Lift Pump #1

NO RECOMMENDATION

Acquired: 1/13/2004 10:03:36 PM Speed: 1XM = 888
Maximum Level is 99 (- 3) VdB [1T] at 360 Hz

Lift Pump #2

NOT TESTED

Acquired: 10/11/2003 5:05:05 PM

Main Service Pump #1

IMPORTANT: INSPECT COUPLING AND CHECK SHAFT ALIGNMENT

Acquired: 7/27/2004 3:36:59 PM Speed: 1XM = 1781
Maximum Level is 111 (+14) VdB [2A] at 1.0x

SERIOUS ANGULAR MISALIGNMENT
SLIGHT PUMP FREE END BALL BEARING WEAR

Main Service Pump #3

NO RECOMMENDATION

Acquired: 7/27/2004 4:10:26 PM Speed: 1XM = 1791
Maximum Level is 107 (+1.8) VdB [4A] at 15xM

Main Service Pump #4

NO RECOMMENDATION

Acquired: 7/27/2004 3:44:07 PM Speed: 1XM = 1786
Maximum Level is 92 (+5.3) VdB [2R] at 4.0x

Manufacturers Information

Raw Water Pump #1

DESIRABLE: MONITOR MOTOR FOR INCREASED VIBRATION

Acquired: 7/26/2004 11:06:53 PM Speed: 1XM = 1192
Maximum Level is 118 (+1.1) VdB [1T] at 120 HZ

MODERATE MOTOR WINDING FAULT OR ELECTRICAL PHASE IMBALANCE
MODERATE MOTOR DRIVE END BEARING LOOSENESS

Raw Water Pump #2

NO RECOMMENDATION

Acquired: 7/26/2004 10:46:45 PM Speed: 1XM = 1170
Maximum Level is 113 (-0.1) VdB [1T] at 1.0x

Service Pump #1

DESIRABLE: OVERHAUL MOTOR

Acquired: 10/8/2003 4:08:02 PM Speed: 1XM = 1777
Maximum Level is 111 (+18) VdB [1T] at 120 HZ

MODERATE MOTOR FREE END BEARING WEAR
MODERATE MOTOR WINDING FAULT OR ELECTRICAL PHASE IMBALANCE
SLIGHT MOTOR STATOR PROBLEM OR ABNORMAL ELECTRICAL LOAD
SLIGHT MOTOR DRIVE END BEARING WEAR

Service Pump #2

IMPORTANT: REPLACE MOTOR FREE END BEARING
IMPORTANT: BALANCE MOTOR

Acquired: 7/26/2004 11:44:04 PM Speed: 1XM = 1776
Maximum Level is 119 (+15) VdB [1T] at 1.0x

SERIOUS MOTOR FREE END BEARING LOOSENESS
SERIOUS MOTOR IMBALANCE
SLIGHT MOTOR WINDING FAULT OR ELECTRICAL PHASE IMBALANCE

Service Pump #3

IMPORTANT: BALANCE MOTOR

Acquired: 7/26/2004 11:40:30 PM Speed: 1XM = 1776
Maximum Level is 117 (+13) VdB [1T] at 1.0x

SERIOUS MOTOR IMBALANCE
SLIGHT MOTOR WINDING FAULT OR ELECTRICAL PHASE IMBALANCE

Sludge Transfer Pump #1

DESIRABLE: VERIFY VALIDITY OF DATA AND ANY DIAGNOSES. RETEST UNIT IF NECESSARY.

Acquired: 1/13/2004 9:55:18 PM Speed: 1XM = 1193
Maximum Level is 103 (+14) VdB [1R] at 2.0x

MODERATE ACCELEROMETER OVERLOAD
SLIGHT MOTOR BEARING MISALIGNMENT

Sludge Transfer Pump #2

DESIRABLE: VERIFY VALIDITY OF DATA AND ANY DIAGNOSES. RETEST UNIT IF NECESSARY.

Acquired: 1/13/2004 10:14:30 PM Speed: 1XM = 1188
Maximum Level is 101 (-3.5) VdB [1R] at 1.0x

MODERATE ACCELEROMETER OVERLOAD

Sludge Transfer Pump #3

DESIRABLE: VERIFY VALIDITY OF DATA AND ANY DIAGNOSES. RETEST UNIT IF NECESSARY.

Acquired: 1/13/2004 9:59:47 PM Speed: 1XM = 1190
Maximum Level is 101 (+5.1) VdB [2T] at 120 HZ

MODERATE ACCELEROMETER OVERLOAD
SLIGHT MOTOR WINDING FAULT OR ELECTRICAL PHASE IMBALANCE

Sludge Transfer Pump #4

IMPORTANT: VERIFY VALIDITY OF DATA AND ANY DIAGNOSES. RETEST UNIT IF NECESSARY.

Acquired: 1/13/2004 10:11:25 PM Speed: 1XM = 1188
Maximum Level is 99 (+1.8) VdB [1T] at 120 HZ

SERIOUS ACCELEROMETER OVERLOAD