TAYLOR
CONDITION MONITORING

VIBRATION ANALYSIS SERVICE

Vibration Analysis Survey Report

Client:	Company Name
Contact:	Name
Report No.:	001-01-12
Survey Date:	26TH of January 2012

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TAYLOR
CONDITION MONITORING

VIBRATION ANALYSIS SERVICE

Condition Based Maintenance Inspection
At
Company Name

26th January 2012

Report No.: 001-01-12

This Report contains the results of the Ultra Sound Leak Detection Survey carried out at
Company Name
on the
26th of January 2012

Table of Contents:

About this Report:

This report is issued in good faith and without prejudice and the information in it is based on what we found at the time of the survey. We take care to carry out our work diligently, conscientiously and professionally at all times. What we don't do and can't do is unequivocally guarantee that you will never have failures. We recommend that you read this report carefully and use the information in it as part of your on-going monitoring of your systems and as a significant but not the sole criteria in your decision making.

_____
Donal Guinan
Taylor Condition Monitoring

Machine Advisory Table

Unacceptable	Data Indicates Imminent Machine Functional Failure
Requires Attention	Data Indicates Machine Requires Attention
Acceptable	Data Indicates a Change in Machine Condition - parameters remain below alarm
Satisfactory	Data Indicates Machine Condition is Satisfactory
Not Monitored	Data Collection Missed i.e. not running or unavailable

Executive Summary

■ **External – DF01 Extract Fan – Fan Support Bearings.**
Monitor
See page 12 for full details.

■ **External – DF02 Extract Fan – Imbalance & Fan DE.**
Imbalance remains evident, increase in bearing noise at Fan DE.
See page 13 for full details.

■ **POD 5 – Z30334 Head 1 - Motor**
Motor bearing replacement suggested as soon as possible.
See page 16 for full details.

■ **POD 5 – Z30334 Head 2 – Tensioner Bearing**
Tensioner bearing lubrication suggested.
See page 17 for full details.

■ **POD 5 – Z30334 Head 4 – Spindle Balance**
Significant increase in imbalance.
See page 18 for full details.

■ **Water Plant – P-01 Pump – Motor Bearings.**
Bearing checks suggested.
See page 20 for full details.

■ **POD 1 – Z24470 Grinder Motor A – Motor Bearings**
Increased bearing noise. Lubricate.
See page 21 for full details.

■ **Pod 1 – Z24465 Head 2. – Motor Drive End Bearing.**
Increased noise level. Monitor during next survey and decide re. bearing replacement timing.
See page 22 for full details.

Notes:

Pod 6 – Pump Z-30351. Motor operating at 55C. – Recommend check fan cover is not blocked.

Water Plant – PU-1. Motor operating at 58C. – Outlet Valve V7 restricted. Consider using an inverter to reduce the flow rate as opposed to restricting the valve.

Machine Summary Table

		Monitoring Schedule										
	Day	25	31	27	26	24	27	16	23	26	23	20
	Month	02	03	04	05	06	07	08	09	10	11	12
	Year	11	11	11	11	11	11	11	11	11	11	11
Plant Room												
P-01A	AHU Pump P01 (a)											
P-01B	AHU Pump P01 (b)											
P-02A	Clean Room Pump P02 (a)											
P-02B	Clean Room Pump P02 (b)											
Water Plant												
Z-24558	**Type II**											
P-202	Pump P-202											
P-102	Pump P-102											
P-230	Pump P-230											
Z-24557	**Type III**											
P-01	Pump P-01											13
P-120	Pump P-120											
P-130	Pump P-130											
P-140	Pump P-140											
P-150	Pump P-150											
P-PU1	Pump P-U1											
P-PU110	Pump P-U110											
P-302	Pump P-302											
Final Clean Upgrade												
Z-24503	**Final Clean Line**											
	Bath Drive No.1											
	Bath Drive No.2											
	Fan St.6											
	Fan St.7											
	Fan St.10											
	Fan St.11											
	Pump T2											
	Pump T3											

		Monitoring Schedule										
	Day	25	31	27	26	24	27	16	23	26	23	20
	Month	02	03	04	05	06	07	08	09	10	11	12
	Year	11	11	11	11	11	11	11	11	11	11	11
POD 1												
Z-24470	**Grinder A**											
	Spindle Motor A											14
	Pump A											
	A Pump Out											
	A Pump In											
	A Filter Pump											
Z-24473	**Grinder B**											
	Spindle Motor B											
	Pump B											
	B Pump Out											
	B Pump In											
	B Filter Pump											
Z-24487	**Hand Grinder A**											
Z-24486	**Hand Grinder B**											
Z-24485	**Hand Grinder C**											
Z-24495	**Hand Grinder D**											
Z-24554	**Grind Unit**											
	Grind Clean Wash Pp											
	Grind Clean Rinse Pp											
Z-24492	**Hand Polish Long**											
Z-24494	**Hand Polish Short**											
Z-24476	**Polish Unit**											
	Polish Clean Wash Pump											
	Polish Clean Rinse Pump											
Z-30313	**NDT**											
	NDT Clean Fan 1											
	NDT Clean Fan 2											
	NDT Clean Fan 3											
	NDT Pump											
Z-24465	**Polisher**											
	Head 3											
	Head 4											
	Head 1											
	Head 2											15

		Monitoring Schedule										
	Day	25	31	27	26	24	27	16	23	26	23	20
	Month	02	03	04	05	06	07	08	09	10	11	12
	Year	11	11	11	11	11	11	11	11	11	11	11
POD 5												
Z-30349	**Grinder A**											
	Spindle Motor A											
	Pump A											
	A Pump Out											
	A Pump In											
	A Filter Pump											
Z-30350	**Grinder B**											
	Spindle Motor B											
	Pump B											
	B Pump Out											
	B Pump In											
	B Filter Pump											
Z-30345	**Hand Grinder A**											
Z-30344	**Hand Grinder B**											
Z-30343	**Hand Grinder C**											
Z-30339	**Hand Grinder D**											
Z-30361	**Grind Unit**											
	Grind Clean Wash Pp											
	Grind Clean Rinse Pp											
Z-30336	**Hand Polish Long**											
Z-30337	**Hand Polish Short**											
Z-30360	**Polish Unit**											
	Polish Clean Wash Pump											
	Polish Clean Rinse Pump											
Z-30334	**Polisher**											
	Head 3											
	Head 4											**12**
	Head 1											**10**
	Head 2											**11**

		Monitoring Schedule										
	Day	25	31	27	26	24	27	16	23	26	23	20
	Month	02	03	04	05	06	07	08	09	10	11	12
	Year	11	11	11	11	11	11	11	11	11	11	11
External												
Z-30280	Chiller Pump P05A											
	Chiller Pump P05B											
Z-30298	DF01 Extract Fan											8
Z-30297	DF02 Extract Fan											9
	EF03 Extract Fan											
AHU's												
Z-30291	AHU12 Return Fan											
	AHU12 Supply Fan											
Z-30290	AHU13 Return Fan											
	AHU13 Supply Fan											
Z-30289	AHU14 Return Fan											
	AHU14 Supply Fan											

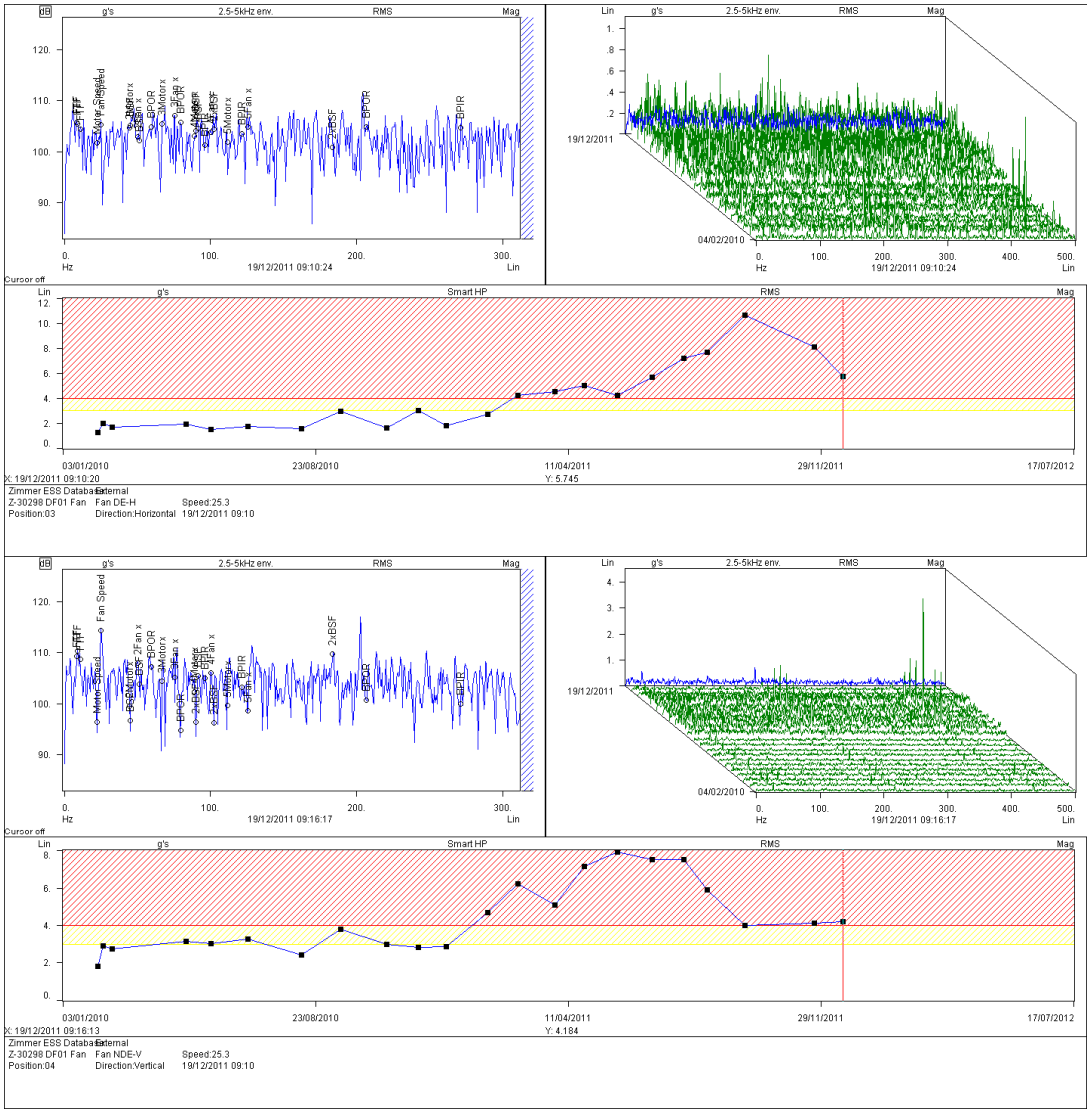
Plant Items Not Monitored & Reasons: -

General Notes: -

Please pass on any reports from RE Grinder motor overhauls.

Appendix 1 - Vibration Analysis

■ **External – DF01 Extract Fan (Z-30298)**



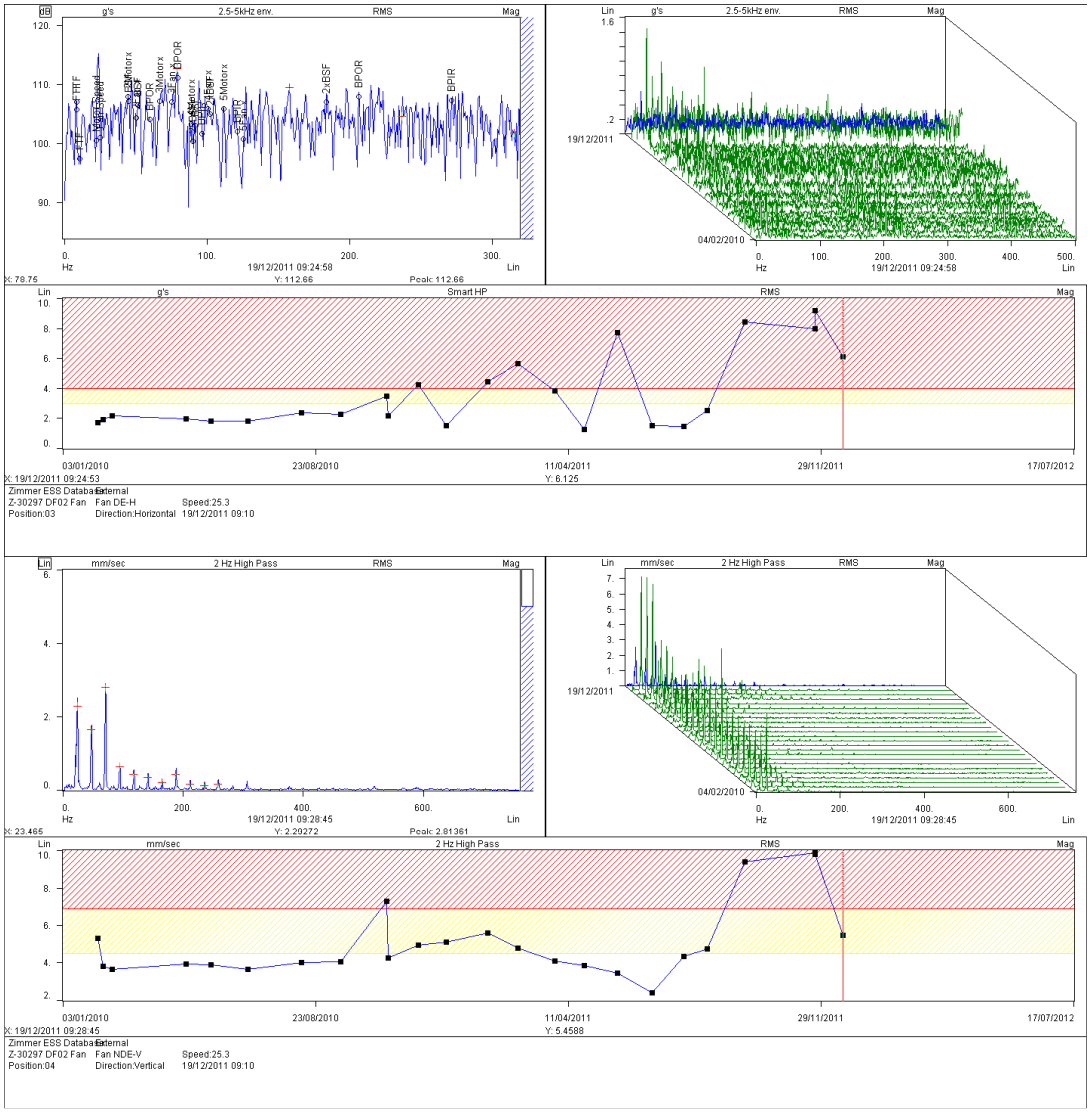
Observation:

General – Overall g's acceleration amplitudes measured from the fan shaft support bearings remain excessive although both bearings appear to be running at lower levels presently. Amplitudes remain 2 to 3 times higher than would be expected and are significantly higher than historical values. The overall levels remain a cause for concern and the Fan drive end bearing shows impact energy in the bearing envelope readings of 203Hz and harmonics, which is a match for the bearing outer race fault frequency.

Recommendation:

It remains our recommendation to replace these bearings due to the excessive noise level and outer race impact energy.

External – DF02 Extract Fan (Z-30297)



Observation:

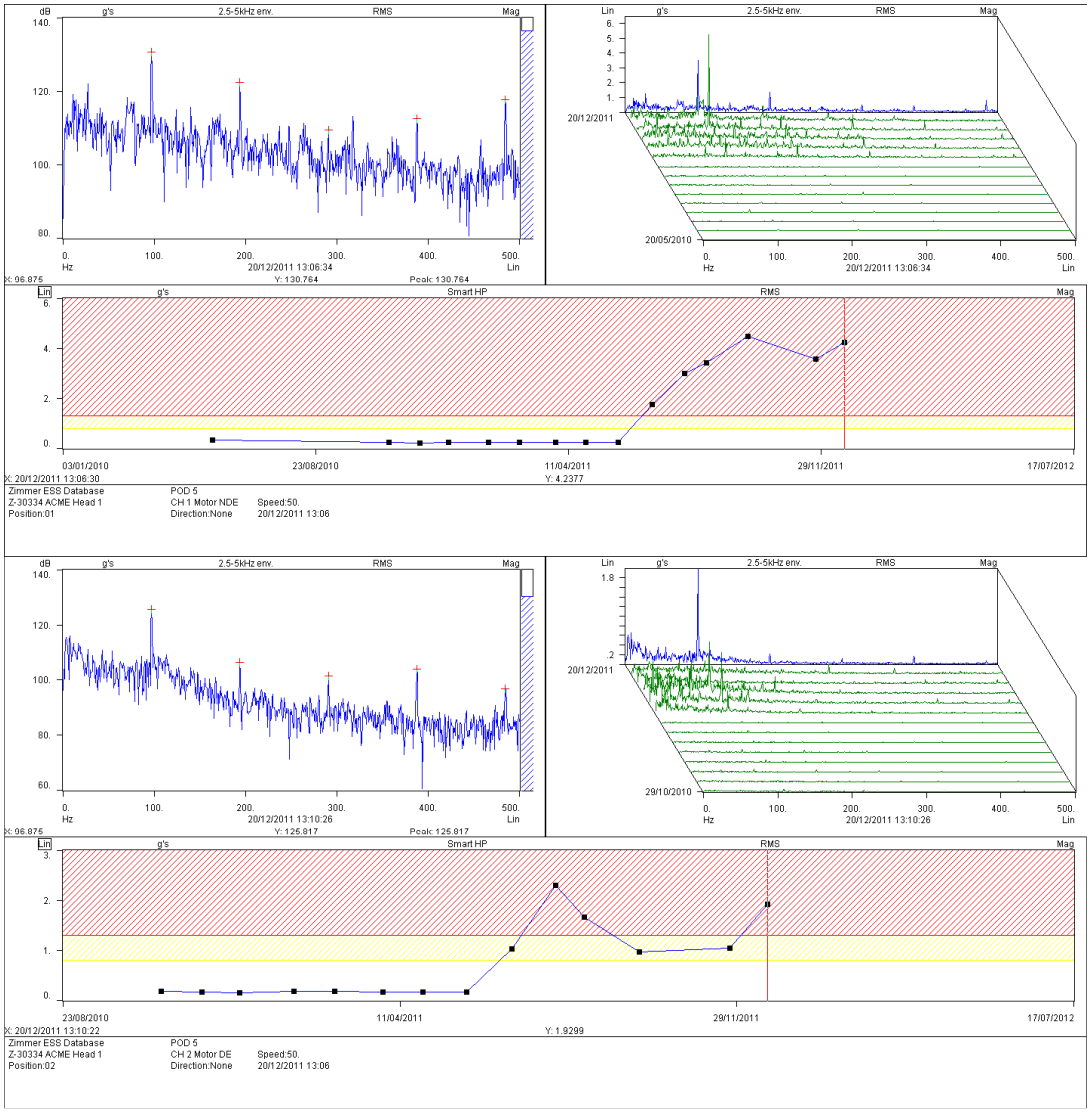
Imbalance – Readings obtained throughout the unit have shown a reduction of the mm/s velocity vibration at the fan shaft rotational frequency on this visit.

Fan DE – Readings from this bearing have shown a significant increase in overall g's acceleration noise levels. No bearing impact energy is evident within the enveloped data.

Recommendation:

Please inform us of any corrective action taken. If no action has been taken previous recommendations apply.
Maintain routine lubrication of the Fan DE bearing.

■ POD 5 – Z30334 Head 1 – Motor



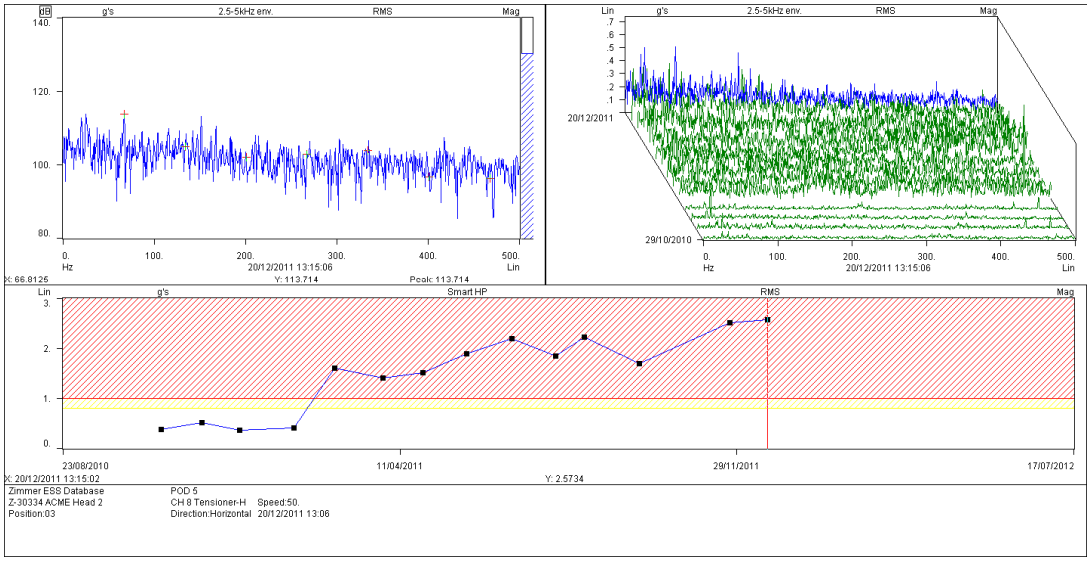
Observation:

Motor Bearings – Readings obtained from the motor bearings have shown a further increase in g's acceleration activity on this visit, both overall noise levels and impacting energy at frequencies possibly related to the bearings. Bearing numbers would be required to confirm this.

Recommendation:

Replacement of the motor bearings is suggested as soon as possible.

■ POD 5 – Z30334 Head 2 – Tensioner Bearing



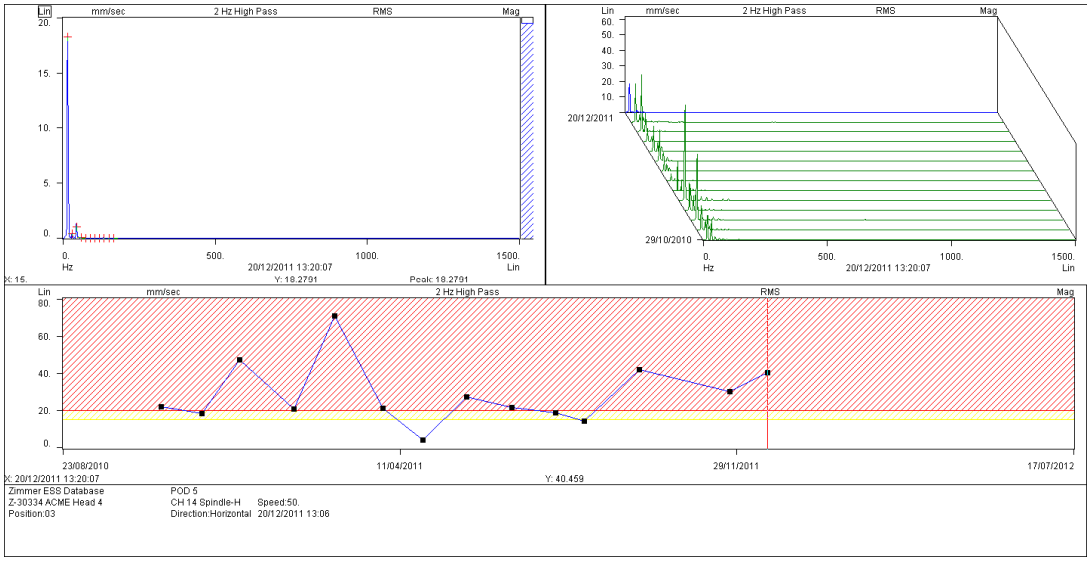
Observation:

Tensioner Bearing – Readings obtained from the tensioner bearings have shown a progressive increase in g's acceleration activity, overall noise levels are raising but no impact energy is evident at this time.

Recommendation:

The tensioner bearing should be replaced when possible.

■ POD 5 – Z230334 Head 4 – Spindle Balance



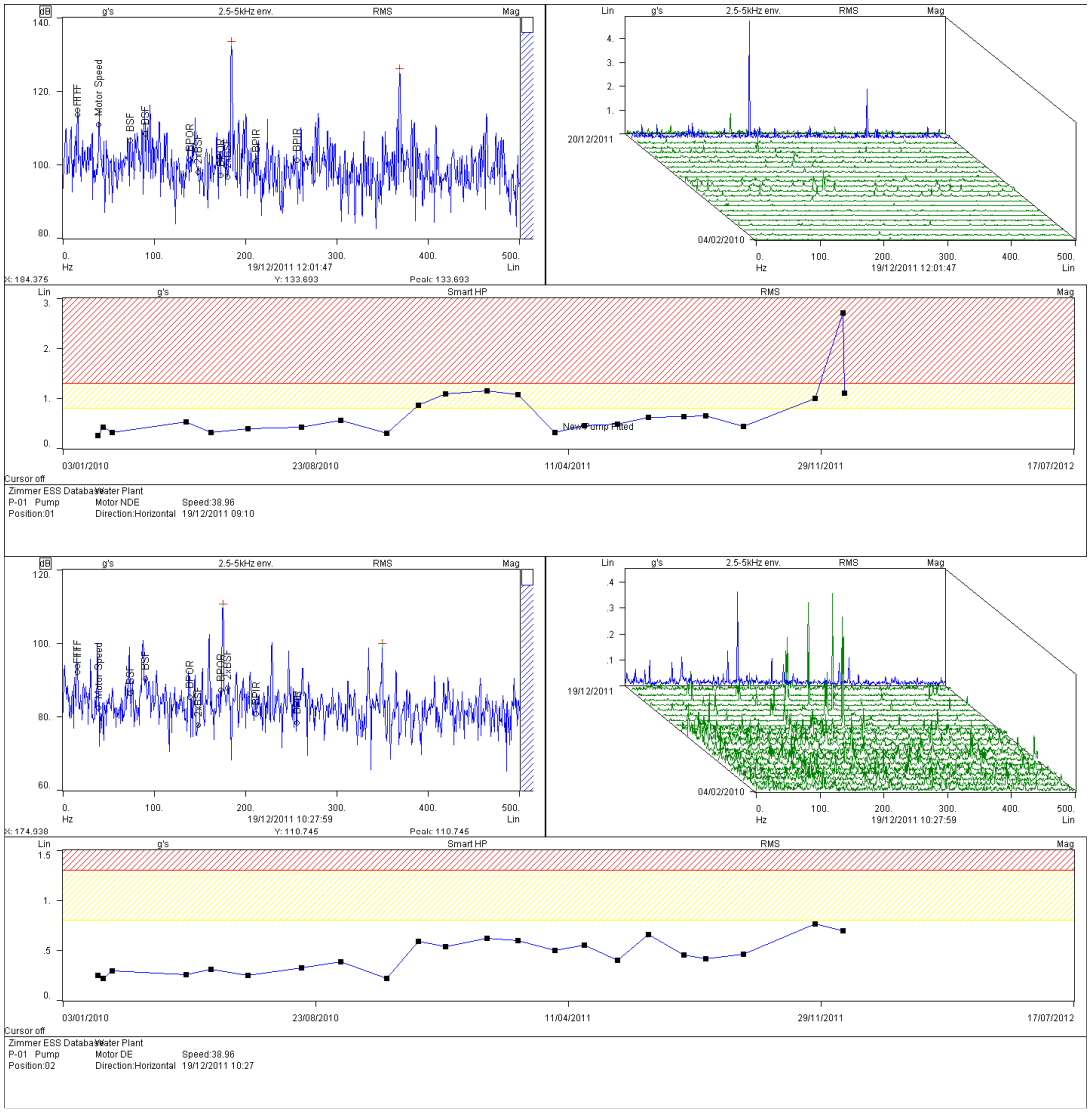
Observation:

Spindle Balance – Readings obtained from the spindle bearing have shown a significant increase in mm/s velocity vibration at 15Hz. This activity is indicative of imbalance.

Recommendation:

It is unlikely buffwheel imbalance is the source of the problem as readings have been consistently high over a number of months. Inspect the spindle wheel and it's mountings for looseness.

■ Water Plant – P-01 Pump – Motor Bearings



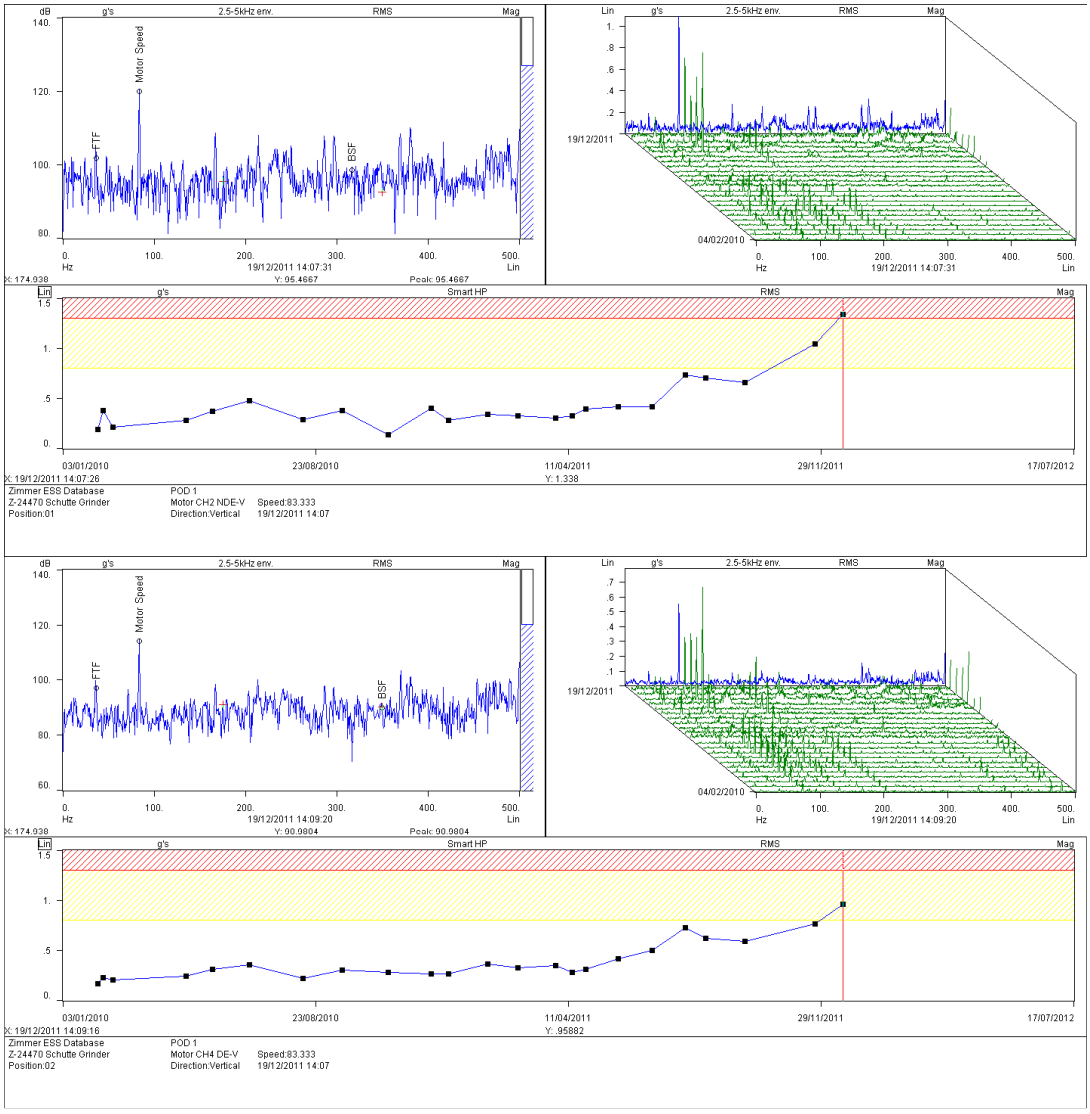
Observation:

Motor Bearings – Readings obtained from the motor bearings have shown a significant increase in g's acceleration activity on this visit. Evidence of increased overall noise levels is evident at two running speeds and the bearing data displays impact energy.

Recommendation:

Pump has been replaced and NDE bearing readings have dropped considerably but are still slightly high.
Monitor during next survey.

■ POD 1 – Grinder Motor A (Z-24470) – Motor Bearings



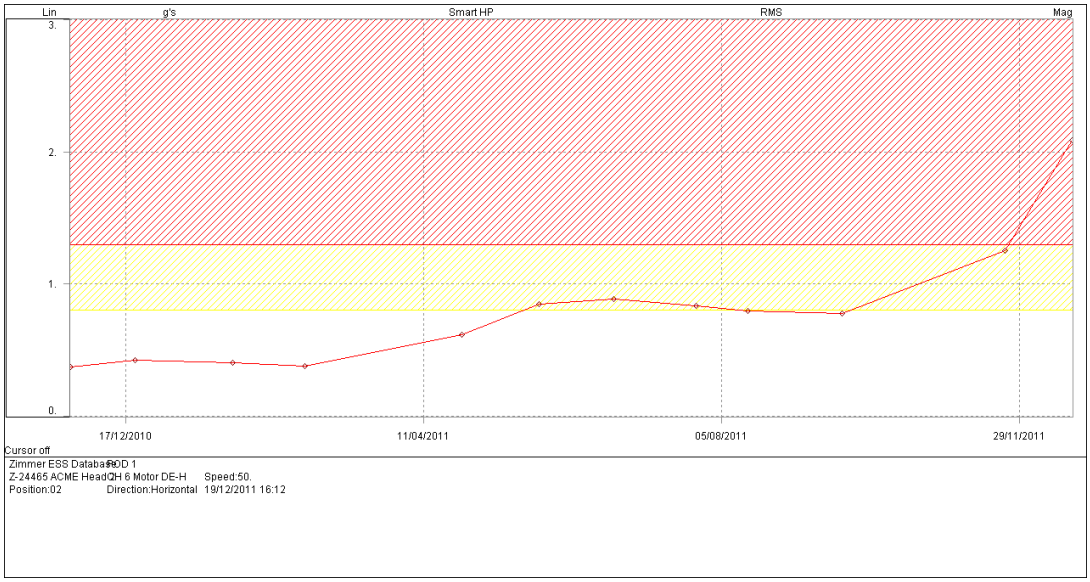
Observation:

Motor Bearings – Readings obtained from the motor bearings have shown a progressive increase in g's acceleration activity on this visit. Evidence of increased overall noise levels is evident particularly at the motor NDE.

Recommendation:

Monitor during the next survey and prepare to make a recommendation regarding replacement .

- **Pod 1 – Z24465 Head 2.**



Observation:

Motor DE Bearing – Readings obtained have increased considerably since Nov. reading.

Recommendation:

Decide on bearing replacement timing after next reading.

Appendix 2

2.1 A site visit was carried out to Company Name in January 2012. The purpose of the visit was to carry out a scheduled vibration survey of the rotational equipment onsite that is included in the Predictive Maintenance Program to determine if the overall level of vibration of the units were acceptable and to indicate if there was any evidence of unit deterioration.

2.2 Vibration data was collected from key points on the Equipment using an Enpac 2500 data collector. This data was then downloaded to Emonitor Odyssey vibration software for analysis.

2.3 The Machine Data Analysis Summary Table in section 3 shows the status of the machine with respect to the vibration data collected. The report summary table provided is graded and uses a simple traffic light system to identify the severity of machine condition, a description of each level of severity can be found at the end of the analysis summary.

2.4 Vibration measurements were collected by recording Overall Magnitudes of Vibration in mm/sec RMS and frequencies in Hz (Cycles/sec) from key points on the equipment which can be related to ISO Standards.

2.5 The vibration levels, frequency and signature (vibration Spectrum) were interpreted to indicate the general condition of the equipment and highlight specific mechanical problems e.g. unbalance, miss-alignment, bearing deterioration, mechanical looseness etc.

2.6 The bearing condition on the equipment was measured in units of g's env Envelope Bearing Energy (acceleration g's). Enveloped Bearing Energy measures the high frequency vibration resulting from the sub-micro craters in the machined surfaces of the rolling elements and races of the bearings (due to wear) and the amplitude and frequency are used to determine the level of deterioration of the bearing.