Attachment 9

ALLIS ENGINEERING, INC.
Reliability Maintenance for Plant Profitability

"There isn't a facility we can't improve!"
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C-06 4136-210
Module PF
Section E Tab 6
By W Date 11-21-02

September 19, 2002

John Burcham
City of Escondido
Escondido, CA

Dear Martin,

Enclosed, please find your report on the 4 blower units. These were tested using more than 1 vibration analyzer. Further more, the alignment condition was also verified with a calibrated laser alignment system.

It is our contention that the motors may be failing because the wear and tear is such that it is the cause of the breakdowns, with the exception of unit #4 which was recently re-aligned. However there are still some serious issues relating to alignment.

Keep in mind that blowers at that speed can progressively get out of alignment, due to even normal vibration.

If you have any questions on any part of the report, please feel free to call me at #760-250-3953.

It was a great pleasure to work for you and your company along with your very able staff. Thank you for putting your trust in Allis Engineering Inc

Very best regards,

Lori Baly for Al

Al Suther, CEO / Principal Engineer
Allis Engineering Inc.

Encl: report, gift
ALS/llb

4.2 Unit 2 - Ran relatively smoothly with acceptable levels of vibration but also with a mild indication of rubbing at the blower. Shaft when no longer under load rotated rather freely. Alignment angularity was less than one mil per coupling inch diameter with parallel between 5.7 and 7.5 mils in both vertical and horizontal planes, which while not acceptable as measured with thermal expansion accounted for is not as bad as some.

4.3 Unit 3 - Exhibited tighter shaft. Likely rub rub at the blower. The misalignment condition is excessively poor with the vertical with angularity of 2.6 mils per inch of coupling (UNACCEPTABLE) and 26.4 mils of vertical parallel offset. A formidable number rarely encountered. The proper number should have been below 1 mil and 3 mils respectively.

4.4 Unit 4 - This unit had recently lost a motor. New motor and new alignment. Alignment was excellent (0.1 - 1.2 and 0.7 - 2.5 mils). Shaft rotation was very free. Yet vibration indicates a serious problem at the blower veins or rotating elements with a possible bent shaft. Unit should not be run. Blower is running at an excessive temperature range.

While bearings may fail due to wear (calculated bearing life never follows is always at variance with the actual measured life span)

5.0 Recommendations:

5.1 It is suspected that the speed, heat and duty hours have combined to damage the blowers in their rotational parts damaging both shafts and bearings as well as causing corollary damage in motors (and foundations). A combination of metal fatigue, inadequate shaft alignment and thermal cycling has caused damage that only a complete overhaul can fix.

5.2 Given the comparatively more limited efficiency of these units compared to modern blowers, it may be indicated to consider upgrading entirely to a new breed of blowers similar to the drawings enclosed (Allis does not sell nor recommend blowers).

5.3 New foundations should be considered and blowers relocated to a segregated building to isolate for noise and vibration.

5.4 When commissioning new blowers include specifications for vibration and alignment in order to ensure long life from start.