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Date: 26 November 2001

Quote Reference SAO/00724/NL

Dear Sir,

Continuing on from your fax correspondence and our site attendance, please find following the items checked and found requiring attention.

It must be noted that when we attended site the following faults, omissions and observations were present on the HVAC Plant, these include:

- Right Hand Chiller was in ALARM displaying 'CLOCK FAULT'. We tried to reset the fault but it would not clear. Suggest the Manufacturer return and diagnose Control Board. The chiller did not run on the day.
- Primary Chilled Water Pump No1's Motor Windings are down to Earth. Pump Left Isolated.
- No Trace Heating on External Pipe work.
- No Glycol Present in Chilled Water.
- Original External Pipe work heavily oxidised.
- Chilled Water Strainers were checked and were found spotless. Chilled Water Quality in system seems very high.

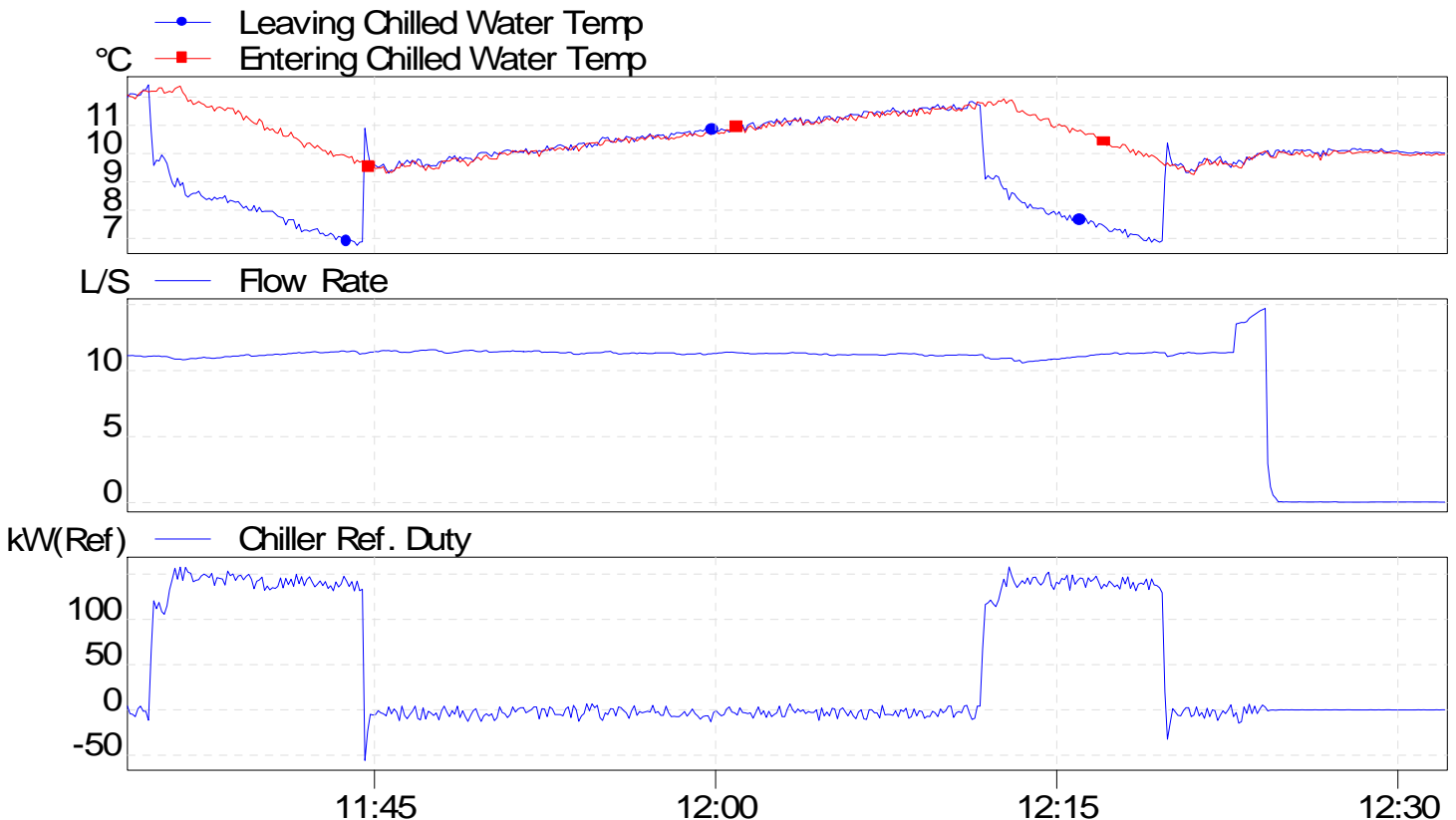


Figure 01.

The chiller flows were checked with an Ultrasonic Flow Meter, it was noted that the Left Hand Chiller had a flow rate between 10.8 and 11.2 Litres/Sec, down 6% of design Flow as per Figure 01. The flow rate through the Right Hand Chiller was measured between 7.5 and 8.0 Litres/Second, down 35% of design flow.

Figure 01 represents the 50% Load Running of the Left Hand Chiller. The Printing Processes on site were off line and there was no load to mention on the day. Looking at the graphs in Figure 01, it seems this chiller would do it's full load duty as it had the correct Chilled Water Split at 50% i.e. 3 degC delivering 150 kW, with approximately the correct flow rate. (100% would be 6.0 degC delivering 288 kW)

It was noted the Primary Chilled Water Pumps have a design of 240 G.P.M @ 69 Ft. Head. (Approximately 15.14 L/S at 2 BarD). I have done some basic calculations and I would expect the pumps for this application to be able to deliver 23 Litres/Sec against a 4.5 Bar Head in order to satisfy the new chillers requirements. The Left hand chiller was isolated from the Chilled Water Hydraulics. This raised the flow to the Right Hand Chiller to around 14 Litres/Sec as displayed at 12:20 on Figure 01.

This site is therefore suffering from insufficient flow. It is our recommendation that due to the current failure on the Primary Chilled Water Pump that this set be replaced with a pump set that can deliver the required 23 Litres/ Sec flow requirement against our estimated Hydraulic losses of 4.5 Bar.

As with your request we have carried out an inspection on the newly installed pipe work with a view to fit Double Regulation Valves with Orifice Plates to measure Flow. The Newly installed pipe work is 3" Mild Steel. A 3" Double Regulation Valve with orifice Plate would incur additional hydraulic losses of around 30 KPa. This suggests that the selected 3" pipe work does invoke a high-pressure drop on the system at design flow.

With the extra losses of the Proposed Commissioning Sets, still utilising the current Primary Chilled Water Pumps, I would expect the Primary flow to reduce from the current 19 Litres/Sec down to around 16 Litres/Second. The flow would be balanced to approximately 8 Litres/Second through each Evaporator. As the right hand unit already runs unacceptably with this flow, the fitting of the Commissioning sets would also require the up rating of the Primary Pumps.

With the above in mind, we are pleased to offer a quotation to fit 2 off Double Regulator Valves and Orifices to the newly installed chillers. Our Price Includes:

- The Supply of 2 off 3" Crane PM 940 Double regulation Valves Incorporating Commissioning Orifice Plates.
- Installation by means of cutting out and Arc Welding a new flange to accommodate the new commissioning set into each chillers 3" pipe work leg as per Figure 02.
- Back Fill Chiller evaporators and to balance available flow.
- Make Good existing Lagging on site. Excluding any Aluminium Boxing over new Commissioning Sets.

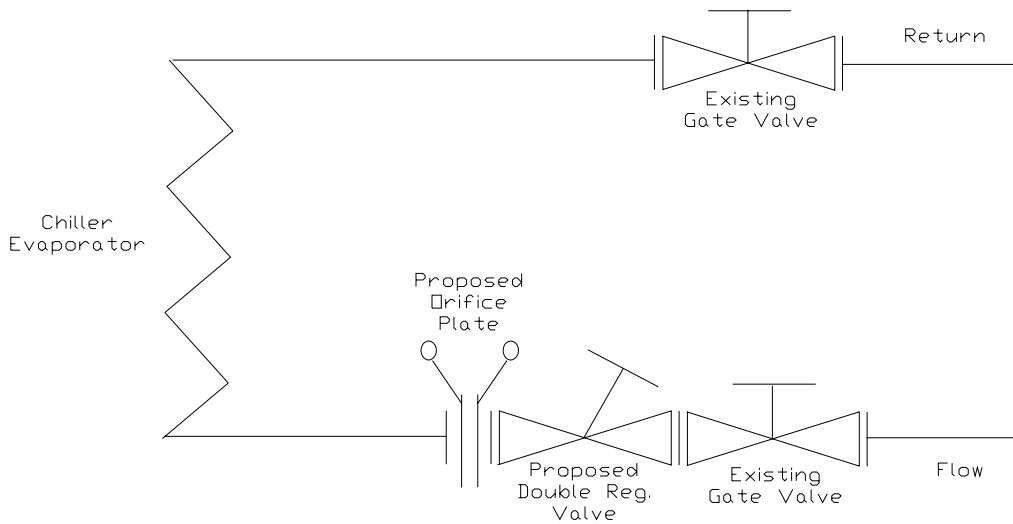


Figure 02.

For the above work we are pleased to offer a Fixed Price of: £2,884.00, which is valid for 30 days from the date of this document. As we are NOT a VAT Registered Company there will be no VAT Payable

The work would be carried out in accordance with our standard terms and conditions, which are available on request.

Please note exclusions:

1. The supply of any item not specifically mentioned
2. Any other work found necessary to enable the subject plant to operate correctly.

To quote for the replacement Primary Chilled Water Pump Set would require a lot of planning and a site inspection with a pipe fabricator. If a consultant has been involved in the works so far he may put this work out to tender. These works will be very costly in relation to the current project. We would however welcome to offer this service if so required.

We trust the foregoing is acceptable and we look forward to receiving your instructions. If you have any queries, please do not hesitate to contact me.

Assuring you of our closest attention at all times.

Best regards,

Steve Orlando  
Director