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Kriebel Engineered Equipment, Ltd.

The Pump Detective

By Doug Kriebel

The “Replacement”

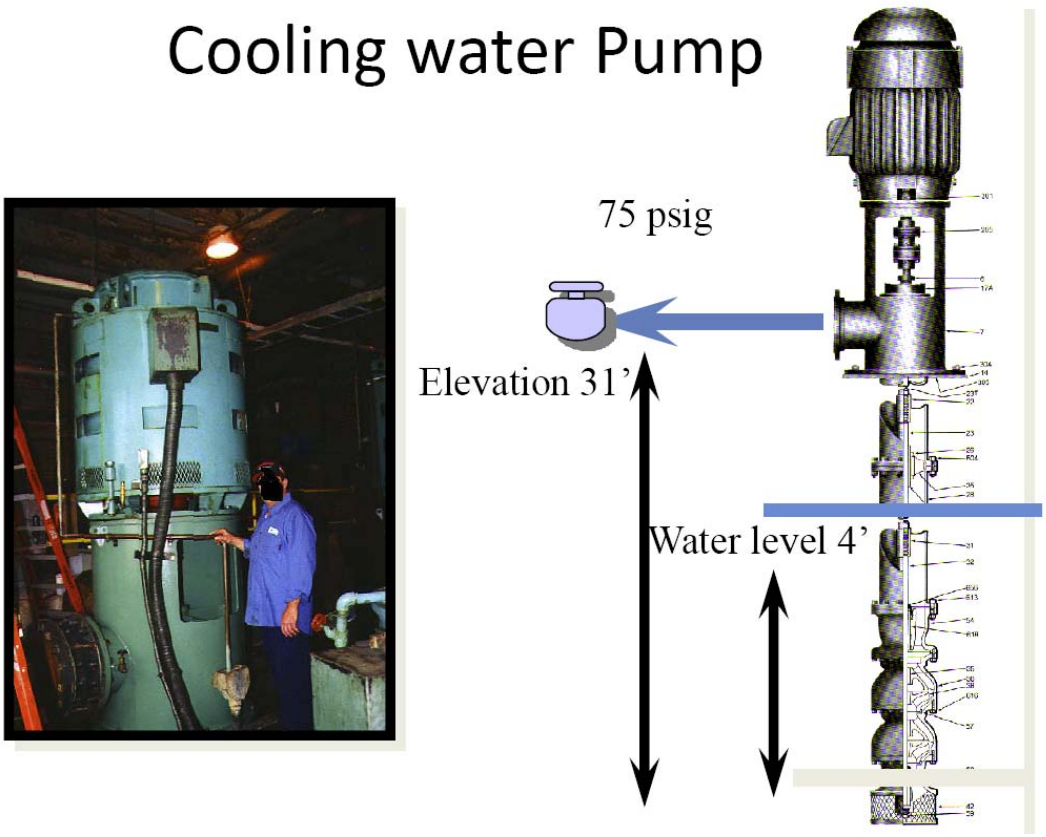
We were contacted by a customer who said their cooling water pumps were not performing well and wanted to replace them with more reliable pumps.

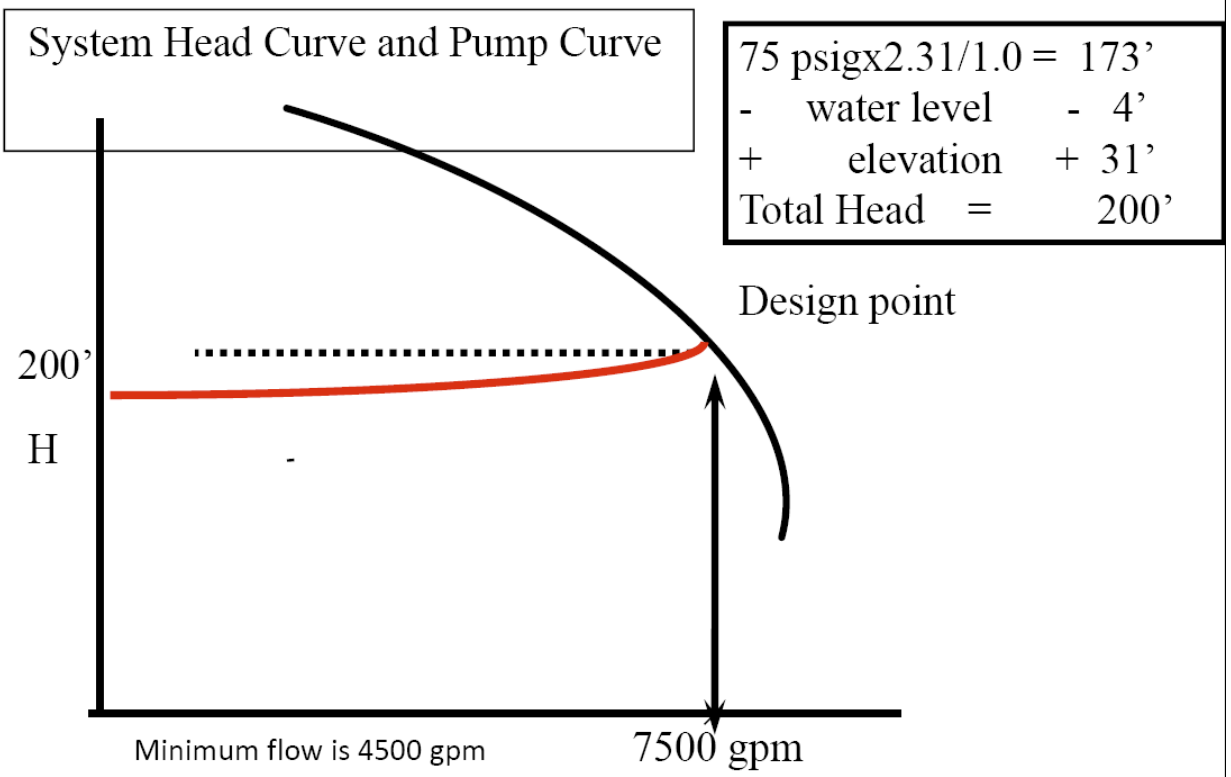
They gave us the name plate data and asked us to supply new pumps for the same conditions.

Being young and dumb, we did just that.

These are taking water from a river, sitting in an inlet basin. See Sketch….

The nameplate hydraulics were 7500 gpm at 200’. They wanted 75 psig at the discharge, the pit depth is 31’, and there is 4’ of water level above the pump suction. This all checked if you look at the Sketch and calculations on the performance curve.



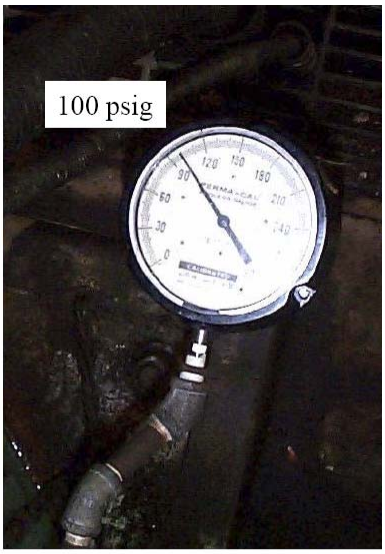


The pumps (2) were ordered and installed.

However in two months we were called because these pumps were "no good" either.

They vibrated, ran very rough and when one pump was pulled from the pit, it had damaged impeller and rings.

We visited the jobsite while the second pump was operating and checked the discharge pressure gauge.



100 psig x 2.31'/psig = 231

\- 4

\+ 31

= 258'

As you can see from the picture, the pump is running at 100 psig discharge pressure which is a head of 258', which means the pumps are operating at 3200 gpm which is below the pump's minimum flow of 4500 gpm. This was the reason for the failure of these pumps, and also the "poorly performing" original pumps.

It turns out that over the years the plant had scaled back and instead of running cooling water to two loops; it was only needed for one loop. Trying to put all that water through a smaller piping system created additional head which forced the pumps back on the curve.

Had we asked, or if the customer was more technically sound, the new pumps would not have been needed.

The quick fix is to bypass 1300 gpm through a minimum flow by pass line back to the river to bring the pump's operation to the minimum flow.

The better fix is to calculate the needed flow and head for the current conditions and specify these for a new, smaller pump. Or if conditions are right, use a VFD to tune the existing pumps to the system.

The study costs engineering time, but the quick fix is burning up a lot of extra KWHrs.

Lesson to be learned: changing the name plate does not always solve the problem!