THE INSTALLATION CRITERIA AND THE LAYOUT

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Contents

Summary

In order to achieve a smooth plant operation, not only the auxiliary components of a desalination plant must be selected taking into account their specific requirements, but also the installation and the matching of these equipment with the rest of the yard, including piping and civil work, is essential.

The causes for bad equipment operation in a desalination plant can sometimes be attributed to unsuitable installation and, in this case, even if the equipment is specified with very high standards their operation can be non-optimal.

This section intends to present some typical installations of major process equipment in the desalination plant, as well as indicating the guidelines that could help the designer to install them in the most appropriate way.

1. Criteria of Selection for the Stand-by Pumps

Operational experience over the past 50 years has led to a much more careful and cost oriented selection of the stand-by facilities.

The cost for the selection of stand-by equipment are not only related to the material cost of the pumps and motors, but also to the erection and civil works cost, as well as the pipe work, valves, and instrumentation.

Therefore the choice of whether to select stand-by facilities has to be carried out taking into account the cost benefit that can be obtained.

1.1. Seawater Supply Pumps

The seawater supply to the desalination plant is a key circuit and the choice of the stand-by is, in general, recommended even if the fixed costs can be quite high. Several operational patterns can be selected in accordance to the steam pattern, Figure 1 gives some typical installations designed for the large MSF desalination plants in the Gulf area.

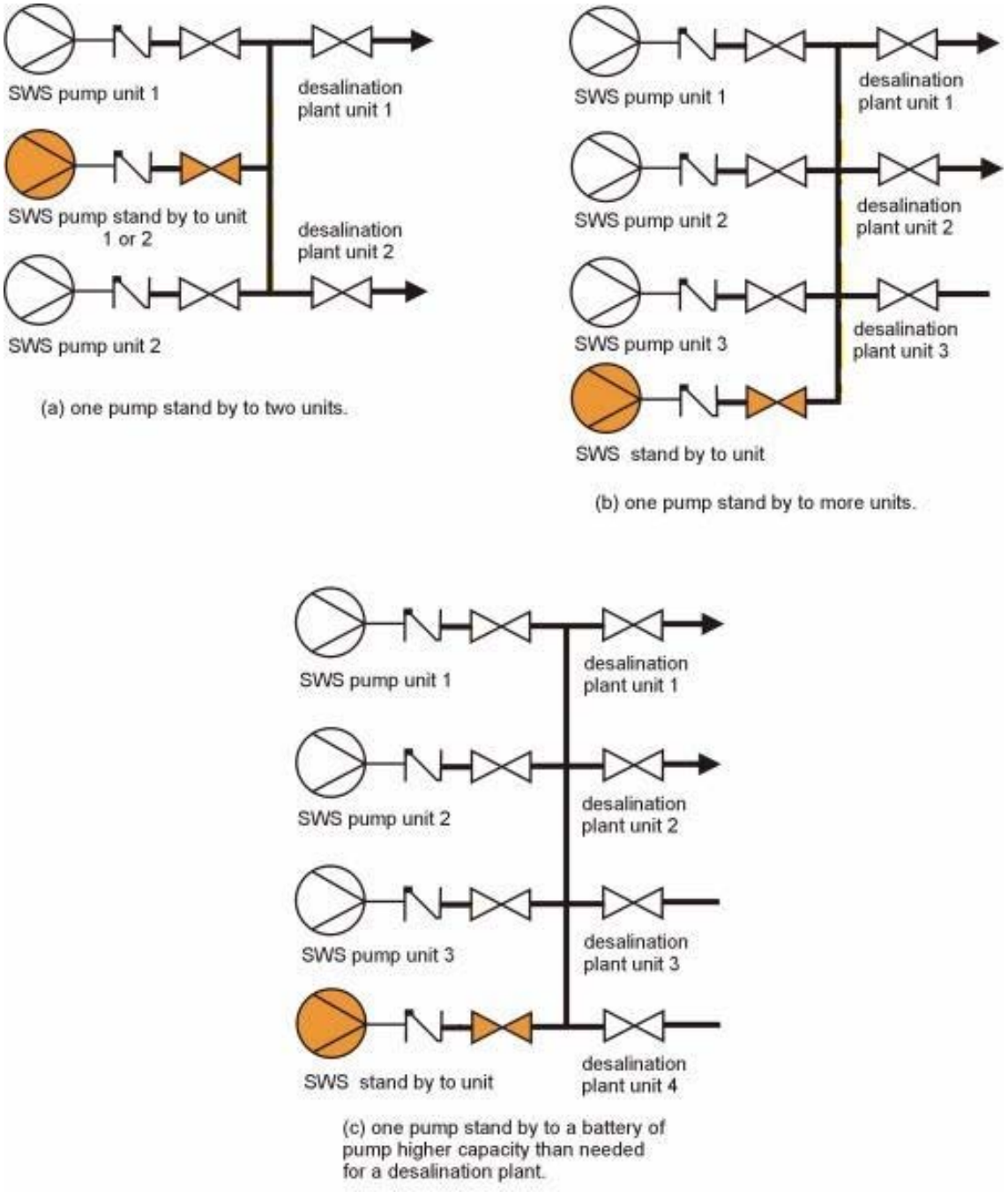

Figure 1. Stand-by criteria for sea water supply pumps.

Figure 1a shows two pumps feeding two desalination plants, the third pump being the stand-by to either unit 1 or unit 2. This pattern installed in the Al Taweelah B plant allows a high flexibility and the possibility to carry out maintenance without interrupting the operation of the plant. The investment cost related to this configuration are obviously quite high.

Figure 1b shows the overall seawater supply pumps manifolded in a common header with one pump as stand-by to all the units, and each pump with the capacity of feeding each desalination plant.

Figure 1c shows the overall seawater supply pumps manifolded in a common header with one pump as stand-by to all the units and each pump having the capacity of feeding more than one desalination plant.

The designs selected allow less flexibility between Figure 1a, b and Figure 1c but allow a higher saving in the fixed cost.

Since the availability of seawater is essential not only to guarantee a proper operation of the plant but also in order to allow smooth shut down operation in emergency situations, the provision of stand-by is recommended.

1.2. Cooling Water Recirculation Pumps

In the first desalination plants installed in the Gulf, the cooling water recirculation pump was not even considered and this design criteria is coming again into question since the operation of this pump is limited to few weeks per year whilst the investment costs necessary to install this pump are quite high. Despite this, several plants especially those contracted in the 1980s incorporated the stand-by for these pumps, but this choice has been widely regarded as wrong and the installation of the stand-by for this kind of pump is worthless.

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Bibliography and Suggestions for further study

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