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RAINY DAY WORK

Looking for an offseason project? Fine-tune your central control database.

If you or your irrigation technician are looking for something to do on a rainy day or over the winter, consider improving and fine-tuning your irrigation system central control database. Why? The database contains information that operates the irrigation system efficiently or, at a minimum, helps better manage your system.

Sprinkler spacings, along with nozzles, their associated flows, arcs and operating pressure are all tracked. As a result, the database calculates precipitation rates which then set the time that a sprinkler will operate. Combined with the ET or other weather input it is all done automatically if you so desire. If any of the information is incorrect, then the overall database will be inaccurate and your system will use more water than necessary.

First, determine how inaccurate the database may be. Do this by comparing the water use your central control system says you used in an irrigation cycle to how much water your pump station flow meter says you pumped during that same irrigation cycle. You may already know your database is way off based on what the pump station capacity is set for in the central control computer. For example, you have a 1,800-gpm pump station, but it is set in the database at 1,500 gpm. The 300-gpm difference is so that the pump station does not trip the low pressure discharge safety in the middle of its cycle because you are pumping more water than the control system thinks you are. Having a significant difference in actual capacity versus the programmed capacity is a sign of an inaccurate database. It increases your overall water window, too; operating your system less efficiently.

So where to begin? Most databases are inaccurate because the sprinklers are operating at a higher or lower pressure than the database thinks. The pressure in the database should be what the pressure regulator is set for; 65, 80 or 100 psi is standard, but there can be others. Remember, valve-in-head sprinklers will not regulate unless they have a minimum of 10 psi above the desired pressure, so to regulate to 80 psi, the sprinkler needs to receive a minimum of 90 psi. Many sprinklers on an 80-psi operating system probably will receive somewhere between 80 psi and 90 psi which will use a little more water than at 80 psi. Since it is per sprinkler, the additional flow adds up quickly over an irrigation cycle. If you do not have pressure-regulating sprinklers (non-valve-in-head) the amount of water the sprinkler actually flows can be much different than what is in the database. The database also assumes set sprinkler spacing in a set geometrical pattern with limited choices; triangular, square, rectangular. The sprinkler arc (0-360 degrees) also needs to be inputted, and in most cases those are a guess and not very accurate. A sprinkler in the field at a 230-degree arc is much different than a sprinkler in the database with a 180 degree arc. Improper spacings, geometry and arcs change the precipitation rate which changes the run times which changes the water use.

The central control database uses theoretical flow based on the nozzles installed in the sprinklers per field controller station. The manufacturer's software then assigns the flow for that particular nozzle and calculates the precipitation rates. It is very important the nozzles in the database match the nozzles in the field. Many times nozzles are changed and that change is not reflected in the database, or the right nozzles were not entered into the database to begin with. The pump system does not use theoretical flow, but actual flow exiting the pump system based on the flow meter in the discharge piping. Flow meters themselves have various inaccuracies and need to be calibrated to register flows correctly. They should to be calibrated every few years to stay accurate.

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Most pump system flow meters are also not very accurate at lower flows and this needs to be considered when making comparisons of theoretical versus actual flow. Some manufacturers' central control databases also have other required inputs such as slope and soils. They are also used as inputs to compute the overall schedule, so they also need to be accurate.

An accurate database is essential to having an efficient system. It takes a commitment to get the database accurate. It's a rainy day project that will take many rainy days. **GCI**