

Specific Capacity of Water Wells

Quick Break Training

13 March 2009

Water wells have a productive life span that can be affected by the availability of groundwater within the aquifer and the build up of biomass (plugging) and solids (clogging). This water producing zone is not uniformly distributed along the entire length of the well. As a result a significant portion of the well's capacity might only come from a small section of the entire length of the screen. This section therefore becomes prone to impacts from plugging and clogging more so than the remaining sections of the well. One major effect of this would be that, as the impacted section loses the ability to move water, there is a diversion of groundwater from other portions of the water bearing zone(s). This could impact both water quantity (through reductions in flow due to plugging and clogging) and quality (through changes in the chemistry of the waters from other zones).

These changes in water well performance can be monitored by measuring the specific capacity of the well. Monitoring specific capacity is a simple and reliable method to determine whether there have been any significant changes in performance. A well's specific capacity equals the discharge rate (in gpm) divided by the water level drawdown (in feet). For example a well with a pumping rate of 200gpm with a 10foot drawdown has a specific capacity of 20gpm/ft of drawdown. By keeping track of the specific capacity over time of the well, it now becomes possible to monitor the health of the well by comparing this data over time. Comparison has the most value if the original specific capacity was taken immediately after the well was developed and brought on line. This original specific capacity (bench mark) may then be considered the goal for all future management practices relating to preventative maintenance and radical regeneration.

Historically water wells will lose specific capacity over time as a result of plugging and clogging. Management practices should always consider getting the water well back to its original specific capacity and gauge any treatment applied to that original specific capacity value. Critical losses in specific capacity occurring even when there is only 5 to 15% loss in the specific capacity should be treated as significant. It should be at this time that a preventative maintenance servicing of the well is undertaken to recover that lost capacity. If critical losses fall to greater than -15 and down to -40% then generally regular maintenance will not bring the well back to original. Here the well will need to be regenerated using a more radical rehabilitation treatment. Normally radical rehabilitation may be considered successful is the specific capacity rises to within 10% of the original value. If a well has lost more than 40% of the specific capacity then the well may not be capable of being regenerated to original and success may be viewed if the specific capacity is regenerated by 40%. Wells that have lost more than 60% of the original capacity may not respond so well to radical rehabilitation and only a fraction (e.g. 10 to 30%) may be gained. All of this well management rests upon getting an initial specific capacity as soon as possible after development.