Air Force Long-Term Monitoring Optimization Tools

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Long-term monitoring (LTM) is a major lifecycle consideration for the Air Force and DoD. Monitoring well estimates for the Air Force alone are 100,000 wells and sampling costs approach $30M per year. Well over 90% of the groundwater data captured by the Air Force is below environmental standards (i.e. MCLs, PRGs). This information alone suggests that there is opportunity to sample less and be protective at the same time. Our experience reveals that there is significant redundancy in sampling results both over time (sampling frequency) and space (well density). This notion is not new and was motivation for developing optimization techniques that have been around over 10 years. The technical literature shows that optimization can reduce sampling efforts by 15-50% with only a minor loss of information. Sacrificing some sampling information is reasonable, particularly if it does not impact risk or drive a necessary environmental decision. In times of budget cuts and cost constraints, optimization certainly makes a lot of sense.

The Air Force developed and currently endorses three user-friendly optimization tools: GTS, MAROS, and 3TMO. They vary from being highly quantitative to qualitative in nature. Although they perform the same basic optimization function using transparent decision logic, their differences allow optimizations to be performed across varying site conditions and a wide technical audience. All of these tools are freeware and can be downloaded without cost. At very least they bring standardized process and reproducible results to a complex problem for stakeholders. Also, LTM tools offer a green and sustainable approach to “smart” monitoring and good stewardship of the environment.