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An Alternative to Side-by-Side Comparative Studies for Implementing Passive Groundwater Sampling

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Background/Objectives. The use of passive, or no-purge, groundwater sampling methods, is becoming more common and widely accepted with decades of data demonstrating that these methods can generate comparable data to traditional purge-based sampling methods. Passive groundwater sampling methods present an opportunity to collect groundwater samples in a sustainable manner with reductions in field labor times and equipment needs. Traditional implementation of passive sampling has used side-by-side comparative studies to demonstrate representative data is collected via passive sampling compared to the historical method. However, side-by-side evaluations conducted over a relatively short time period do not adequately capture intrinsic variability in monitoring well data and any unique bias that may be imparted by the specific sampling methodology. In addition, side-by-side comparisons can be costly and time consuming, particularly if a large number of monitoring wells is involved. An alternate approach to side-by-side comparative evaluations, which has been successfully implemented, is a programmatic comparison of passive sampling data to historical data to assess if a change in sampling method has impacted overall trends and interpretation of the data in a manner which may influence remedial decisions. An evaluation of this type allows for a more efficient transition to passive sampling, while still ensuring data is obtained which can meet the objectives of the monitoring program.

Approach/Activities. At a site in California transition to passive sampling was implemented for over 300 monitoring wells without a programmatic side-by-side comparative study. The data evaluation approach to support this transition included assessment of variability and time-series data trends and calculation of prediction intervals for data collected via historical purge methods for comparison to data collected via passive sampling. The primary objective of the evaluation was to confirm consistency in data between sampling methods over a majority of the wells and to identify monitoring wells at which passive sampling produced datasets which were inconsistent with historical fluctuations and trends. Passive data were evaluated over multiple events to account for one-off anomalies and focus on consistent discrepancies in the data. This evaluation did include side-by-side studies on select wells as one outcome of the data assessment. Side-by-side evaluations were limited to a small number of locations and focused on understanding the reasons and influence of discrepancies between passive and purge sample results. The programmatic comparison of passive sampling data to historical trends allowed simple identification of inconsistent data at all wells, a benefit over side-by-side evaluations at large sites where often only a relatively small subset of randomly selected wells is evaluated.

Results/Lessons Learned. Overall, the comparative evaluation produced similar results to data from literature side-by-side evaluations, and found passive sampling produced comparable datasets to purge sampling in 85-90% of cases. The evaluation approach allowed transition to passive sampling to be undertaken with enhanced efficiency relative to an upfront side-by-side study, while still maintaining the flexibility to further evaluate discrepancies in the data, either by targeted follow-up side-by-side comparative studies or other means. This comparative approach is particularly relevant for larger-scale sites, and locations where the primary objective is to

evaluate if a transition to passive sampling will influence the data in such a way that remedial decisions will be affected.