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ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

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Henry R. Darwin
Director

Registered Mail/Return Receipt
April 19, 2012

RPU12:079

Mr. Donovan L. Neese
Superintendent
Roosevelt Irrigation District
103 West Baseline
Buckeye, Arizona 85326

Re: Groundwater Modeling Work Plan for Wellhead Pilot Treatment Systems
Roosevelt Irrigation District Early Response Action
West Van Buren Area, Water Quality Assurance Revolving Fund Site, October 27, 2011

Dear Mr. Neese:

The Remedial Projects Unit (RPU) of the Arizona Department of Environmental Quality (ADEQ) has reviewed the above-referenced work plan dated October 27, 2011. The work plan was prepared by Montgomery & Associates (M&A) on behalf of the Roosevelt Irrigation District (RID). The work plan outlines the scope of work and tasks associated with groundwater modeling to evaluate hydrologic effects of prioritized pumping of wells to be equipped with wellhead treatment, as part of the pilot project. Although the pilot project is not part of the ERA and has not been approved by ADEQ, as a condition of ADEQ's approval of the ERA, RID must conduct well testing and modeling to ensure that changes in pumping will not adversely impact groundwater quality and levels within the West Van Buren Area (WVBA) beyond what would be expected with the current pumping regime. Specific comments on the work plan are identified below.

Model Updating:

Model Updating includes fixing errors in the pumping files of the Central Phoenix Plume Model (CPPM), including missing data, incorrect stress period lengths, and adding the additional model stresses through 2007. M&A must include verification that the model discretization (including layering) and boundary conditions are both adequate for the type of predictive simulations being run. Choices made during model construction affect the model results, especially particle tracking results.

Calibration Evaluation:

The work plan states that "the model will not be recalibrated during this phase". M&A's conclusion that no recalibration is necessary is based on work already conducted on the model. Although calibration statistics appear to support this conclusion, additional information is needed to make a determination. Therefore, additional evaluation on the adequacy of the existing calibration should be done. The following three areas must be elaborated upon to determine if recalibration of the model is unnecessary:

1. The water-level data set (i.e., calibration targets) must be examined. Skew in the calibration statistics can occur where many of the data points are from a few wells and must be evaluated.

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Besides data culling, two statistical methods (jackknifing, which uses subsets of the data; and bootstrapping, which randomly replaces data) may be useful to evaluate this effect.

2. The calibration check should have compared earlier statistics (pre-1999) to the later statistics (through year 2007). It is often assumed that the data quality improves over time, however a model calibrated on fewer data sets of uncertain data quality should not be expected to perform as well in predictive mode (1999-2007) when comparing results to the larger data set.
3. The RSD/range is a useful statistic, however, scientific or theoretical analysis must be provided to justify that this statistic should be less than 10 percent for an acceptably calibrated model. Also, provide documentation supporting the statement that this target "meets industry conventions." The 5.5% value may be acceptable, but it should be recomputed along with the other calibration checks mentioned above.

Predictive Simulations:

The work plan contains no mention of pumping the upper alluvial unit or taking other steps that would maximize removal of contaminants. Although the pilot test is not part of the ERA, a demonstration of system optimization to maximize contaminant removal must be made if RID chooses to request approval from ADEQ for the permanent operation of the treatment systems that are currently part of the pilot project. This demonstration must be made pursuant to paragraph 2 of the conditional approval letter dated June 24, 2010 which states "The conditions ADEQ is placing on this approval will ensure that the ERA maximizes the benefit of pumping and treating contaminated groundwater within the Site, which is intended to result in aquifer restoration and reduce the cost of the final remedy." This demonstration must also be made pursuant to condition No. 3 of the conditional approval letter which states that "One of the goals of the ERA is to remediate groundwater. RID must maximize, to the extent practical, the removal of contaminants from the subsurface when the ERA is implemented." Please also ensure that the results of the model satisfy the requirements of condition No. 2 for the ERA approval.

Groundwater Withdrawal:

The work plan states that the current net annual volume of groundwater pumped by RID is not expected to change after startup of the pilot wellhead treatment pumping regimen; an elaboration of this statement providing specific details on historical pumping and the proposed pumping regimen throughout the duration of pilot wellhead treatment must be provided.

Please contact me at 602-771-4293 if you have any questions or need additional information regarding this matter.

Sincerely,



Tina LePage
Manager, Remedial Projects Section

cc: Henry Darwin, ADEQ
Amanda Stone, ADEQ
Kevin Snyder, ADEQ