Problems with the Evaluation of the CEMEX Model

In investigating the DEIR evaluation of the CEMEX model, I have found some serious problems. Appendix E-2 shows a graph (attached) of observed and model-predicted measurements of groundwater elevations at different sites and times. To critique the evaluation thoroughly, I would need the Excel spread sheets showing the data and the calculations, which the DEIR does not supply.

For example, I cannot tell from the graph and its description in the text whether the residuals between predicted and observed measurements were computed by subtracting the first from the second (correct) or the second from the first (incorrect), which Appendix A to Appendix A of Appendix E-2 indicates is being done. Supporting the belief that the determination of residuals might be incorrect is the mean residual reported on the graph. It is -0.7 feet when it should be zero if the residuals had been determined correctly. As presented, the graph shows the estimation of predicted from observed measurements when a prediction line having equal predicted and observed measurements at the two extremes would be correct only if the estimation were in the opposite direction, unless the prediction were perfect (all the points falling on the line).

If you look at the graph, the difference between these two methods of residual computation for each data point is the identification of its residual as the horizontal distance (correct) or the vertical distance (incorrect) between the point and the diagonal line running through the dots from lower left to upper right.

Doing the calculation incorrectly could give a substantially better, but incorrect, evaluation of model fit. I would need the Excel spread sheet showing the data and the calculations to determine which way the residuals were determined and, if determined incorrectly, what the correct model evaluation might be.

Another serious problem with model evaluation is that the data points in the graph represent an area far more extensive than the CEMEX site to which the model is applied, as well as depths not accessed by the slant well there. The depths represented include not only the 180-foot aquifer, which the slant well accesses, but also the 400- and

900-foot aquifers, which the slant well does not access. In fact, the graph shows no data points representing the Dune Sand aquifer, even though it is accessed by the slant well. To provide a truly apt model evaluation, I would need the Excel spread sheet to evaluate the model separately for the 180-foot aquifer. Examination of the graph suggests that the fit for these data points (yellow-filled circles) may not be very good at all, many of the predicted elevations being uniformly much too high.

Since the slant well draws water only from the Dune Sand and 180-foot aquifers, a graph and residual calculations should be based on data from only these depths within the CEMEX area.

All this may seem overly technical, but the model fit is crucial to the DEIR since its conclusions are based on unconfirmed model predictions of future slant-well effects.

REPORTING REMEDIATION. The EIR should report the correlation coefficient between observed and predicted values for both the entire data set and for the data set restricted to the CEMEX area and the 180-foot aquifer. This statistic does not depend on the method of residual determination. One minus its square is the proportion of observed measurement variation that is not predicted, or is unaccounted for, by the model. This proportion is the statistical standard of model evaluation.

OPERATIONAL REMEDIATION. Since the model is unevaluated for one portion of its intake source region (Dune Sand aquifer) and is inadequately and likely erroneously evaluated for the other (180-foot aquifer) at the CEMEX site, reliance on the model to make predictions of the impact of slant-well pumping on groundwater elevations is out of the question for any envisioned scenario. Data collection over dozens of months of test-well pumping is necessary to evaluate the effects of the proposed project on groundwater elevations before a decision can responsibly be made to go forward with the project. Without such data collection, no EIR would be adequate and no CPCN could be justified.

If you do not take these remediation measures, please explain, Why not?

DRAFT

Comparison of Measured Versus Model-Calculated Groundwater Elevations
Transient Model Calibration (Water Years 1980-2011)

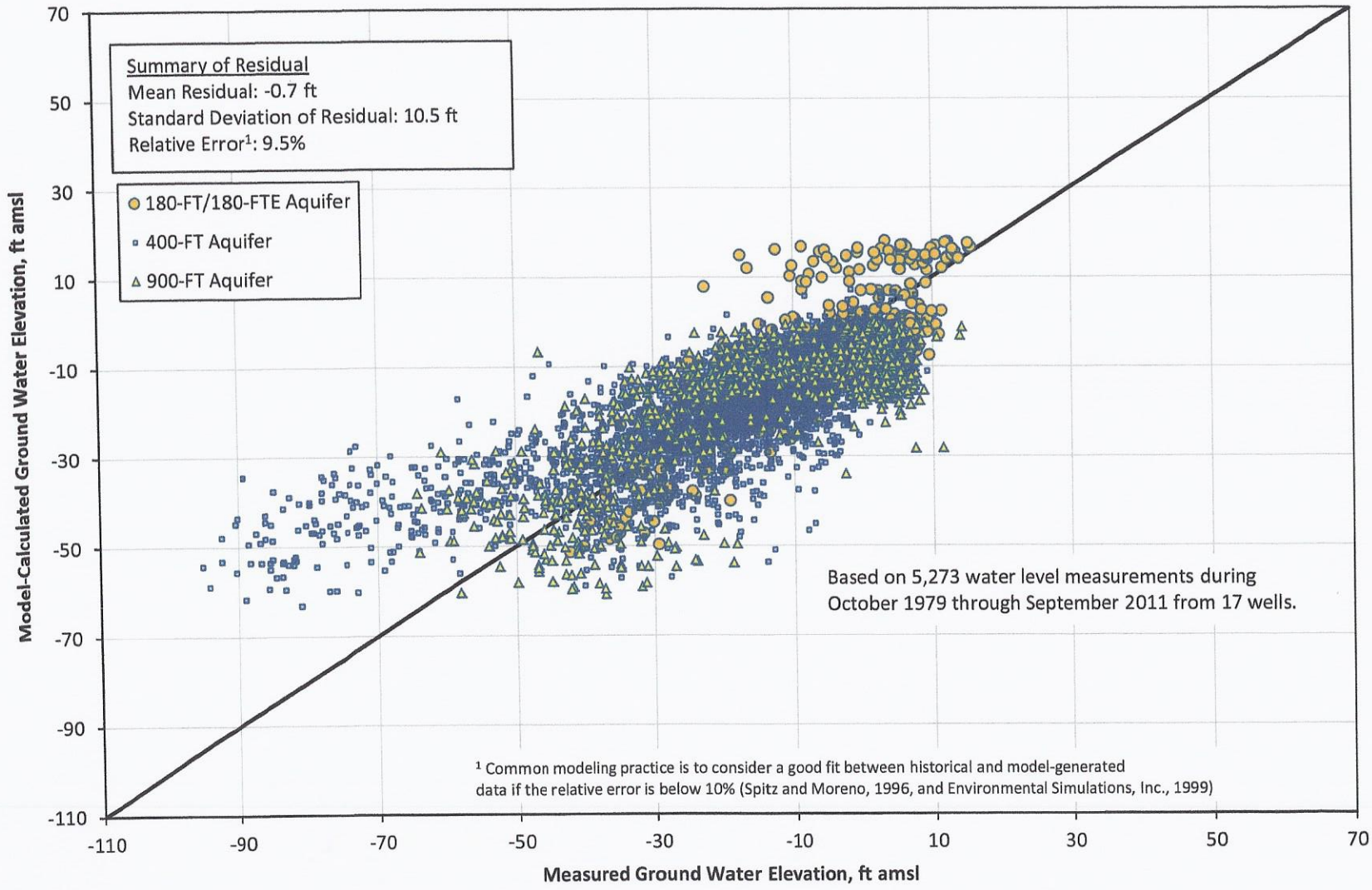

Figure 37

GEOSCIENCE Support Services, Inc.

17-Apr-15