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FENNEMORE CRAIG, P.C.

2394 East Camelback Road, Suite 600
Phoenix, Arizona 85016-3429
(602) 916-5000

Scott K. Ames
Direct Phone: (602) 916-5339
Direct Fax: (602) 916-5539
sames@fclaw.com

Law Offices
Denver (303) 291-3200
Las Vegas (702) 692-8000
Nogales (520) 281-3480
Phoenix (602) 916-5000
Reno (775) 788-2200
Tucson (520) 879-6800

May 6, 2013

Arizona Department of Environmental Quality
Attention: Tina Le Page
1110 West Washington Street
Phoenix, AZ 85007
tl1@azdeq.gov

Re: Comments and Request for Written Interim Decision Disapproving Roosevelt Irrigation District's Feasibility Study Work Plan for the West Van Buren WQARF Area

Dear Ms. LePage:

The following comments addressing Roosevelt Irrigation District's ("RID's") February 2013 Feasibility Study ("FS") Work Plan are submitted on behalf of Nucor Corporation and BNSF Railway Company (collectively, "Stakeholders"), pursuant to the Notice of 30 Day Public Comment Period on Request of Approval of Feasibility Study Work Plan for the West Van Buren Water Quality Assurance Revolving Fund (WQARF) Registry Site.

There are three principal reasons why RID's FS Work Plan should be disapproved. First, it is premature for anyone to be performing an FS at this time. RID has received approval from ADEQ to implement its Modified Early Response Action ("MERA") that is to include, when completed, wellhead treatment systems on eight of its production wells. To date, however, RID has installed only four of the planned wellhead treatment systems. RID has also indicated that, as a result of installing wellhead treatment systems on certain wells, the production capacity for those wells has declined and modifications to the infrastructure may be required to compensate for the reduced pumping capacity. Any FS to be performed on the West Van Buren WQARF Site should await full implementation of the MERA and an evaluation of the extraction efficiency of all eight wellhead treatments after RID has completed whatever modifications to its infrastructure it intends to perform.

Second, RID claims that it will consider sources of contamination other than those identified in the 2012 Final Remedial Investigation Report ("RI") for the West Van Buren WQARF Site. FS Work Plan, p.12. However, under A.R.S. § 49-287.03(E), it is the purpose of the RI to "collect the data necessary to adequately characterize the site." In fact, the first

requirement of an RI as set forth at A.A.C. R18-16-406.A.1. is to "[e]stablish the nature and extent of the contamination and the sources thereof." A.A.C. R18-16-407.E.2.a. provides that the reference remedy shall be based on "the information in the remedial investigation." Moreover, under A.R.S. § 49-287.03(F), the FS is to be fully integrated with the results of the RI. In other words, the FS is to be based on the Final RI. There is no legal basis for RID to be evaluating potential sources other than those set forth in the Final RI.

The third reason RID's FS Work Plan should be disapproved is that the Central Phoenix Plume Model ("CPPM") it claims to be using to support its FS (FS Work Plan, p.17) is not adequate for that purpose. Furthermore, RID does not explain how it intends to consider or identify additional sources. To the extent RID believes that its groundwater model can be used to identify other potential sources of contamination, it is mistaken. The groundwater model is inappropriate for that purpose also. See attached technical comments from Conestoga-Rovers & Associates ("CRA"), consultants for the Stakeholders.

For the reasons set forth above, Stakeholders request a written interim decision from ADEQ disapproving RID's FS Work Plan.

Sincerely,

FENNEMORE CRAIG, P.C.

Scott K. Ames

cc: Henry Darwin, Director (HRD@azdeq.gov)
Kevin Snyder, Project Manager (snyder.kevin@azdeq.gov)

Enclosure: Technical Comments

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

May 6, 2013

Reference No. 036752/077060

Mr. Scott K. Ames, Esq.
Fennemore Craig, P.C.
2394 E. Camelback Road, Suite 600
Phoenix, Arizona
85012-3429

Dear Mr. Ames:

Re: Central Phoenix Plume Model (CPM), West Van Buren Water Quality Assurance Revolving Fund (WQARF) Study Area (WVBSA)

This letter presents Conestoga-Rovers & Associates' (CRA's) comments on the utility of the above-referenced model as the basis for groundwater flow and transport modeling in the WVBSA. Weston Solutions (formerly Roy F. Weston {Weston}) prepared this model in 2000 and the Roosevelt Irrigation District (RID) is using it as part of the Feasibility Study (FS) it is preparing.

CRA has reviewed the 2000 modeling report and model input/output files at your request and has prepared this letter to document our observations and comments.

CRA understands that RID has been reviewing and revising this model. We do not have the results of their work and condition these comments on the review of RID's work product and revisions to the model.

BACKGROUND

1. The CPM Model covers an area of 180 square miles bounded by 99th Ave on the west, 56th St on the east, Camelback Rd on the north, and Dobbins Rd on the south.
2. Weston used a uniform grid size with a spacing of 660 feet (ft) by 660 ft per model cell.
3. Five model layers represent the Upper Alluvial Unit (UAU), Middle Alluvial Unit (MAU), and Lower Alluvial Unit (LAU). Two layers are for UAU, two layers for the MAU, and one layer for the LAU:
    a. The UAU is loosely consolidated silt, sand, and gravel with clay present only in minor amounts as clay lenses. Weston considered the UAU to be relatively uniform and assumed clay/silt lenses do not play an important role in groundwater flow. Weston subdivided the UAU into two model layers; however, the model documentation suggests there is likely a continuous clay layer that could be used as a third model layer for the UAU.

b. The MAU is predominantly silt and clay with sand and gravel lenses. Weston subdivided the MAU into two model layers of equal thickness.

c. The LAU is mainly conglomerate and represented as one model layer.

4. Weston used assumed values for precipitation, canal leakage, Salt River leakage, irrigation recharge, and lateral groundwater flow to represent groundwater recharge in the model.

5. Water supply (well production) was considered as the main groundwater extraction.

6. Although canal lining history was discussed in the model documentation; Weston did not explicitly represent it in the final model.

7. Weston assumed that the canal recharge rates from 1970-1977 and 1989-1996 reflected the canal recharge in 1978 and 1988, respectively.

8. The model was run in transient flow conditions from 1972 to 1996 with three stress-periods assigned for each year for a total of 75 stress periods.

9. Weston used 156 calibration targets. 70 out of the 156 calibration targets are water supply wells including RID, SRP, and COP wells.

10. Weston extended the model from 1996 to 1998 and considered/used this extension as the model verification.

11. Numerous data gaps existed at the time Weston developed the model. Weston identified these data gaps in the report. These data gaps include the following:

a. A lack of detailed well construction information.

b. Insufficient bedrock characterization at the northeast corner of the model domain.

c. A lack of observed groundwater elevation data in the area northwest of the model domain.

d. Limited characterization of the vertical hydraulic gradients in all units (UAU, MAU, and LAU).

e. Limited data for the leakage from Salt River.

f. The calibration targets (wells) were not surveyed, therefore most of the observed groundwater elevations were estimated from ground surface contour maps with resolution on the order of 5 ft.

g. The water levels in the production wells were "flash" static water levels. A flash static water level is a water level in a production well measured usually in minutes after the well is turned off for a short period of time.

h. Insufficient aquifer testing data in most of the areas within the model domain.

i. Poor delineation of the MAU in the eastern portion of the model domain.

j. Seasonal pumping data for COP wells and SRP wells were not available for use in the model. Weston therefore assumed that the seasonal pumping patterns for the RID production wells was representative of the seasonal pattern of pumping for the COP and SRP wells, which appears to be an inappropriate assumption based on the demands for water from each of these three operators' customers. In addition, the pumping records in the modeling report appendices are to be incomplete.

k. The clay layer in the UAU was not represented in the model where it exists.

CRA COMMENTS

A. The model grid appears to be very coarse both horizontally and vertically (in particular) and therefore is not likely suitable to evaluate contaminant transport in groundwater.

B. The model construction is outdated and does not reflect the current understanding of geology and hydrogeology in the WVBSA and in the area where RID operates its wells.

C. The model does not represent the presence of the continuous clay layer where it exists in UAU, although Weston recognized the presence of the clay layer in the model documentation. The clay layer plays a significant role in controlling groundwater flow within the UAU. The presence of the clay layer results in a strong vertical gradient between the upper UAU and the lower portion of the UAU, especially when pumping occurs in the lower portion of the UAU. This results in a significant difference in the groundwater flow pattern in the upper UAU and the lower portion of the UAU. Where the clay layer is not present, groundwater extraction from the lower portion of the UAU has a direct and profound impact on groundwater flow in the upper UAU. The existing CPM model does not represent these fundamental hydraulic conditions.

D. The model calibration relied on the observed water level mostly in water supply wells that are screened in multiple subunits. True equilibrium groundwater conditions may not have been achieved before the flash static water levels were measured. Relying on water supply wells as calibration targets likely introduces additional uncertainty into the model calibration and in turn the model results. Therefore the model cannot be relied upon to represent the actual groundwater flow conditions. There may be a bias in the predicted groundwater elevations but the model appears to be so coarse and the calibration targets so uncertain that it is not possible to assess the significance of the bias or skew.

E. The presence of numerous data gaps means that the model may not be representative of the actual groundwater flow conditions. RID has apparently already re-examined the stress periods in the model, developed new calibration targets, updated boundary

conditions, and updated recharge conditions. However, using this better information on an outdated and unrepresentative model construction appears to serve limited purposes.

F. A complete reconfiguration of this model would be required using appropriate discretization both horizontally and vertically and the aquifer characterization information collected in the area since 2000; this would be in effect a new model. This would be needed to make reliable predictions with respect to groundwater flow and contaminant transport.

Should you have any questions on the above, please do not hesitate to contact us.

CONESTOGA-ROVERS & ASSOCIATES

Stephen M. Quigley, P.E.

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