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**REMEDIAL  
INVESTIGATION  
OF THE  
MIRACLE MILE WQARF SITE  
TUCSON, ARIZONA**

**Prepared for  
ARIZONA DEPARTMENT OF  
ENVIRONMENTAL QUALITY**

**URS Job No. 24097087  
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## 10.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

### 10.1 CONCEPTUAL SITE MODEL

Analytical results of water quality samples collected from monitor wells, water supply wells, and private wells indicate that the regional aquifer beneath the Site currently contains concentrations of TCE and chromium that exceed their respective AWQS. However, there is currently no known exposure to these COCs above the AWQS or MCL. Two other VOCs (1,1-DCE and cis-1,2-DCE) are present in the regional aquifer at the Site but at concentrations below their respective AWQSs, and hence, are not considered to be a potential risk to human health. PCE is also detected within the site in the regional groundwater. However its presence in the perched groundwater is limited, and therefore it is considered a COPC with a likely upgradient, offsite source. In addition, TCE; 1,1-DCE; and chromium exist in the perched groundwater and vadose zone beneath the site.

Analytical results of soil samples collected from the area indicate no areas of known TCE concentrations above the SRLs. However, chromium concentrations at the former Spring Joint property indicate hexavalent chromium concentrations exceeding the SRLs.

RI activities have included conducting an ERA in June 2002, which consisted of the re-abandonment of the Fairfax well, a private water supply well, which may have been constructed without the use of annular materials. It was hypothesized that this well was acting as a conduit for the vertical migration of perched groundwater to the regional aquifer. Another ERA was completed for FWID in 2006 that provided a GAC treatment system to remove VOCs from two FWID wells.

Field investigations conducted to investigate and identify potential source areas of COCs included passive and active soil-gas and soil sampling. Passive soil-gas survey results defined five separate areas within the Site that contained higher detectable TCE. One area is located along the northern boundary of the Friedman Recycling property. The other four areas extend from the northern portion of the Public Storage property south to the southern and southeastern end of the R.E. Darling property and the northeastern corner of the Abrams property. TCE concentrations in the perched groundwater zone appear to correlate well with the soil-gas results in the area of the R.E. Darling property.

The elevated concentrations of TCE, cis-1,2-DCE and 1,1-DCE in the perched groundwater and vadose zone are a potential source of contamination to the regional groundwater. Natural and artificial groundwater recharge could mobilize the contaminated perched groundwater, driving it

down to the regional groundwater where it will be carried and dispersed in the regional flow direction.

Chromium concentrations in the regional aquifer, as of December 2011, indicate one IRA monitor well in the Site (IRA-8) contained chromium above the AWQS of 0.10 mg/L. IRA-8 is located near the center of the R.E. Darling property (Figure 3). Perched groundwater wells located on the Spring Joint facility have consistently shown levels of chromium 2-3 orders of magnitude above the AWQS. Therefore, the perched zone in the area of the Spring Joint facility continues to be a potential source of chromium to the regional aquifer.

PCE in the regional aquifer has shown increasing levels along the western perimeter of the Site (Figure 43). Freons are also confined to the western perimeter of the Site. The analytical results from IRA-1 and IRA-5 show proportions of Freon and PCE not found in the onsite perched groundwater. Therefore, further evaluation is needed to identify potential upgradient sources for PCE.

The migration of COCs in the regional aquifer beneath the site is governed primarily by advection and dispersion and to a lesser extent sorption. Data obtained and evaluated during the RI indicate that the TCE and chromium plumes will likely continue to migrate on a north-northwesterly trend until the contamination is intercepted by wells or is degraded.

The risk evaluation included in this RI assessed the human health risks posed by the ingestion of groundwater contaminated with TCE, PCE and chromium. Because TCE, PCE, and chromium have not been detected in the FWID public supply wells or the private domestic wells (Douglas and Crescent Manor) at concentrations above the MCL, the risk evaluation concluded that consumption of water from these wells poses no past or current risk to human health from these constituents.

Based on ADEQ's evaluation of (1) the perched groundwater and regional aquifer water quality and well water elevation data, (2) the soil and soil-gas data, (3) the history of the Fairfax well, and (4) the information from the HGL facility background report related to the facilities located in the vicinity of Romero Road between Prince and Roger Roads, ADEQ has determined the following regarding likely source areas within the Miracle Mile WQARF Site:

Chromium: The soil and perched groundwater sampling results indicate that the chromium contamination in the regional aquifer is likely sourced primarily at or near the 3660 N. Romero Road Parcel.

TCE: Perched groundwater and passive and active soil gas sampling results indicate that the TCE contamination in the regional aquifer is likely sourced at or near parcels near Romero Road between Prince and Roger Roads, including the 3660 N. Romero Road, 3749-3761 N. Romero Road, and 3735 N. Romero Road parcels.

## 10.2 DATA GAPS

Based on the data obtained from the RI and previous investigations, the following potential data gaps have been identified and may be addressed as part of the ongoing FS and remedial design:

1. Adequately define the northern and western plume boundaries of the regional aquifer.
2. Evaluate whether perched groundwater monitor wells should be installed at the previous soil-gas investigation hot spots at the Friedman Recycling and Public Storage properties.
3. Further define the nature and extent of the perched groundwater/
4. Evaluate whether a vertical delineation well is needed near IRA-14.
5. The full extent of hexavalent chromium contamination in the soil and total/hexavalent chromium in the perched groundwater in the vicinity of the Spring Joint property is not defined. Additional soil borings, soil sampling and installation of perched groundwater monitor wells is recommended in areas to the north, south and east of the perched groundwater monitor wells SJ-MW-1 and SJ-MW-2 to better define extent of the chromium contamination in this area.
6. Additional sampling and investigations are necessary to determine the exact source and extent of the nitrate in the perched groundwater.
7. Evaluate the FWID ERA for potential to treat hexavalent chromium.
8. Evaluate the need for additional monitor wells to assess potential PCE (which is a COPC) impacts from upgradient sources.