

**KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
Bureau of Environmental Remediation**

MEMORANDUM

To: Rick Bean

Through: Doug Doubek

From: Jon Vopata

Date: September 17th, 2010

Subject: Recommendation for reclassification of the North Flora Street Site to resolved status.

Site Description:

The North Flora Street Site is located in the South ½ of Section 14, Township 27 South, Range 1 West and the North ½ of Section 23, Township 27 South, Range 1 West, Sedgwick County, Kansas. The site is in west central Wichita bounded by 9th Street to the north, Flora Street on the west, 2nd Street to the south, and West Street to the east. The impacted area of concern is approximately two city blocks in width, beginning at the intersection of Flora and 9th Street and extending southeast to the intersection of 2nd Street and West Street. The site encompasses approximately 300 acres of urban residential and commercial development. The general site boundary is depicted on Figure 1.

Site History:

March 2001 – The site was discovered when Tetrachloroethylene (PCE) was detected at 6.3 micrograms per liter (ug/L) in a domestic well at 908 North Flora in Wichita, KS.

January 2002– A Site Reconnaissance and Evaluation (SRE) was conducted by KDHE. Water samples were collected from seven drinking water wells and one lawn and garden well. The well at 908 N. Flora contained PCE at 4.0 ug/L and trichloroethylene (TCE) at 0.6 ug/L. No PCE or TCE was detected in the other drinking water wells but the lawn and garden well sample indicated PCE at 15.3 ug/L and TCE at 1.3 ug/L. The SRE analytical results are depicted on Figure 2.

August 2002 – A Preliminary Assessment/Screening Site Inspection was conducted by KDHE. Sixty three groundwater samples were collected from fifty locations; ten soil samples were collected from eight locations. Figure 3 depicts the sampling locations and PCE levels detected in groundwater. Figure 4 depicts soil sampling locations and PCE concentrations in soil. The source area was defined as an area about 225 ft north of Robinson

Street in the road right-of-way along Hoover road. The contamination was likely an improper dumping along the road ditch, since no sewer lines, water lines, or other conduits for contamination were identified. Given the thin soil mantle and a subsurface composed of clean quartz sand, it is doubtful that significant quantities of hazardous substances remain in the source area. The groundwater pathway was determined to be the most significant threat at the site with numerous domestic and garden wells within a one-mile radius of the site.

- March 2004 – GSI completed a Supplemental Sampling Event (SSE) at the site. The SSE attempted to identify private water wells and water use at private residences within the site area. Approximately 25 samples were collected from residents not connected to city water to determine if these residences were impacted with PCE. Three wells contained PCE at concentrations exceeding KDHE’s residential groundwater pathway RSK value of 5 ug/L. Figure 5 illustrates analytical results of the SSE.
- October 2004 – Two residents (805 Clara and 814 Doris) were connected to the city of Wichita public water supply.
- December 2004 – The site was added to the State Water Plan (SWP) long-term monitoring (LTM) program.
- October 2005 – The first phase of LTM was completed at the site. Twenty-four domestic wells were to be sampled, however due to lack of resident cooperation and inoperable wells only nine wells were sampled. PCE/TCE was present in five of the nine wells sampled, all detections were below the residential groundwater RSK value of 5.0 ug/L. The sampling results are shown in Figure 6.
- March 2006 –At the property owner’s request, KDHE assisted in connecting the residence of 913 Doris to the city of Wichita public water supply.
- May 2006 - KDHE initiated a survey and sampling event to fill data gaps and determine the extent of contamination at the North Flora Street Site. KDHE's survey identified 20 domestic wells and 30 lawn and garden wells within the newly defined site boundary. KDHE was successful in obtaining samples from 15 domestic wells and seven lawn and garden wells at the site. Analytical results indicated PCE and/or TCE contamination in seven of the 22 wells sampled. All detections reported were below the KDHE RSK values. May 2006 sampling results are depicted in Figure 7.
- April 2007 - KDHE conducted LTM sampling and an additional survey of the North Flora Site to determine the full down gradient extent of the PCE/TCE plume. Groundwater samples were collected from 27 private wells.

PCE/TCE was detected in nine samples, all below applicable KDHE RSK values. April 2007 sampling results are depicted in Figure 8.

September 2007- KDHE reviewed and investigated the source area identified in the Preliminary Assessment/Screening Site Inspection. Results of the investigation confirmed the source area previously identified and indicated the neighboring Allen Millworks property was not a source.

September 2007- KDHE initiated a Site Investigation (SI) to delineate the full extent of PCE/TCE contamination. Results of the SI indicated a low level PCE/TCE plume from approximately Clara and Murdock extending in a southeasterly direction to approximately 3rd and West Streets. All contaminants analyzed during the investigation were detected at levels below KDHE RSK standards. Based on results of the SI, KDHE modified the sampling plan and conducted LTM sampling to ensure the plume was sufficiently delineated and investigated. The 2007 Site Investigation and LTM sampling results are depicted in Figure 9.

April 2008 - KDHE conducted the 2008 LTM sampling event. Nine private wells were sampled and PCE/TCE was detected in four samples at concentrations below KDHE RSK values. The 2008 LTM sampling results are depicted in Figure 10.

July 2009 - KDHE conducted the 2009 LTM sampling event. Twelve private wells were sampled and PCE/TCE was detected in four samples at concentrations below KDHE RSK values. The 2009 LTM sampling results are depicted in Figure 11.

August 2010- KDHE conducted the 2010 LTM sampling event. Ten private wells were sampled and PCE/TCE was detected in three samples at concentrations below KDHE RSK values. The 2010 LTM sampling results are depicted in Figure 12.

Hydrogeologic Setting:

The investigation area is located within the Lower Arkansas River Valley. This region is typically characterized by poor surface drainage. Unconsolidated alluvial sediments of sand, gravel, silt, and clay are of Wisconsinan to Recent Age and have an estimated saturated thickness of 60-70 feet. The Wellington Formation is the local bedrock, which is characterized by a calcareous shale with minor amounts of limestone, anhydrite, and gypsum.

The uppermost aquifer in the Lower Arkansas River Valley is composed of unconsolidated alluvial sand and gravel. Minor quantities of poor quality groundwater are also found within fractures and voids in the Wellington Formation bedrock. Regional transmissivity values are estimated to range from 0 to 250,000 gallons per day per square foot, depending upon lithology and thickness of the aquifer. Groundwater is encountered

within the unconsolidated deposits at a depth of approximately 12-18 feet below ground surface. Groundwater flow is to the southeast.

Target Identification:

As indicated in the Preliminary Assessment/Screening Site Inspection Report, the groundwater pathway was determined to be the primary threat with numerous domestic and garden wells within a one-mile radius of the site. Figure 13 depicts all the wells within a 1-mile radius of the North Flora Site identified in the Kansas Geological Survey (KGS) water well (WWC-5) database. Table 3 is a list of wells the KGS WWC-5 database identified as constructed within a 1-mile radius of the North Flora Site. The WWC-5 database identified 6 air conditioning wells, 17 dewatering wells, 214 domestic wells, 23 injection/air sparge wells, 8 irrigation wells, 403 lawn and garden wells, 3 livestock wells, 171 monitoring wells, 16 recovery/SVE wells, and 10 other/unknown wells within a 1-mile radius of the site.

During door to door surveys at the North Flora Site in 2003, 2006, and 2007 KDHE located 35 domestic wells and 33 lawn and garden wells in the vicinity of the site. These wells are listed in Table 2 and sampled for PCE/TCE with sampling results also depicted in Table 2. The well locations are depicted in Figure 14.

No public water supply wells were located within a 1-mile radius of the site. The Wichita public water system obtains water from 71 wells and one reservoir, and serves 340,000 persons. Sixteen of the wells are located in a well field within 3 miles of the site. These wells supply 9% of the water for the Wichita PWS. Fifty-five of the wells are located in the "Halstead well field" which is located 18 miles north-northwest of the site. These wells supply approximately 35% of Wichita's water. The Cheney Reservoir supplies around 56% of the total water of the PWS system and is located 20 miles west of the site.

Significant Analytical Results:

Results of the PA/SSI conducted in 2002 identified PCE in soil at up to 34 ug/Kg in the source area along Hoover Road, this is below the 2010 residential soil RSK value of 7,537 ug/Kg and the 2010 residential soil to groundwater RSK value of 121 ug/Kg. PCE was detected in groundwater at up to 99.5 ug/L, this exceeds the 2010 residential groundwater RSK value of 5 ug/L. The PA/SSI results are depicted in Figure 4.

Table 2 is a comprehensive table summarizing private wells sampled from 2001 to 2010 and includes PCE/TCE concentrations reported. The only private well samples that exceeded KDHE's 2010 residential groundwater RSK standards are: Gary Gardner's lawn and garden well with a PCE concentration of 15.3 ug/L reported in 2002; John Sanborn's lawn and garden well with PCE concentrations of 13 ug/L and 11 ug/L both reported in 2003; Carol Volye's domestic well with a PCE concentration of 17 ug/L reported in 2003; Lawrence Lank's lawn and garden well with a PCE concentration of 10 ug/L reported in 2003; and Ronald Turner's lawn and garden well with PCE concentrations of 12 ug/L and 6.6 ug/L both reported in 2003. There has not been a PCE or TCE detection exceeding KDHE's 2010 residential groundwater RSK standards in any private well since 2003.

During a Supplemental Site Investigation in 2007 groundwater samples were collected utilizing Geoprobe technology in order to delineate the full extent of the PCE/TCE plume. Groundwater samples were collected from three separate depth intervals (shallow, intermediate, deep) at twenty probe locations along the entire length of the plume. PCE or TCE were only detected at three probe locations all at concentrations below KDHE RSK values. The Supplemental Site Investigation direct-push groundwater analytical results are summarized in Table 1.

Recommendations:

It is recommended the North Flora Street Site be reclassified as resolved and removed from the State Water Plan Program. There have been no detections of PCE or TCE exceeding 2010 KDHE RSK standards in any samples collected at the North Flora Site since 2003. The PCE/TCE plume was fully delineated in 2007 and subsequent LTM sampling events in 2007, 2008, 2009, and 2010 all confirm PCE/TCE concentrations below RSK in all private wells sampled. Based on the data provided, contamination at the North Flora Street Site no longer poses a significant threat to human health or the environment.