



Illinois EPA UPDATE #4:

Wood River Refinery West Fence Line and Residential Area Environmental Investigations Roxana, Illinois

Remedial Work Ongoing:

Shell Oil Products U.S. (Shell) is continuing to address subsurface hydrocarbon contamination along the west fence line of the Wood River Refinery's (WRR) North Property. In January and February 2012, Shell's contractor, URS, completed construction and on January 31, 2012 began operation of an upgraded soil vapor extraction (SVE) system designed to remove underground hydrocarbon vapors near the WRR's North Property fence line. ConocoPhillips continues to operate a groundwater removal system on refinery property including wells located along the property fence line.

The upgraded SVE system incorporates the vapor extraction wells from the interim SVE system which had operated successfully near the intersection of Chaffer and 4th St. since early summer of 2011, and expands the area from which vapors are removed from soils. A portion of the SVE system designed to extract hydrocarbon vapors from underneath the Roxana Public Works Yard property has not yet been constructed.

Hydrocarbon Vapors Continue to Diminish Under 4th St. Homes:

The homes on Roxana's E. 4th St., under which high concentrations of hydrocarbon (mainly methane) vapors had been found, continue to be monitored for sub-slab hydrocarbon vapors on a twice-weekly basis. The interim SVE system installed for this area in May 2011 appears to have been successful at reducing subsurface methane and other hydrocarbon vapors; the upgraded SVE system continues to remove vapors in this immediate area. During past indoor air monitoring at these homes, hydrocarbon concentrations in the indoor air had not been at levels that would present a health concern for residents.

Nearby "Step-Out" and Area-Wide Screening and Sampling:

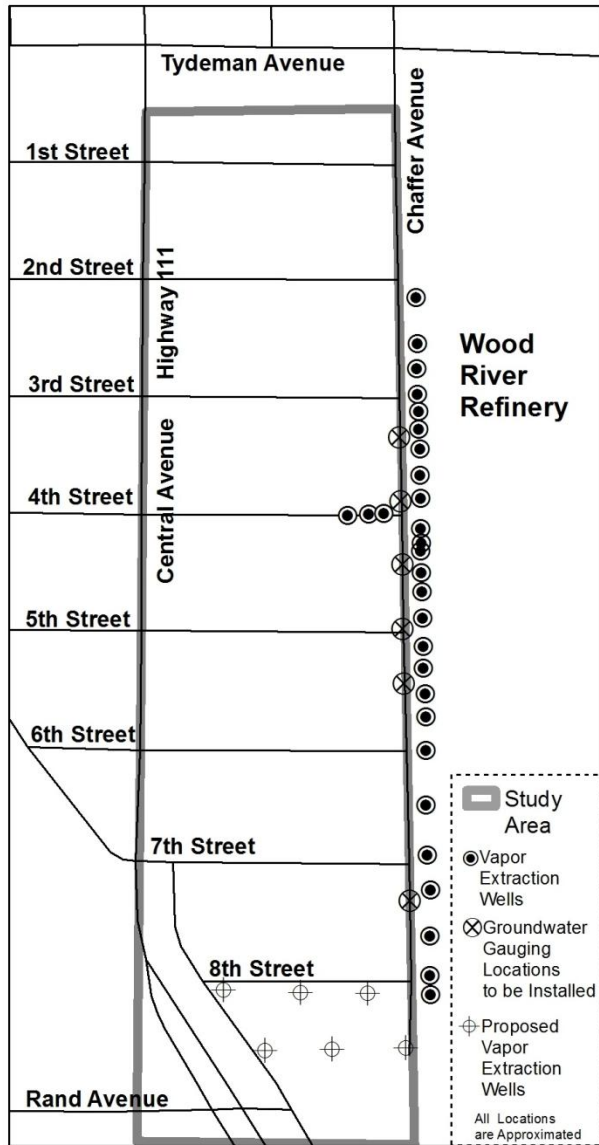
On behalf of Shell, URS continues to assess, screen and conduct indoor air sampling at other homes near the refinery and report the results to homeowners, the Illinois EPA and the Illinois Department of Public Health (IDPH). A total of 49 homes and three public properties in the wider study area, including the high school buildings, the old Post Office and the Roxana Public Works Yard, have been screened and sampled for hydrocarbon vapor intrusion with more being added to the list. (If you are interested in having your property sampled, please refer to the map on page 2 of this *Update* to determine if your property falls within the study area.)

IDPH reports that, to date, the hydrocarbon concentrations detected in indoor air at non-smokers' homes and in public buildings have not been at levels that would present a health concern for residents. (At a few homes where tobacco smoking is an additional indoor source of benzene, concentrations of benzene have been above levels of concern for the health of residents; however, in most of those cases, the benzene vapor concentrations beneath the home were low so indoor air benzene concentrations were not attributable to hydrocarbon vapor intrusion.)



Properties Within the Study Area Remain Eligible for Sub-Slab and Indoor Air Sampling:

All properties located within the study area are eligible to be screened, sampled and, if a hydrocarbon vapor problem is identified either beneath (“sub-slab”) or within the building, to have vapor mitigation work performed to remedy the problem. If you wish to have your eligible residential or commercial property sampled, **please contact Bob Billman, URS, at 314/743-4108 to make arrangements.** There is no charge to property owners for any of this work.



SVE System Upgrade:

On January 31, 2012, the upgraded, larger-scale SVE system began operation and continues to extract hydrocarbon vapors from the subsurface. The upgraded SVE system includes 28 vapor extraction wells installed from 2nd St. to 8th St. along Chaffer Ave., and is designed to remove underground hydrocarbon vapors from this six block-long fence line area. The SVE wells and the associated piping system capture and send hydrocarbon vapors to a thermal treatment unit on the refinery property where they are destroyed.

Fifteen additional soil vapor monitoring locations have been installed in the residential study area to monitor the performance of the upgraded system; soil vapor samples can be collected from three depths at each location. Monitoring indicates the system is creating a vacuum, pulling hydrocarbon vapors through the soils toward the SVE wells.

Once the necessary property access has been granted, Shell will complete installation of an additional portion of the SVE system on the Roxana Public Works Yard property. The source of hydrocarbon vapors in the soils beneath the Public Works property appears to be benzene-contaminated groundwater resulting from 1986 benzene pipeline releases near the intersection of Rand Ave. and Hwy. 111. Over time, benzene has migrated down through the soils at the release site, dissolved into groundwater, then moved with groundwater toward the refinery. (For further

explanation of this groundwater movement, see the discussion of the refinery’s “inward gradient” below.)

Groundwater Pumping at the Refinery:

Shell and ConocoPhillips are required to maintain an eastward flow of groundwater onto the refinery property along the WRR’s North Property fence line. That “inward groundwater gradient” is accomplished by pumping production wells located on the North Property in order to lower groundwater levels on-site. When an “inward gradient” is being maintained, contaminated groundwater and any free product within the refinery boundaries will remain on-site.

Because off-site groundwater is also moving toward the refinery property due to the WRR's groundwater pumping, groundwater suspected to have been contaminated by historic benzene releases near the intersection of Rand Ave. and Route 111 has also migrated toward the refinery. This movement of groundwater explains the high concentrations of benzene dissolved in groundwater under the Roxana Public Works Yard property as contaminated groundwater moves from the release site toward the refinery.

Shallow Groundwater and Free Phase Hydrocarbon Removal System Improvements:

By August 31, 2011, the Illinois EPA required Shell to provide a proposal for improvements to corrective action efforts for both shallow groundwater and free phase hydrocarbon (FPH or "free product") removal within the study area. To date, limited free product has been found at some wells near the intersection of 3rd and Chaffer and has been removed manually. Shell proposed to use the existing on-site free product removal system to meet the Agency's requirement. However, increased precipitation over the last year or more has caused the groundwater table in the area to rise and is preventing the existing system from removing the free product. Due to the current high water table, free product is now expected to be either above the level where system wells are "screened" (the well screen is the portion of each well open to the geological formation so is also the level at which groundwater moves into the wells), or trapped and immobilized in the formation as groundwater has risen.

Consequently, the Illinois EPA is requiring Shell to install additional groundwater monitoring wells along Chaffer Ave. screened at depths that can intercept both the current high water table and future lower water table levels as the groundwater table returns to more normal conditions. These new wells will be used to monitor the location of any existing free product in this area and ensure that any additional free product has not migrated into the Village from the refinery property. As with all existing project wells, if free product is found in any well Shell must remove it. Once groundwater levels return to normal, the existing free product recovery system which is currently removing groundwater, can once again be used to remove product.

For more information:

To review fact sheets and other documents concerning this project, please go to the Illinois EPA web site: <http://www.epa.state.il.us/community-relations/fact-sheets/shell-environmental/index.html> and to the Shell project web site: <http://RoxanaInvestigation.urs-stl.net>

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