

Permit



- **A Resource Conservation and Recovery Act Permit was issued to Shell on November 3, 1989**
- **RCRA Permit was renewed in September 2010**
- **Original RCRA Permit required Shell and WRB Refining LLC to control and clean up the groundwater below the refinery. Renewal requires off-site cleanup as well.**

TWO AREAS OF CONCERN



- **Historical groundwater and subsurface soil contamination along the western fence line of the North Property (below ground contamination).**
- **1986 Benzene Releases at Route 111 and Rand Ave.**

Investigation Area



1986 Benzene Releases



- January 30, 1986 approx. 8,500 gallons released
- February 22, 1986 approx. 420 gallons released

- From an underground pipeline between the refinery and the river dock
- Surface contamination was cleaned up
- Pipeline was abandoned in place

Historical Refinery Contamination



- In 1989, Shell notified the Illinois EPA of on-site groundwater contamination along the western fence line of the North Property
- Investigation and remediation of this contamination was required by the original RCRA Permit



2005 - 2008

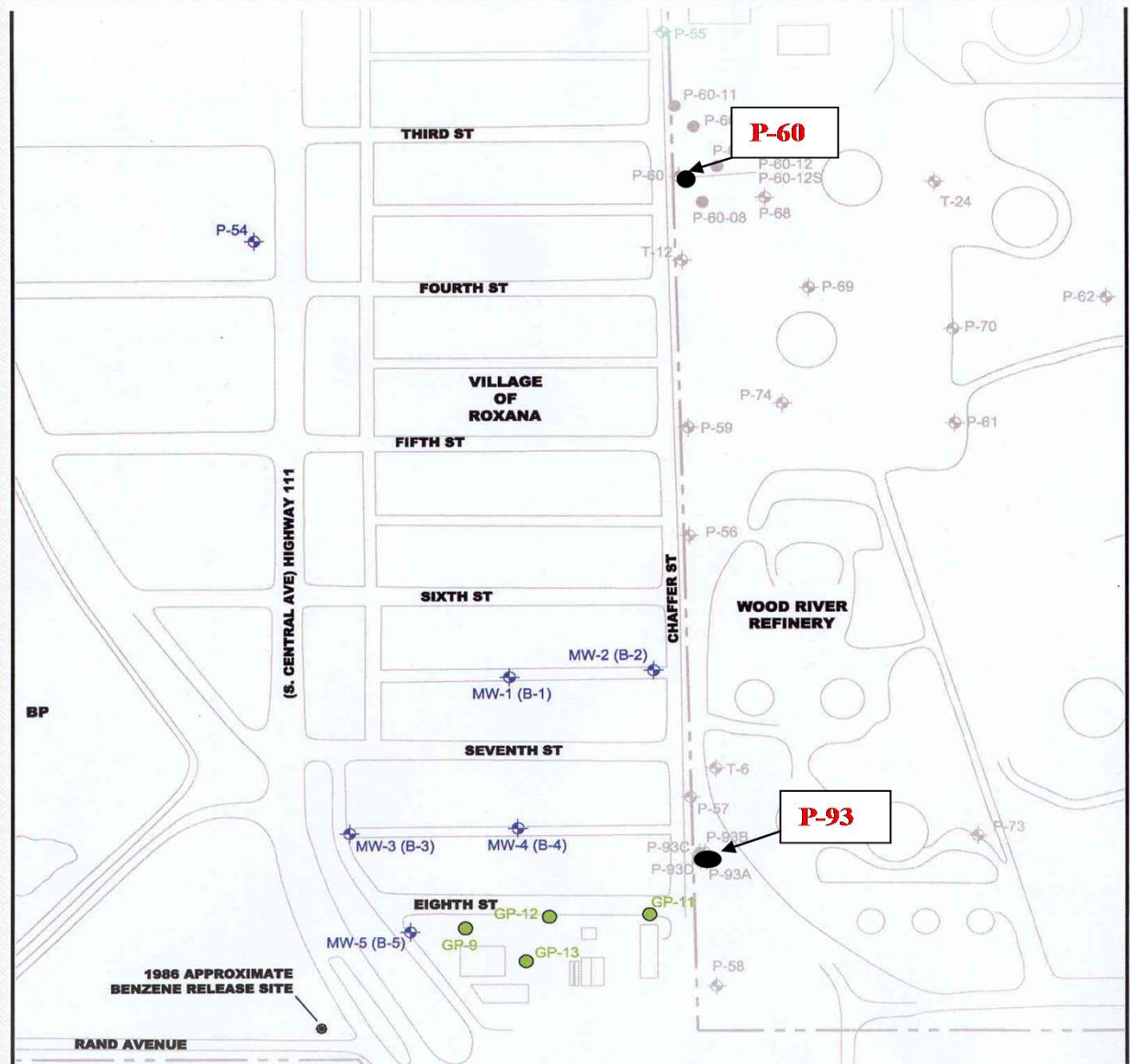
Shell conducted a study of the dissolved benzene in well P-93

Highest concentrations found under Roxana Public Works Yard

Shell conducted an investigation around well P-60

Shell found increased levels of contamination along the western fence line

Enforcement action followed; off-site cleanup required by renewed RCRA permit



2009

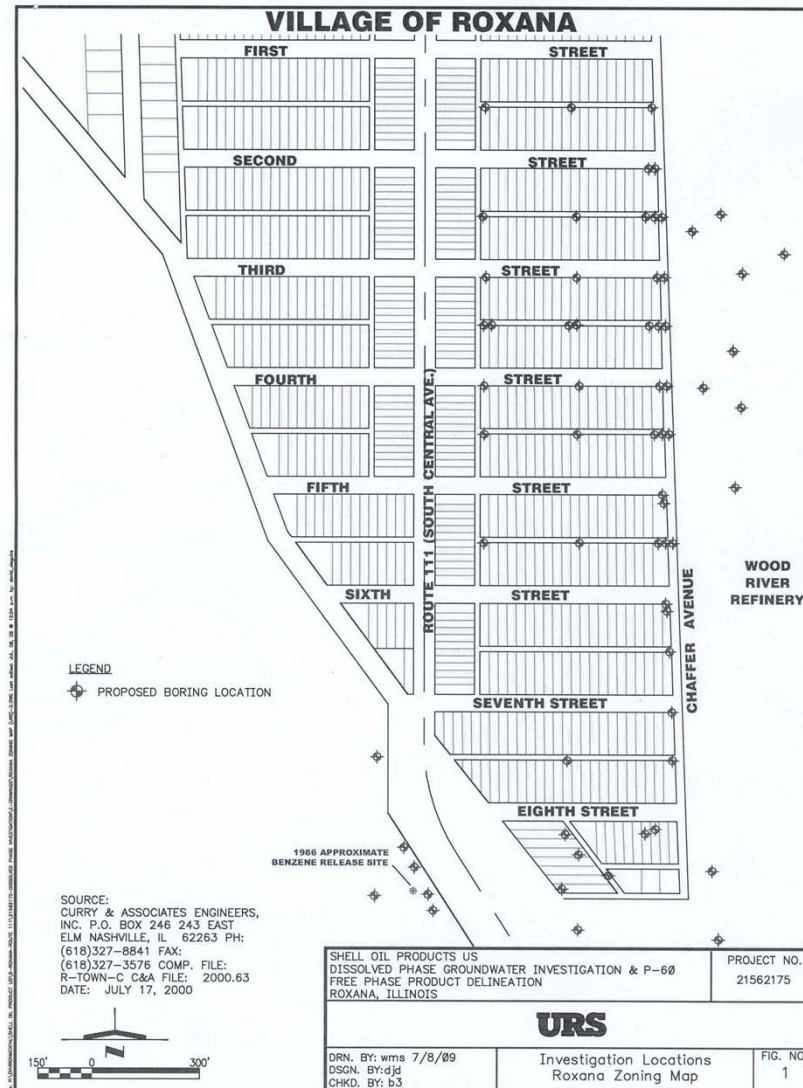
In response to P-60 and P-93 findings on-site, Illinois EPA required Shell to sample off-site and characterize :

Groundwater for dissolved hydrocarbons

Subsurface soil

Soil gas for hydrocarbon vapors

Free floating hydrocarbon on the groundwater

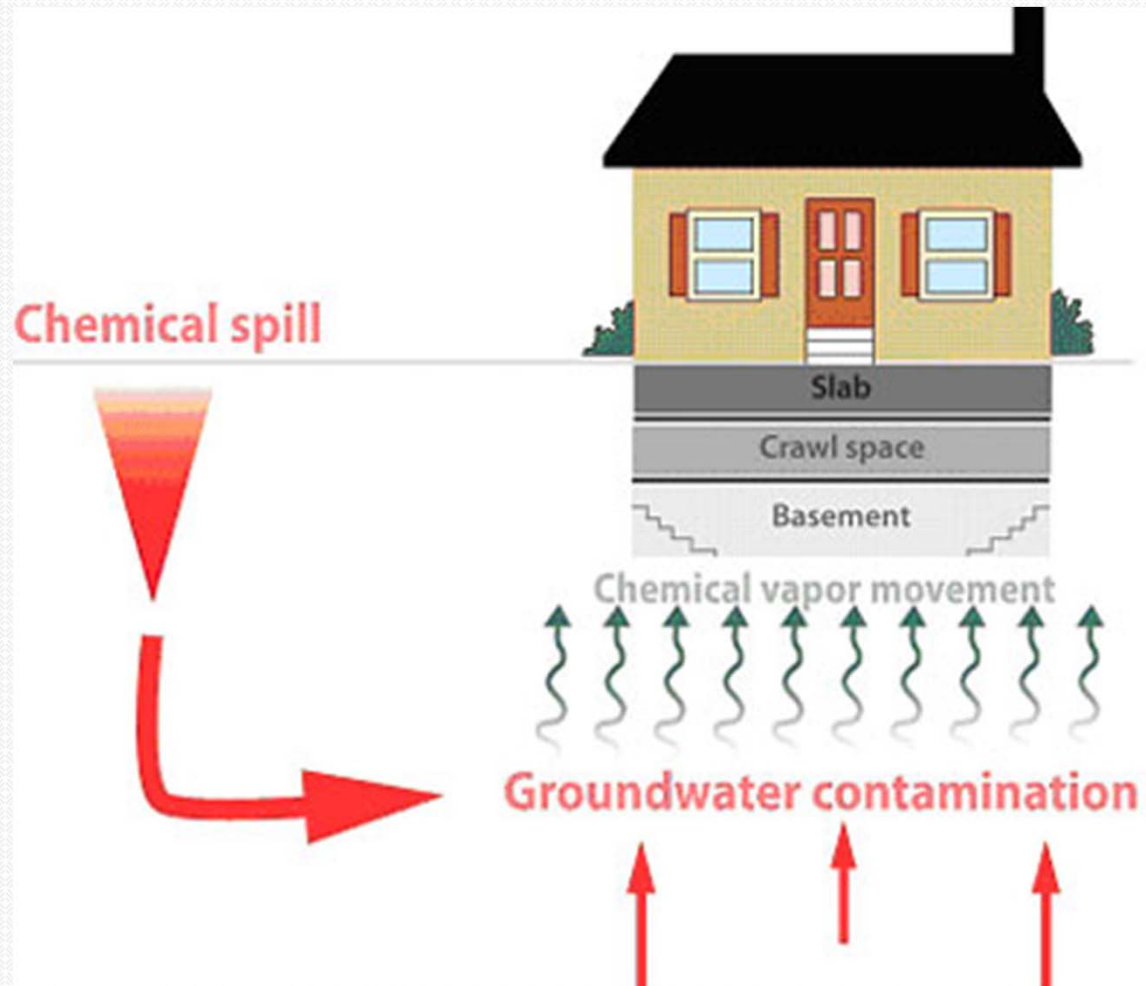


2010

2009 investigation showed potential for vapor intrusion

IEPA required Shell to investigate homes for evidence of vapor intrusion

Shell submitted a work plan in 2010, an implementation plan in early 2011, and in February, began to conduct in-home assessments with sampling





2011 and 2012 Shell Response to Elevated Vapors

Needs assessments showed elevated petroleum vapor levels under the slabs at three homes at the corner of 4th Street and Chaffer

Shell conducted aggressive sampling in these homes

Used an Internal Combustion Engine (ICE) Unit to mitigate the vapors until the Soil Vapor Extraction System was operational

Shell made the decision to purchase and demolish the homes





2011 – 2012 Soil Vapor Extraction

Along Chaffer Street on
the refinery side of the
fence

In 4th Street

Roxana Public Works
Yard

Purpose is to remove
subsurface vapors





2011 - 2013

Groundwater and soil vapor investigation to determine the extent of the contamination.



Groundwater wells

Vapor monitoring well

Soil vapor extraction wells





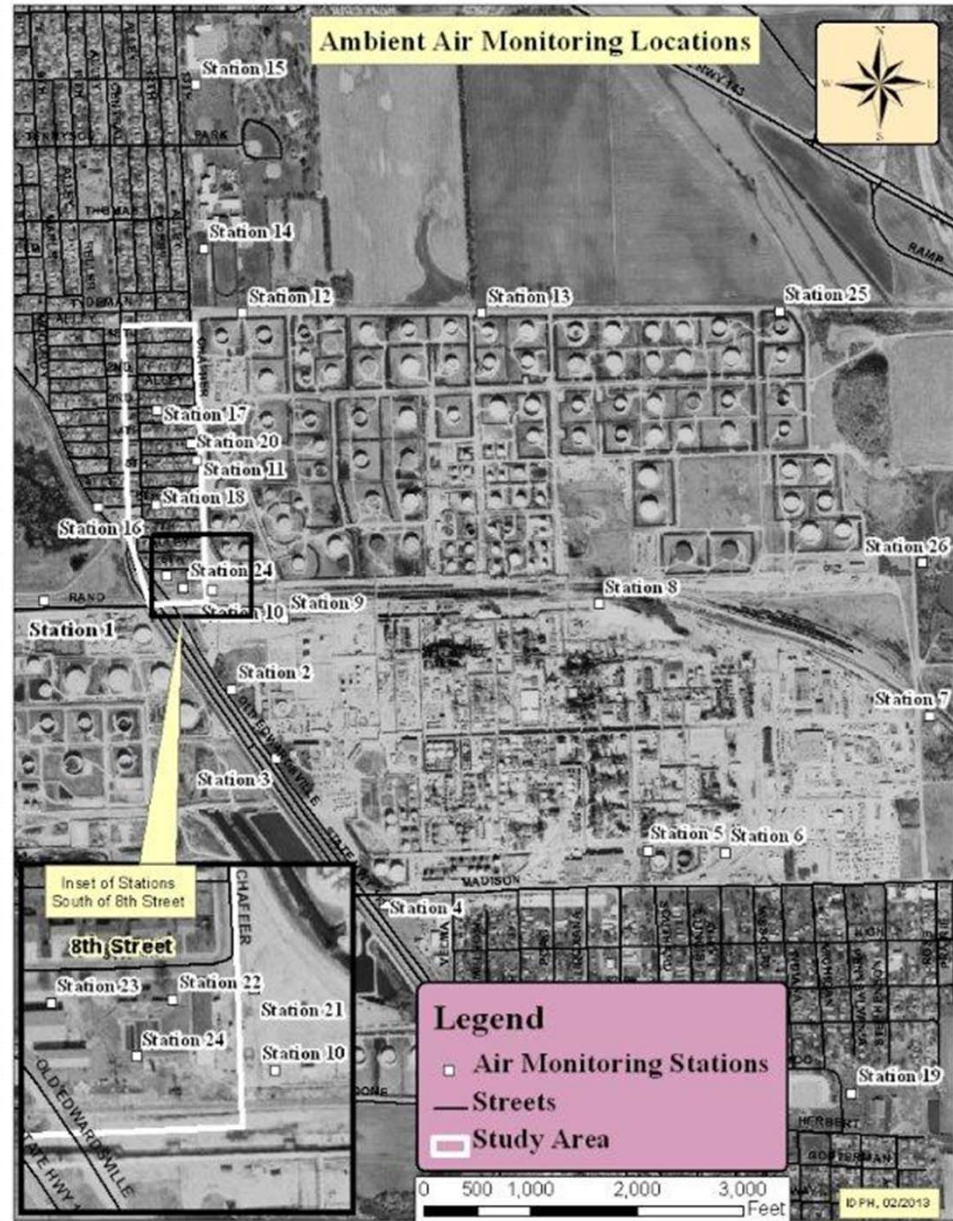
2012 Ambient Air Sampling

In response to 2011 Shell outdoor air data

May to September 2012 Phillips 66 and Shell conducted outdoor air sampling in Roxana, South Roxana and in the refinery

July 2012 Central Elementary, South Roxana Elementary and the High School Complex were sampled

2012 Illinois EPA and United States EPA conducted outdoor air sampling in Roxana and South Roxana





Prevention of Future Releases

IEPA and IAGO met with Phillips 66 to discuss the current pipeline and tank inspection procedures

Insure the current pipelines and tank are being inspected to prevent leaks

- Phillips 66 has a monitoring program to inspect and maintain underground pipelines to comply with
 - American Petroleum Institute 570: In-service Inspection, Rating, Repair and Alteration of Piping Systems
 - Coast Guard Regulations – River Dock Lines
 - U.S. Department of Transportation Regulations
 - Phillips 66 Required Standard for External Corrosion

Some underground pipelines will meet more than one set of code requirements

Process Storage Tanks



- **Regular inspection of storage tanks pursuant to American Petroleum Institutes standards**
 - External Inspections
 - Corrosion Surveys or thickness monitoring
 - Internal Inspections
 - Cathodic Protection Survey
 - Operator Visual Inspection

IEPA and USEPA requirements of leak detection of organic emissions due to leaks in tanks and equipment