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# USEPA Region V Greener Cleanup Workshop Case Study February 9, 2010

Hannover Property / Lot 2/B of the Former AM  
General/LTV Missiles and Aerospace Facility  
South Bend, Indiana

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# Case Study – Hannover Property

- Case study is presented to document the decision making process that went into the design of the final remedial work plan for the site;
- Remedial action recommended the use of high-vacuum Multi-Phase Extraction (MPE) supplemented with pump and treat to recover light non-aqueous phase liquids (LNAPLs) and remediate impacts to soil and groundwater;
- Pump and treat supplement will incorporate windmill pumps to augment power needs and recovered LNAPL will be recycled through local vendors

# Site Background

- Site originally part of 89-acre former Studebaker Corporation facility constructed in 1941
- Site was used for the manufacture of jet engines and military vehicles, and later used for the manufacture of truck and automotive parts
- Subject parcel was utilized as the utility base for the larger manufacturing facility, and operated at least 37 underground storage tanks (USTs) containing gasoline, diesel fuel, engine oils and jet fuel
- Two large UST pits were located in the northwest corner of the parcel and contained at least thirty 15,000-25,000 gallon USTs containing gasoline and jet fuel

# Site Background

- USTs were removed from the site in separate actions by 1989
- Subject parcel was segmented off and sold as separate parcel
- Numerous subsurface investigations conducted indicated the presence of petroleum impacts to soil and groundwater in the area of the former UST pits
- Significant amounts of LNAPLs were detected in groundwater encompassing 4 separate present day parcels

# Aerial Photograph



**Legend**  
• Monitoring Well

Base Map: 2005 Statewide Natural Color Aerial Photo

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FIGURE 1  
SITE MAP  
HANNOVER PROPERTY  
731 WEST CHIPPEWA AVENUE  
SOUTH BEND, INDIANA

Project Number: 06-03-008  
Date: 12/2/08  
Drawn By: CWB  
Scale: 1"=350'  
Checked By: RBV  
Sheet: 1



# Subsurface Investigation and Delineation

- Subsurface investigative activities included installation of numerous soil borings and shallow and deep groundwater monitoring wells
- Vertical delineation of free product depth was necessary due to historic USTs installed submerged in first encountered groundwater aquifer and the proximity of site to natural creek and municipal well field
- Based on subsurface investigations and delineation efforts, LNAPL generally encountered between 18 and 22 feet below ground surface (bgs); first encountered groundwater generally between 13 and 15 feet bgs (submerged LNAPL plume)
- Estimated area of LNAPL plume is 3.98 acres with a calculated volume of approximately 38,000 gallons of recoverable free product (conservative estimate)



# Pilot Testing

- Pilot testing of three different remedial alternatives was conducted:
  - Pump and Treat utilizing down well recovery pumps;
  - Selective LNAPL recovery utilizing down well skimmer pumps; and
  - High vacuum MPE
- Due to fluctuating hydrogeologic conditions, selective LNAPL recovery was deemed ineffective
- After data analysis, it was determined that MPE would effectively recover and remediate impacts; however additional drawdown of the water table would be necessary
- MPE supplemented with pump and treat would present the most effective way of recovering LNAPL and remediating soil and groundwater impacts at the site

# Impacted Area Images

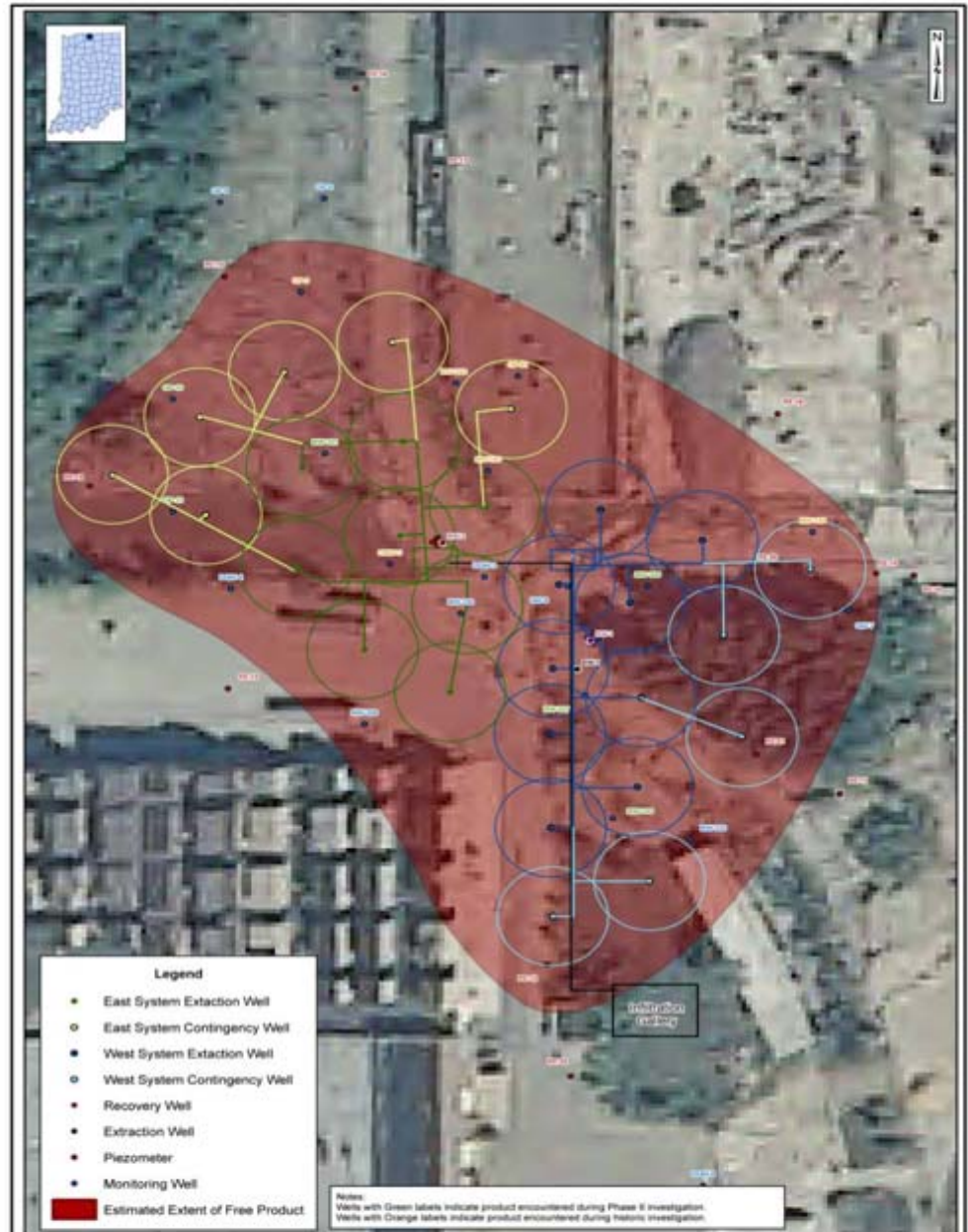


Base Map: 2008 National Agriculture Imagery Program

**FIGURE 6**  
 ESTIMATED EXTENT OF FREE PRODUCT  
 SEPTEMBER 2009  
 HANNOVER PROPERTY  
 731 WEST CHIPPEWA AVENUE  
 SOUTH BEND, INDIANA

Project Number: 08-03-009 Date: 9/8/09  
 Drawn By: CWH Scale: 1"=150'  
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Base Map: 2008 National Agriculture Imagery Program

**FIGURE 13**  
 PROPOSED REMEDIATION SYSTEM LAYOUT

HANNOVER PROPERTY  
 731 WEST CHIPPEWA AVENUE  
 SOUTH BEND, INDIANA

Project Number: 08-03-009 Date: 9/8/09  
 Drawn By: CWH Scale: 1"=60'  
 Checked By: NTV Sheet: 1

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# Green Remedial Alternatives

- After researching various environmentally efficient options for the selected remedial technology, it was determined that the two pump and treat wells will be installed with windmill operated down well recovery pumps tied into the larger remediation system
- Windmill pumps help ease electric requirements and are less expensive to maintain in the long term, helping justify the initial upfront expense compared to standard down well pumps
- Solar power would require significant initial investment with real world potential cost savings not realized until after the desired length of system operation has lapsed
- Furthermore, it is expected that recovered LNAPL free product will be recycled, with local vendors being arranged to collect the product at no cost.

# Work Items Planned

- Well and system installation – March 2010
- MPE System delivery and windmill installation – early April 2010
- System start up – late April 2010
- After system start up, electric usage data and operation data will be gathered to attempt to quantify real world cost savings brought out by the use of these windmill pumps. We look forward to sharing this data with the USEPA later this year.

Thank You

