



Accelerated Bioremediation &  
Natural Attenuation by  
*iSOC™*  
Groundwater Remediation System

**Case Study – Flying J Truck Station,  
Indiana**

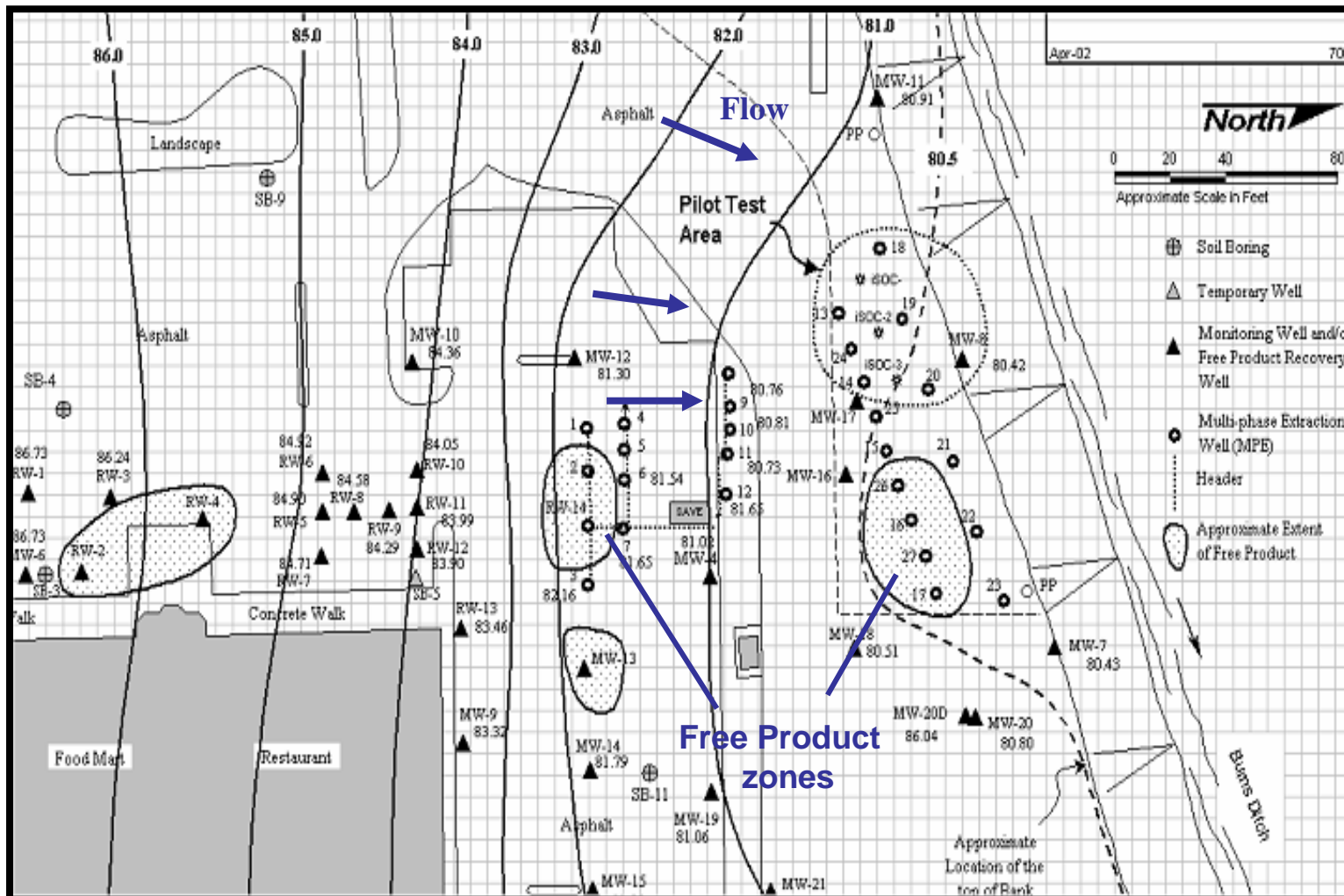
## Case Site Characteristics

- Site is underlain by medium sand with silt, clay-rich deposit at depth of 5.8 m BLS.
- Water table aquifer with depth to water table approximately 4.3 m.
- Hydraulic conductivity determined to be 3 m/day; ground water velocity 18cm/day.

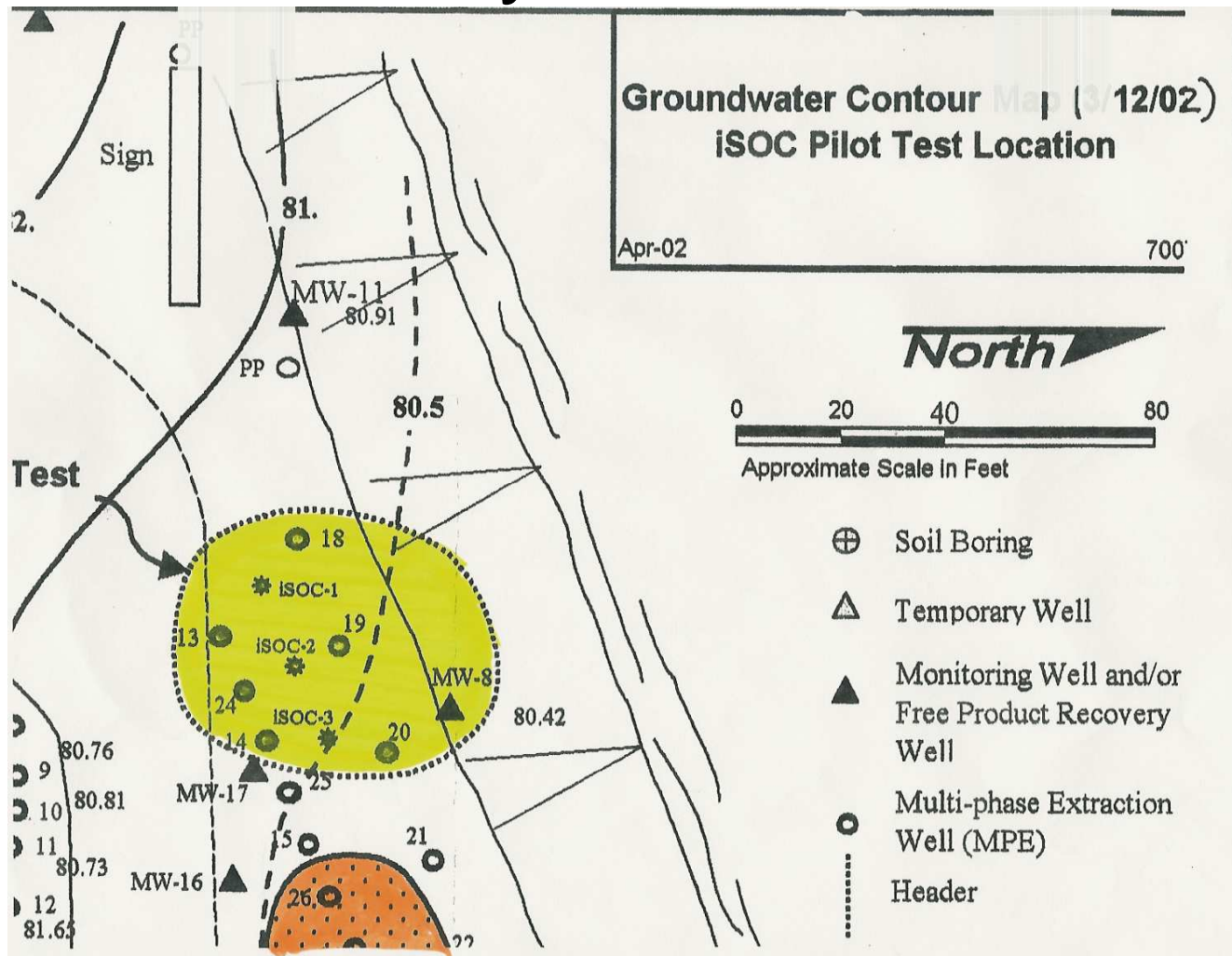
## iSOC™ System Implementation

- *i*SOC pilot currently underway; installation completed June 25, 2002.
- Five sampling rounds completed during period June through October, 2002.
- 3 *i*SOCs installed in 5 cm monitor wells
- Approximately 1.5 to 2.1 metres of water column in wells during the 5 months pilot test.
- *i*SOC well spacing- 6.1 m apart.
- Dissolved oxygen in *i*SOC injection wells ranged from 30 to 50 ppm
- Effective radius of influence 6+ metres.

# Case Study- Ground Water Flow



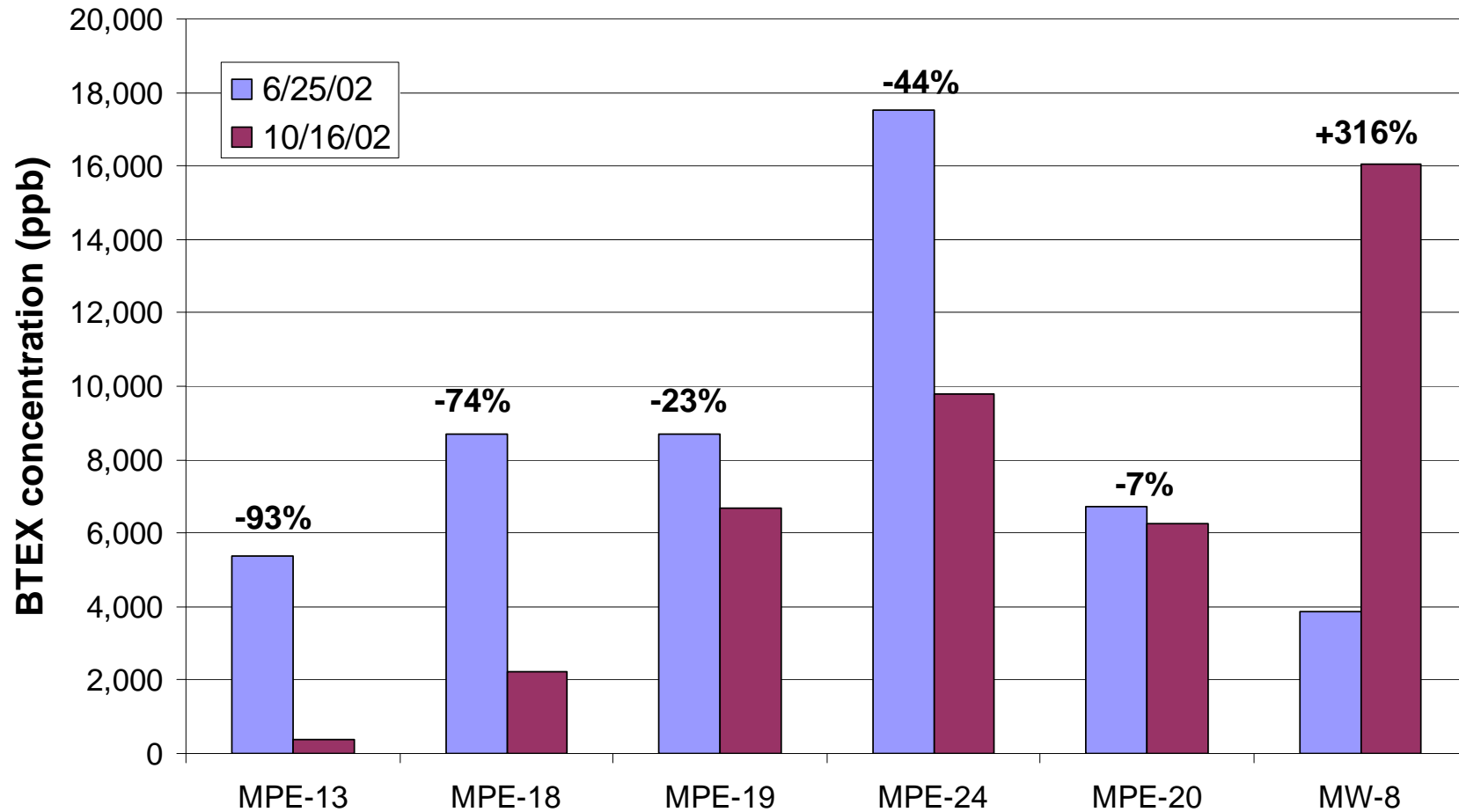
# Case Study – Pilot Test Area



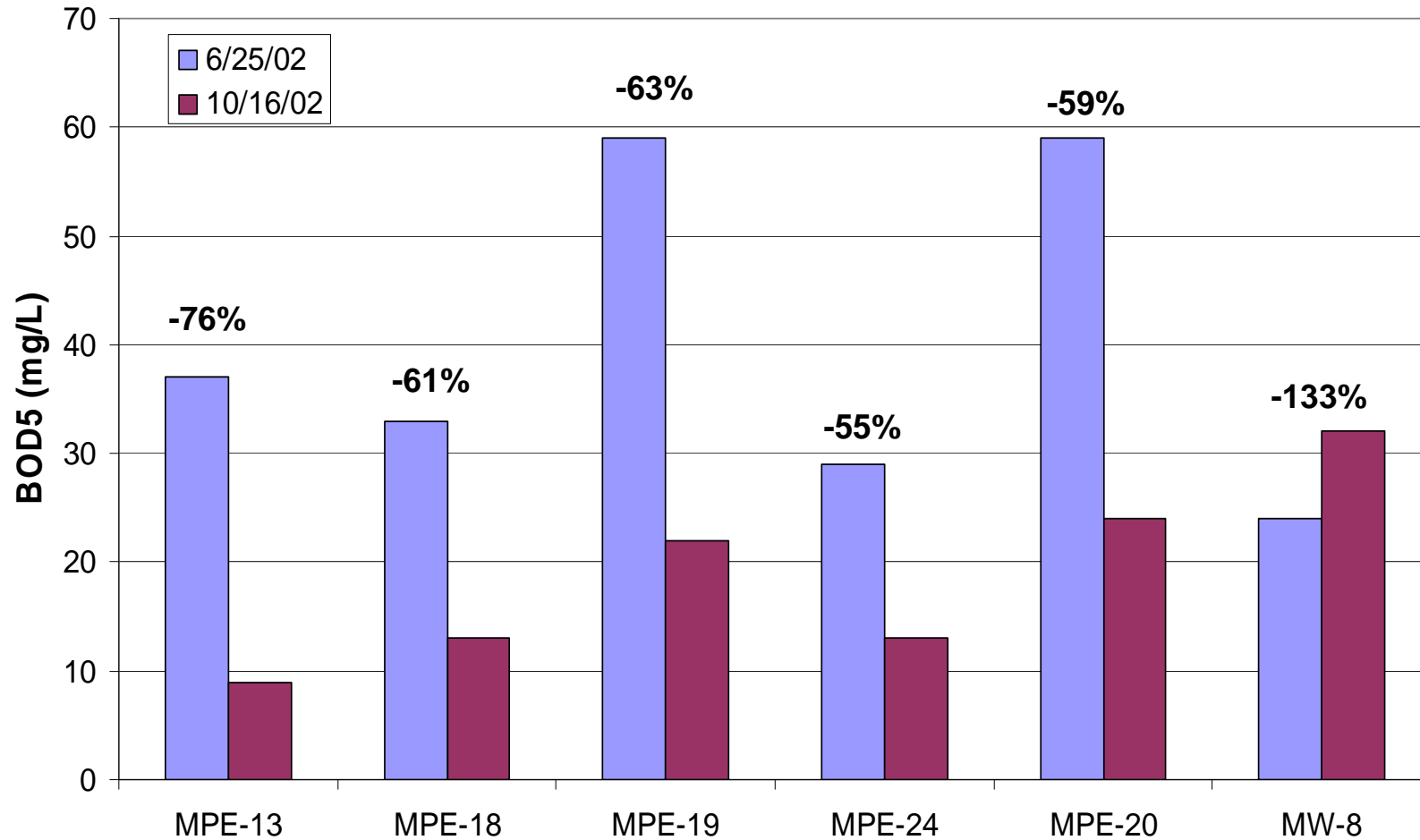
# Case Study Results

LOCATION	DATE COLLECTED	BOD, 5 DAY mg/L	BOD %Change	MAX. DO mg/L, Date	BTEX ppb	BTEX % Change
<i>Western Side Wells</i>						
MPE-13	6/25/02	37		0.4 on 8/5	5,360	
MPE-13	10/16/02	9	-76%		370	-93%
MPE-18	6/25/02	33		1.4 on 7/31	8,700	
MPE-18	10/16/02	13	-61%		2,225	-74%
MPE-19	6/25/02	59		0.6 on 7/31	8,687	
MPE-19	10/16/02	22	-63%		6,672	-23%
MPE-24	6/25/02	29		0.8 on 8/5	17,500	
MPE-24	10/16/02	13	-55%		9,805	-44%
<i>Eastern Side Wells</i>						
MPE-14	6/25/02	Free Product	-		-	-
MPE-14	10/16/02	Free Product	-		-	-
MPE-20	7/10/02	59		0.9 on 8/5	6,718	
MPE-20	10/16/02	24	-59%		6,256	-7%
MW-8	6/25/02	24		1.7 on 7/31	3,855	
MW-8	10/16/02	32	133%		16,050	316%

# Results - BTEX Degradation



# Results-BOD<sub>5</sub> Reduction



## Conclusions

- In most monitor wells, BTEX was reduced between 93% and 7%.
- Greatest reduction was in the western portion of the pilot area.
- Least reduction was in the eastern portion where free product was present and expanding and dissolved BTEX concentrations increased significantly during the pilot test. Free product now in iSOC-3.

## Future Remedial Activities

- Free product recovery will continue on portions of the site.
- Free product expanding into iSOC wells; water levels have dropped significantly forcing temporary suspension of pilot.
- Remedial action work plan submitted to Indiana DEM for full implementation of *iSOC* remediation throughout the site once free product recovery has been completed.