

Surface Water to Groundwater Technical Memorandum Briefing for the Paducah CAB

March 6, 2008



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Purpose

The technical memo was prepared to better understand several factors, including:

- Surface water and groundwater interaction
 - Movement of surface water to groundwater
 - Movement of groundwater to surface water
- Dynamics of surface water flow around PGDP



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Surface Water Overview

- The major surface water features near the Paducah Gaseous Diffusion Plant (PGDP) include:
 - Ohio River to the north;
 - Bayou Creek, a perennial (continual flow) stream, bordering the west side of the plant
 - Little Bayou Creek, currently a perennial stream, bordering the east side of the plant
- Most of the flow within Bayou and Little Bayou Creeks originates as process effluent or surface water runoff from PGDP
- If not for plant process effluent, Little Bayou Creek would be an intermittent stream
- Flow from PGDP estimated at 0.7 million gallons/day (mgd) to Bayou Creek and 1.0 mgd to Little Bayou Creek



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Groundwater Background

- Rainfall infiltration is seasonal
- For the industrial area of the plant, rainfall results in approximately 0.4 mgd of recharge
- Leakage from plant water pipes and sewer lines is suspected to be an important source of infiltration at PGDP
 - Water use for PGDP for calendar year 2006 averaged 13 mgd
 - A review of municipal water systems indicates municipal water systems lose as much as 24% of their water
 - Using this as a guide, the PGDP system could lose up to 3.1 mgd



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General Surface Water to Groundwater Dynamics

- Continuous seepage through overlying soils controls the level of the water table, as opposed to infiltration from episodic flow events in the ditch related to rainfall
- An assessment demonstrates minimal exchange occurs between shallow groundwater and adjacent ditches
- The area water table, in general, remains insensitive to storms and other surface water “events;” most surface water winds up in the Ohio River, not the groundwater
- No regular occurrences of the discharge of contaminated groundwater to surface water are known within the boundaries of the industrial area



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Creeks

Gaining streams receive water from groundwater
Losing streams seep into groundwater

Lower Bayou Creek

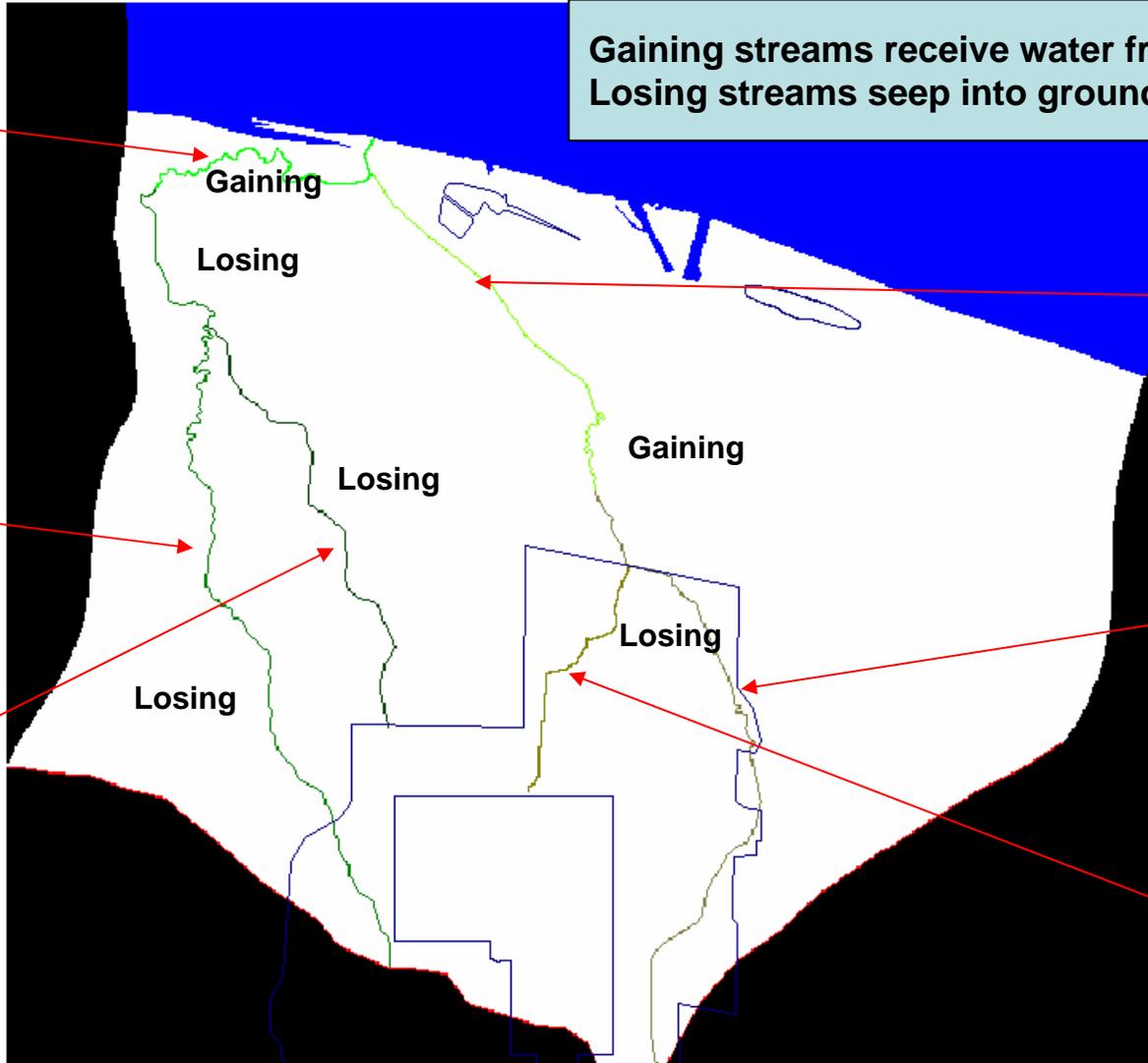
Lower Little Bayou Creek

Upper Bayou Creek

Upper Little Bayou Creek

Bayou Creek Tributary

Little Bayou Creek Tributary



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