THE RELATIONSHIP BETWEEN LITHOFACIES AND CONTAMINANT MIGRATION PATHWAYS AT A SITE CONTAMINATED WITH HEAVY METALS

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ABSTRACT

Lithofacies distribution is the primary influence on the migration of an acidic, heavy metal plume of contaminated groundwater at a site in southeast Louisiana. The site, located north of Lake Pontchartrain, is situated on the youngest of the Pleistocene terraces. The presume source of contamination is an inactive hazardous waste impoundment formerly used to store spent acid from a battery recycling operation. Another potential source, located approximately 300' southeast of the impoundment, is a battery waste pile which has since been removed. Sulfuric acid has mobilized heavy metals such as arsenic, cadmium, chromium, and lead derived from onsite smelting operations. Heavy metals, sulfates, and low pH (acidic) groundwater characterize the nature of the subsurface contamination.

Geotechnical borings at the site reveal that the shallow stratigraphy (0-30') is composed primarily of point bar deposits. A fluvial depositional model has been developed in this study to explain the distribution of the various lithofacies. The main depocenters associated with point bar deposits are on the inside (concave) bend of the meander. These deposits pinch out laterally into flood basin clay deposits. Groundwater contaminants, due to intrinsic porosity and permeability characteristics, are concentrated primarily in the coarser grained point bar deposits.

Potentiometric maps reveal that the direction of groundwater flow is controlled primarily by the distribution of point bar deposits. Pinchout of sand in a northerly direction causes groundwater flow vectors to shift from a predominantly northerly to a westerly direction where the pinchout occurs.