Using a Geographic Information System to Determine the Chicot Aquifer System Surficial Confining Unit's Thickness and Location of Sand Lenses, Southwestern Louisiana

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The Chicot aquifer system in southwestern Louisiana has a surficial confining unit that is undifferentiated from overburden material near the surface. This confining unit is composed of fine sand, silt, and clay, through which recharge flows to the underlying aquifer units. The thickness of the confining unit was mapped suing water-well and petroleum-well data from federal and state agency databases, and supplemental information from previous publications. thicknesses were estimated from 128 petroleum-well geophysical logs, 260 water-well geophysical logs, and 1,705 water-well driller's logs. Although an abundance of petroleum-well geophysical logs are available from southwestern Louisiana, logging commonly did not start at or near the ground surface, which rendered the logs unusable. Water-well driller's logs vary in quality, and those used were complied from paper-files of more than 10,000 well records. Thickness values from driller's logs were not used if the values did not match thickness values from other nearby geophysical and driller's logs.

The thickness of the confining unit was estimated using kriging, and interpolation method. Kriging can handle spatial variability, smooth out random "noise", and mitigate the impact of "hot spots" where there is a great quantity of data. Universal kriging was used instead of ordinary kriging because the data were highly correlated in a particular direction.

The distribution of shallow domestic wells completed in sand lenses within the Chicot surficial confining unit was compared to the distribution of sand lenses obtained from the log data. This provided independent corroboration of areas where sufficient water is available for rural domestic use.

Achieving Remedial Endpoints Using A Risk Based Approach and Integrated Remedial Technologies to Mitigate Impacted Aquifers at Exxon Chemicals Baton Rouge Polyolefins Plant

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The disposal of chlorinated hydrocarbons in an unlined pit prior to RCRA regulations contaminated the shallow ground water at the Exxon Chemicals Baton Rouge Polyolefins Plant. This impact was discovered through a due diligence survey. Through successive investigations the upper three water-bearing units were found to be impacted by multiple contaminants which formed both a dissolved and a DNAPL plume.

Soil vapor extraction and air sparging in the uppermost zone and pump and treat for contaminated water removal in all three zones was proposed and implemented after Agency approval. During the past 4+ years of operation, the system effectiveness has been monitored and adjustments made to enhance contaminant recovery.

With the recent promulgation of LDEQ RECAP Regulations, final cleanup levels based on site specific parameters and exposure risk evaluations have set an achievable endpoint to this remediation effort. The primary concern in this project has been the control of downward migration of contaminants and restoration of the shallow aquifers. Now the focus is on exposure pathways and receptors that may be exposed to the reduced levels of contaminants. In this evaluation, if no exposure occurs or the levels are below those that present health risks to any receptors, then the remediation has been effective and may be terminated. This paper will focus on the team approach to managing the problems of downward movement of DNAPLs, improving contaminant recovery, determining exposure pathways, evaluating risk to receptors and developing and implementing timely and reasonable environmental solutions.