

**INDUCTION CONDUCTIVITY AND NATURAL GAMMA-RAY LOGS  
AT THE OSAGE SKIATOOK RESEARCH SITES "A" AND "B",  
NORTHEASTERN OKLAHOMA**

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Induction conductivity and natural gamma-ray logs collected from wells at the Osage Skiatook Research Sites "A" and "B" support ongoing geological, geophysical, geochemical, and hydrologic studies of the environmental impacts of oil production. These logs can be obtained from PVC cased wells and provide data both above and below the water table. The lithologies include shales with moderate conductivity and high gamma activity, and sandstones with low conductivity and low gamma activity. Induction conductivity logs show the vertical distribution of soluble salts in the unsaturated zone and of saline ground water in the saturated zone. Such data augments chemical analyses of soil/rock extracts and ground-water samples, and improves estimates of the total volume of rock affected by salts. Depth intervals of high salinity identified in the borehole logs were confirmed by anomalously high concentrations of chloride in 1:1 aqueous extracts of crushed core samples from the intervals. Greater borehole conductivity values found in some shallow intervals of shale indicated the extent of penetration of sodium chloride into these low permeability rocks. Gamma-ray logs were used to identify distinctive radioactive layers and were correlated with lithologic data from core from the wells. Gamma-ray correlations assisted in hydrologic interpretations of water level measurements in the wells and the regional determination of the strike and dip of the units. When used in combination with conductivity logs, the gamma-ray logs provided additional lithologic information to supplement core sample descriptions or to substitute for missing section of core samples. Surface electrical conductivity surveys were calibrated by the induction conductivity logs from wells near the survey.