

# NEAR-SURFACE LIGNITES OF THE WILCOX GROUP IN EAST-CENTRAL TEXAS<sup>1</sup>

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## ABSTRACT

As lignite becomes a major energy resource in Texas, information concerning the distribution, quality, and quantity of lignite available for utilization is becoming necessary for future planning. A continuing study has yielded results concerning the distribution, depositional environments, and exploitability of near-surface lignites in the Wilcox Group of east-central Texas.

Fifteen hundred geophysical logs from closely spaced boreholes were made available by private industry for this study. Cross sections and a lithofacies map constructed from the geophysical logs clearly show the stratigraphic and facies relationships within the Wilcox Group. The Wilcox in Bastrop, Milam, Robertson, and Limestone Counties can be subdivided into three lithostratigraphic formations: Hooper, Simsboro, and Calvert Bluff. From Freestone County northward the massive sands of the Simsboro thin and break up, preventing the tripartite division of the Wilcox.

The Calvert Bluff Formation is a fine-grained succession of clays, silts, and lignites with occasional sands. Lignites occur regularly in the lower part of the Calvert Bluff just above the Simsboro and in the upper part of the Calvert Bluff just below the Carrizo. Calvert Bluff sands observed in this study are single to multistory, laterally discontinuous channel sands. Lignites in the Calvert Bluff frequently extend over the top of these sand channels and across some of the projections of mapped subsurface sand belts. Sequences coarsening upward from clay to silt to very fine grained sand topped by lignite are common in the Calvert Bluff. The Calvert Bluff, with its continuous lignites and occasional sand units, is interpreted as a fine-grained meanderbelt deposit. Calvert Bluff streams were possibly highly sinuous, mixed- and suspended-load streams.

The Calvert Bluff conformably overlies the Simsboro Formation. Mapping of the Simsboro in this study has documented discontinuous lignites in areas where the formation is dominated by massive multistory sands and continuous lignites and where the thick sands break up, thin, and interfinger with finer grained sediments. The depositional environment of lignite formation in the Simsboro in Bastrop, Milam, Robertson, and Limestone Counties is characterized by thick multistory, multilateral channel sands, interpreted as coarse-grained meanderbelt deposits accumulating in swamps located in narrow, interchannel basins. Simsboro streams were possibly bed-load, low-sinuosity streams. From Freestone County north, the Simsboro succession is interpreted as being a predominantly fine-grained meanderbelt deposit. Sites of peat accumulation were swamps that formed in more extensive interchannel areas.

Lignites occurring in the Hooper Formation are often associated with upward-coarsening units, possibly deltaic in origin. The paucity of data for the near-surface Hooper Formation limited the study of these sediments.

The exploitability of Texas lignites depends not only on the occurrence of thick, regular seams of favorable quality lignite, but also on the hydrologic setting of the lignite deposits. Detailed mapping of the depositional systems, facies, and individual sand units, together with hydrologic parameters of flow, transmissivity, and recharge, may aid in predicting hydrologic problems before mining.

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