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Mining Geology of the Fire Clay Coal

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Introduction

The Fire Clay (Heck 1963, 1970) is one of the leading producers in the Eastern Kentucky Coal Field and contains some of the highest-grade coal in the eastern United States. The coal is mined in the low-lying areas between 179 and 213 ft, and according to Kentucky Department of Mines and Minerals data, Regional thickness and resource of the coal are estimated to be 400 and 50 ft and 5,600 and 200 ft, respectively. Historically, the coal was the middle part of the Middle Pennsylvanian, the lower part of the Adamsian, and the middle part of the Old Red. Structural features of the coal are described in detail in previous work (Heck 1963, 1970). This paper presents the results of the research in Fire Clay coal deposits with a focus on the structural features that control the occurrence of the coal in the mineable area.

Coal and Roof-Back Variation

As in most eastern Kentucky coals, mine roofs above the Fire Clay coal are entirely variable. A typical example of the type of lateral variation in mine Fire Clay coal is shown in Figure 4. Laterally, the coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 4. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 5. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 6. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 7. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 8. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 9. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 10. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 11. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.

Figure 12. Lateral changes in coal and roof-back variation in the Fire Clay coal from the upper Fire Clay mine. The coal changes from a sandstone (interpreted as an ancient river) to a sandstone and shale (as in the Lower Fire Clay coal). In both cases, the present-day Fire Clay coal is a mudstone and sandstone (Fig. 4). Interbedded sandstones and shales are present in the lower Fire Clay coal, and the sandstones in the middle Fire Clay coal are present in the upper Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal. The sandstones in the middle Fire Clay coal are present in the lower Fire Clay coal, and the sandstones in the upper Fire Clay coal are present in the lower Fire Clay coal.