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Public Service Company of Oklahoma
Black Fox Station
Interim Mapping Report

B&V Project 6212
File: 6212.210.1121.21
October 14, 1978

Public Service Company of Oklahoma
P.O. Box 201
Tulsa, Oklahoma 74102

Attention: Mr. T. N. Ewing
Manager, BFS Nuclear Project

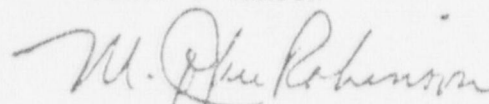
Gentlemen:

Please find enclosed three (3) copies of the interim geologic mapping report requested by V. L. Conrad.

If you require further information on this subject, please contact Mr. P. R. Zaman.

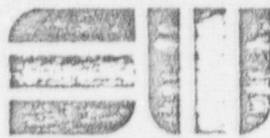
Very truly yours,

BLACK & VEATCH


M. J. Robinson

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Enclosure

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SHANNON & WILSON, INC.
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6212.210.1121.22
6212.111.1012.44

October 13, 1978

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Attention: Dr. M. J. Robinson
Project Manager

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PUBLIC SERVICE COMPANY OF OKLAHOMA, BLACK FOX STATION,
GEOLOGIC ANOMALIES

Geologic Anomalies at the Black Fox Station Site

This interim report summarizes the current status of the geologic investigations of the anomalies exposed in the excavation for the proposed Unit 1 at Black Fox Station.

A north-trending linear anomaly in the Drywood coal in the vicinity of the proposed Unit 1 was originally identified in subsurface studies for the Black Fox Station PSAR. Stratigraphic correlations of both the coal and a deeper sandstone bed indicated that this anomaly is a depression in the coal bed that is not reflected in the deeper sandstone strata. On the basis of the boring data for the PSAR studies, the anomalous depression was interpreted to have formed by deposition of the coal in an erosional channel cut in the underlying Savanna shale. This evidence is discussed in the PSAR Subsection 2.5.1 and Appendix 2B, Section 2B.5.5.2, and is depicted in Figures 2B.5-14, 2B.5-15 and 2B.5-16 of the PSAR.

Geologic mapping of excavations for Category I structures is being performed in accordance with Section 2.5.4 of the PSAR. The excavation and trenching program for Unit 1 was designed to

expose the anomalous depression as well as any other geologic features that might underlie the proposed Unit 1. The original plans called for two north-south trenches and two east-west trenches to be excavated through the Drywood coal. When the initial anomalous offset in the west flank of the depression was exposed in two of these trenches, six additional trenches were excavated to evaluate the offset. Of a total of ten trenches, eight now cross and two approximately parallel the linear trend of the depression. These trenches have a cumulative total length of approximately 1400 linear feet.

The geometry of the depression in the coal bed, as exposed in the trenches, is essentially as depicted in the PSAR. However, the sequence of Pennsylvanian strata exposed in the trenches indicates that the depression is not occupying an erosional channel, but was formed by penecontemporaneous deformation; i.e., by folding or offset of the sedimentary strata that occurs either during deposition or shortly thereafter by consolidation of the sediments. In this instance, the penecontemporaneous deformation resulted from differential compaction of a highly compressible underclay that lies directly below the coal.

The trenching exposed five offsets within the Pennsylvanian strata, all of which appear to be associated with the depression. The largest of these offsets is exposed along the west flank of the depression and is present in all of the east-west trenches. It consists of a low-angle slippage plane dipping $10-17^{\circ}$ (from the horizontal) that has resulted in a horizontal separation of the coal bed between 6.5 and 10 feet, and a vertical separation of 1.5 to 2.5 feet. The offset, which has a normal sense of

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Page 3

displacement, locally is taken up along a series of rotational slumps rather than along a discrete slippage plane. Information accumulated to date indicates that this offset is the result of penecontemporaneous deformation associated with the development of the depression.

The other smaller offsets exhibit similar slippage planes, with the same low angle of displacement as the offset described above. All of these offsets have displacements of less than two feet, have varying strikes, and typically cannot be traced between trenches. Thus far, it has been determined that two of the offsets do not cut the complete section of Pennsylvanian strata exposed in the trenches. Preliminary findings indicate that all of the smaller offsets also were formed by penecontemporaneous deformation.

The geologic investigations of these offsets are continuing in order to further evaluate the origin of the offsets found in the Unit 1 excavation. If these minor offsets are the result of penecontemporaneous deformation, as currently indicated, they occurred during Pennsylvanian time (280 to 320 million years ago). Furthermore, if the offsets are of penecontemporaneous origin, they are non-tectonic and, therefore, by definition in 10 CFR Part 100, Appendix A, Seismic and Geologic Siting Criteria, paragraph III(e), they are not faults.

SHANNON & WILSON, INC.



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