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ARCHAEOLOGICAL STUDIES:
CHERT AT THE DENNIS SITE

BY

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INTRODUCTION

Archaeologists at the Kansas State Historical Museum are interested in where Native Americans obtained their raw material for points and other tools. Archaeological excavations at the prehistoric Dennis Quarry (Banks, 2003) revealed an in place limestone layer containing chert. The basic question was: which chert bed? The local stratigraphy was established by: (1) measuring and describing the exposures in the active Bayer stone quarry east of the archaeological site and (2) by obtaining a core of the sequence between this modern quarry and the archaeological excavations at the Dennis Quarry. Chert nodules and archaeological artifacts were to be analyzed using Neutron Activation Analysis to obtain chemical signatures for both the artifacts and the chert. Such analyses would test the hypothesis that the chert flakes and artifacts would have the same chemical composition and therefore were from the same layer as the exposed chert. Unfortunately, these analyses were not completed.

ARCHAEOLOGICAL ASPECTS

The Dennis Quarry is an ancient stone quarry in northeastern Pottawatomie County, Kansas, within the Glaciated Region physiographic province (Figure 1).

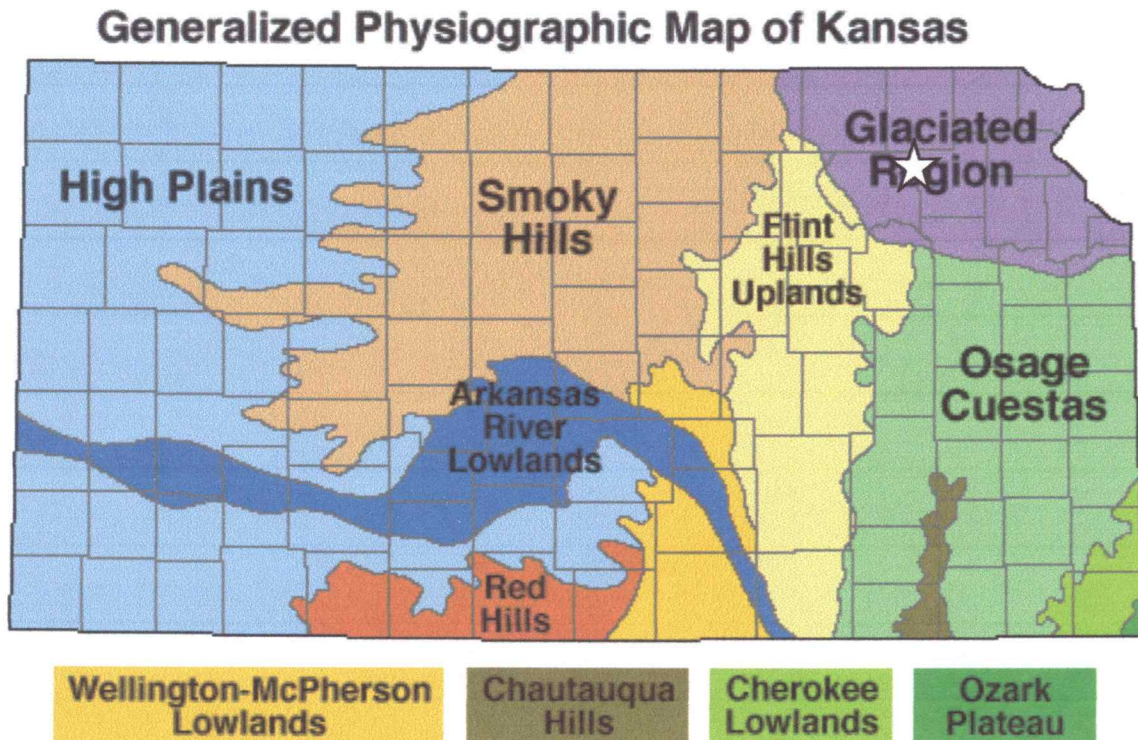


Figure 1 - Physiographic Map of Kansas, star marks approximate location of research area. From Kansas Geological Survey

At this site prehistoric people excavated chert from a hilltop, leaving behind pit and trench features with large amounts of flintknapping debris (Banks, 2003). The sinuous trenches, backdirt and lithic debris piles are covered by grass, but are readily visible at the surface. These features are the result of prehistoric excavations

down to the chert-bearing limestone (Banks, 2003), although there is some uncertainty as to the rock layer from which the chert was quarried. On September 12, 2004, Kansas State Historical Society archaeologists Will Banks and Ron Hoard mapped the site (Figure 2) and dug test pits to collect chert nodules for NAA analysis (Figure 3)..

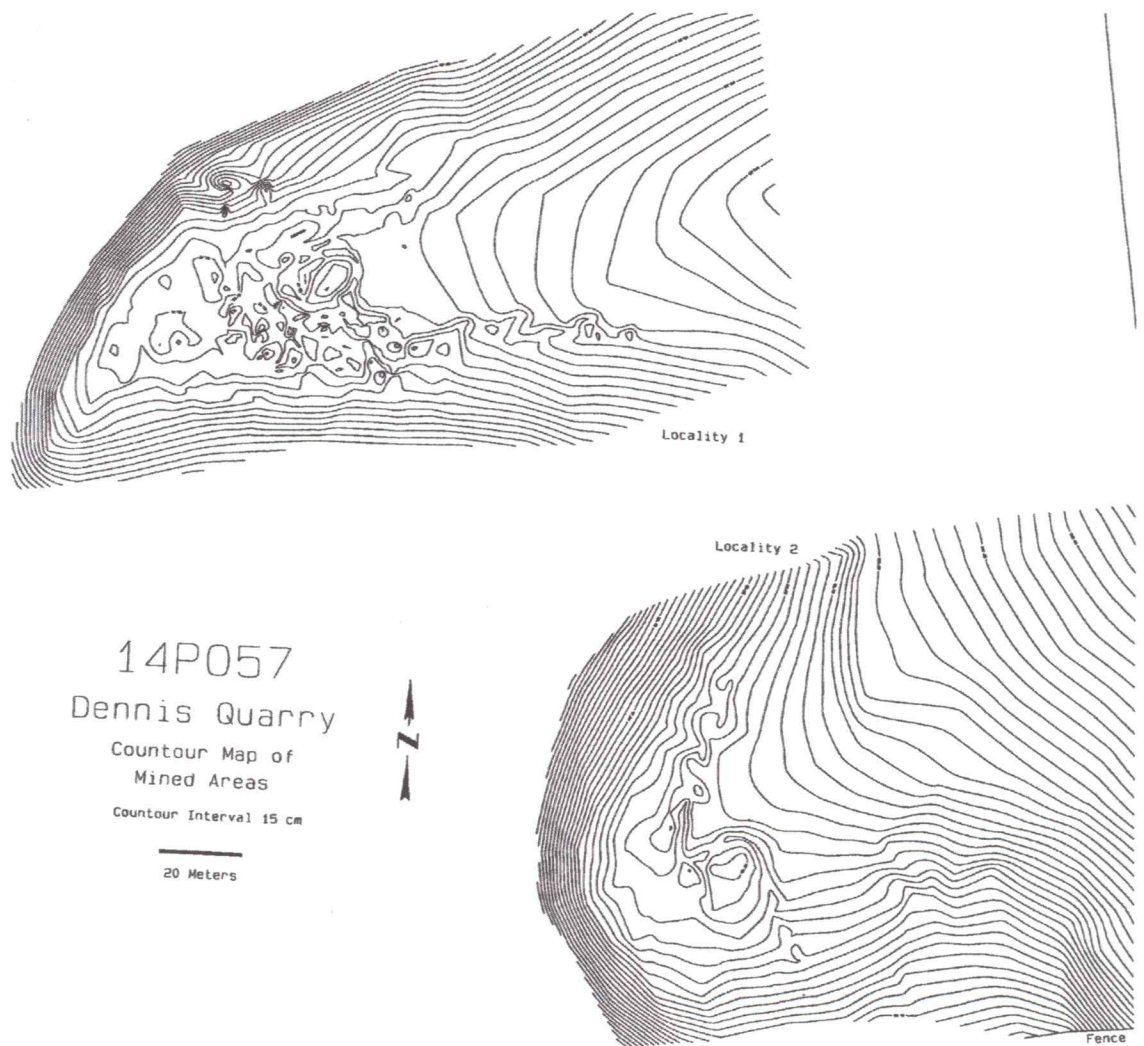


Figure 2 – topographic maps of the Dennis Quarry excavations.



Figure 3 - Will Banks sights in the location of samples collected for analysis.

GEOLOGICAL ASPECTS

The Dennis Quarry site is located on a ridge along which limestone outcrops are limited. Previous archaeological investigators have tentatively identified this rock unit as the Threemile Limestone Member of the Wreford Formation (Banks, 2003). The Threemile limestone in Pottawatomie County contains several beds of limestone alternating with thinner beds of chert. The Threemile is approximately seven feet thick, and is prevalent throughout the county (Scott et al., 1959). Its thickness and position in the

county (Scott et al., 1959). Its thickness and position in the stratigraphic column (Figure 4) should easily distinguish it from other chert-bearing units, above and below.

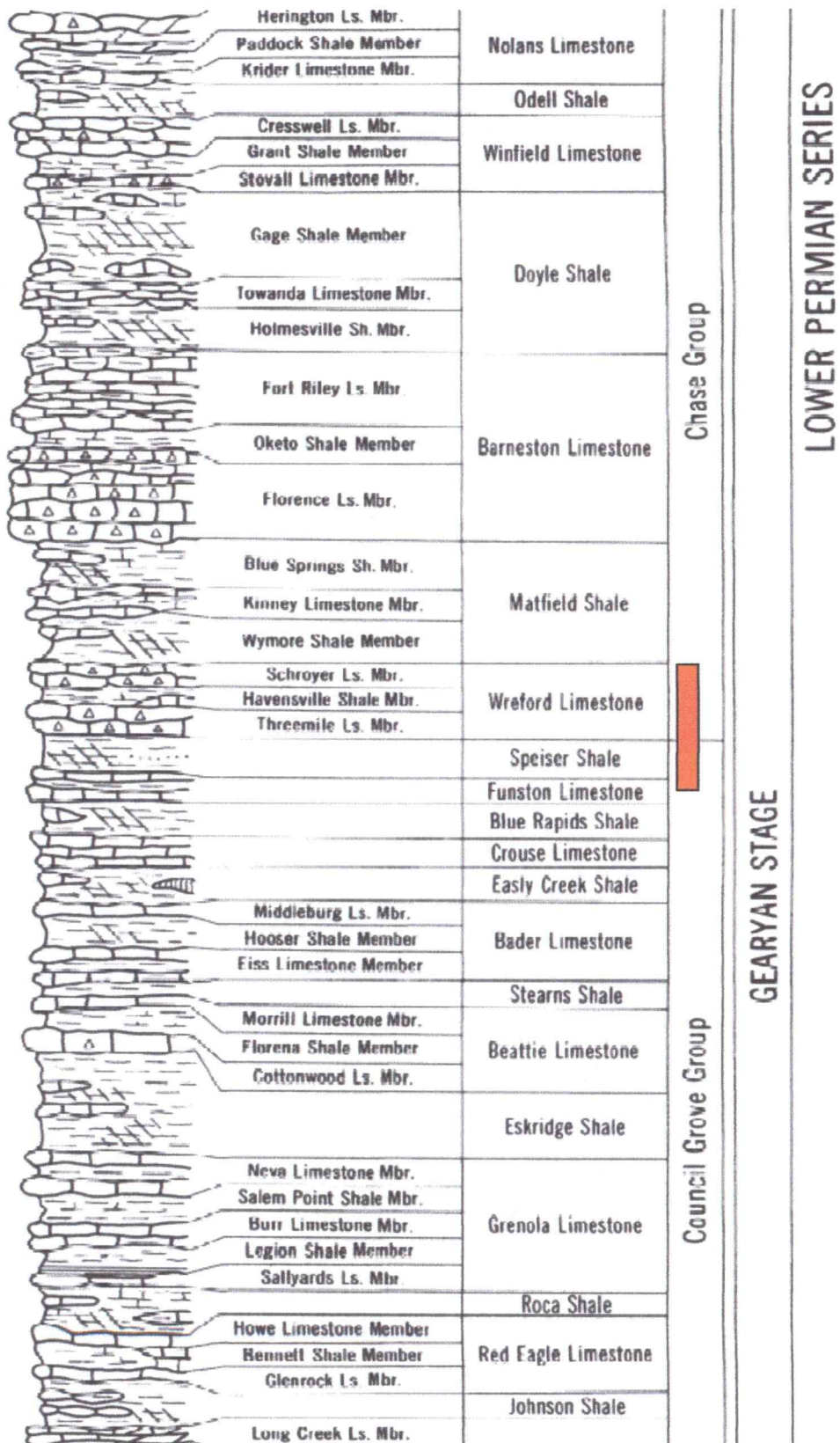


Figure 4 – Sequence of lower Permian rocks in Kansas. Modified from Zeller, 1968.

The Threemile Limestone Member of the Wreford Formation is a conspicuous rock layer in the Flint Hills of Eastern Kansas. This relatively thick, resistant limestone layer caps many of the hills in the eastern Flint Hills region. The limestone contains abundant chert beds and nodules, which, upon weathering of the surrounding limestone, form “rim rock” around the hilltops. Although chert from this unit is readily available at the Dennis Quarry, was it the chert utilized by the native inhabitants of this region?

Useful exposures of the Threemile Limestone are lacking near the Dennis Quarry, but it, and associated units, is well exposed at the currently active Bayer Quarry. Two stratigraphic sections (outcrops 1 and 2) were measured and described at the Bayer quarry that is located approximately one kilometer northeast of the Dennis Quarry (Figures – 5, 6, 7, 8, & 9).

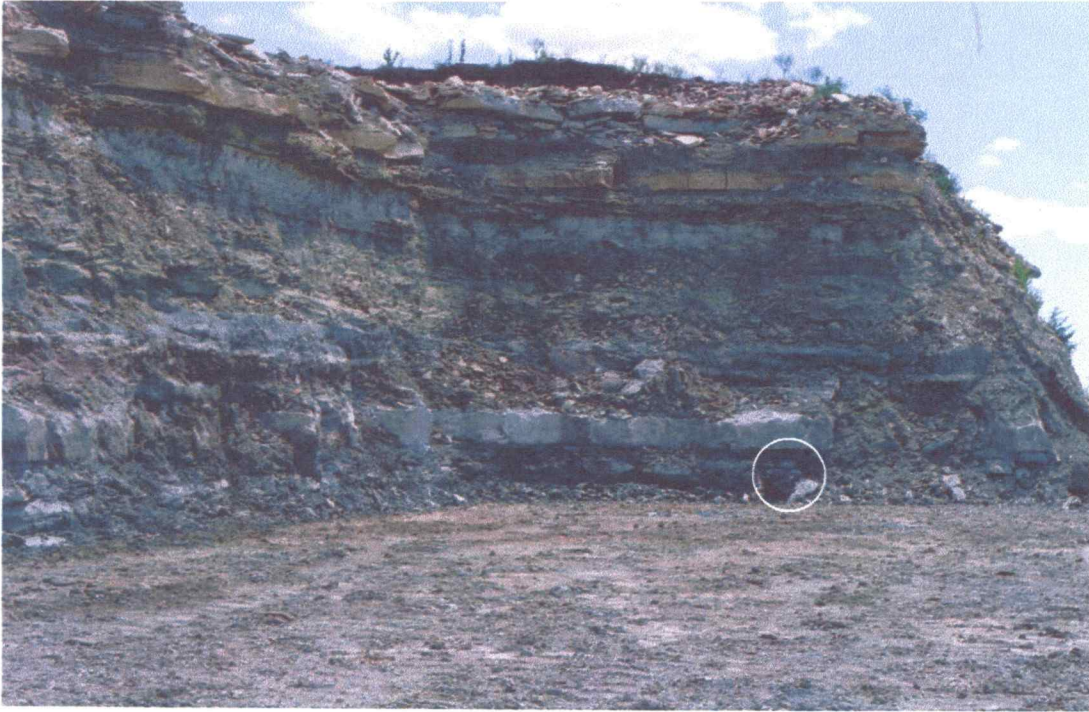


Figure 5 - Described section (outcrop 2) of Speiser Shale and Threemile Limestone (top) at Bayer Quarry. Backpack for scale.





Figure 6 - Funston limestone to Threemile limestone at Bayer Quarry at outcrop 2.



Figure 7 – Threemile limestone at outcrop 2.



Figure 8 – Chert bed in Threemile limestone at outcrop 2

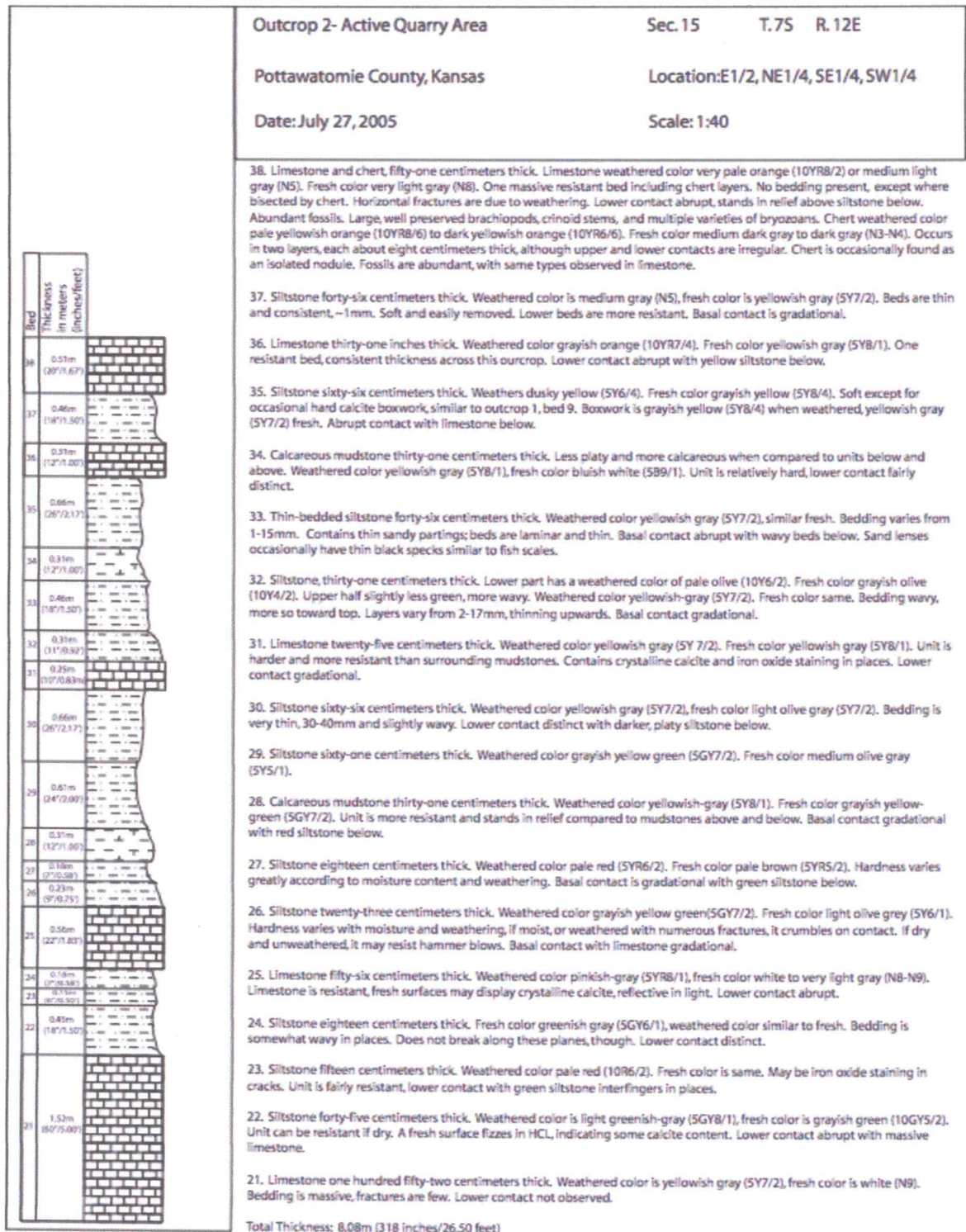


Figure 9 – Measured and described sequence at outcrop 2.

The Blue Rapids Shale Member (outcrop 1; Figures 10 & 11) is exposed in a gully approximately 250 meters southeast of the active quarry area.



Figure 10 – View looking west of a gully in the Blue Rapids Shale Member at the Bayer Quarry (outcrop 1).

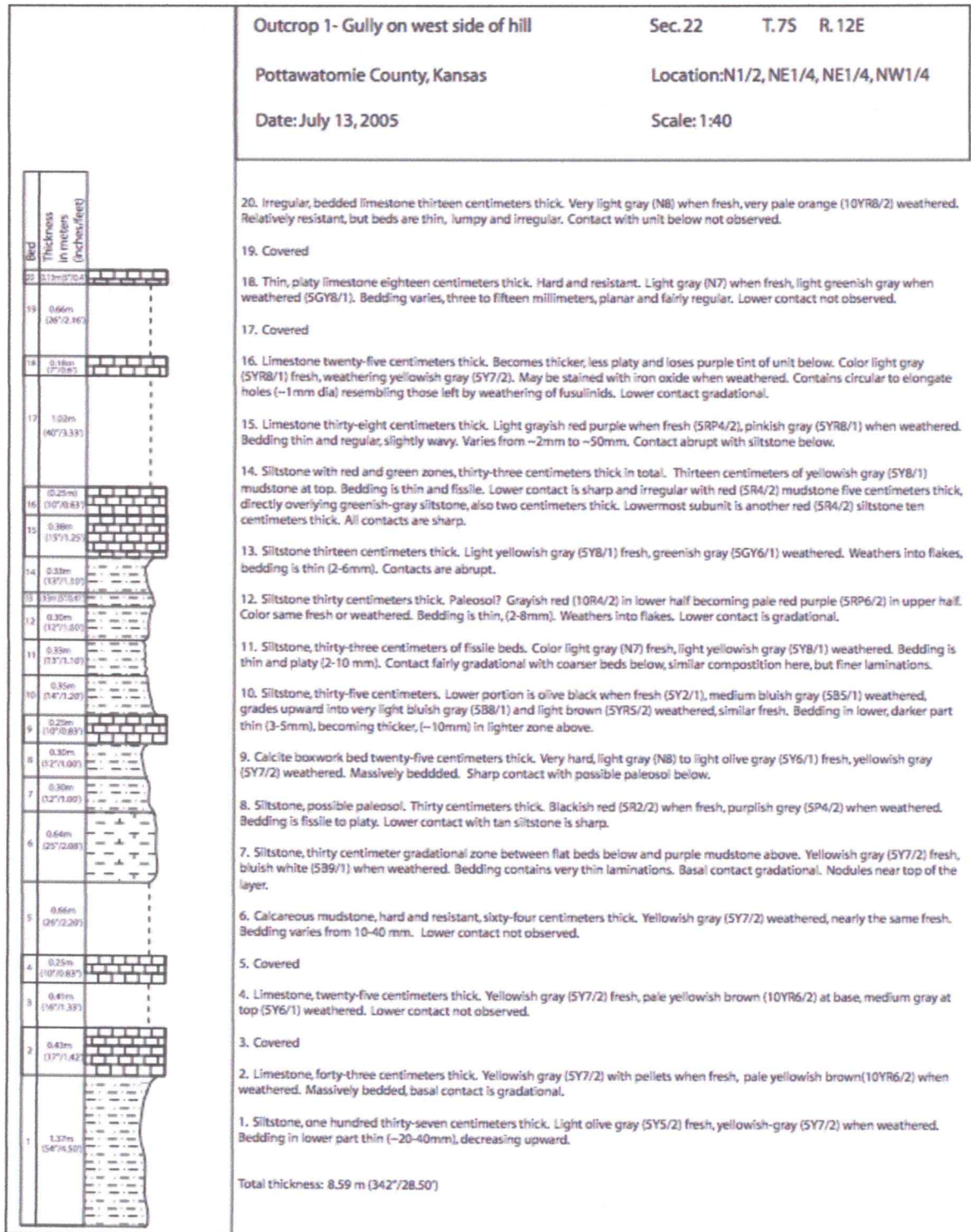


Figure 11 – Measured and described sequence at outcrop 1.

Outcrop 2 (Figures 5 & 6) is a section from the Funston Limestone Formation to the Threemile member of the Wreford Limestone, which was covered by 1-1.5 meters of glacial till. Current quarrying operations have removed most of these glacial deposits in the immediate area. Note that there is a gap of unknown size between the sequences at outcrops 1 and 2 because the rocks are not exposed.

APPROACH

On December 10, 2004, an attempt to obtain a small core of the chert from a test pit at Dennis Quarry was unsuccessful (Figures 12 & 13). Hand samples of the chert were collected for further study.



Figure 12 - Coring attempt at Dennis Quarry



Figure 13 – Equipment failure halted coring attempt

To obtain stratigraphic data between the Dennis Quarry and the modern stone quarry. A proposal was submitted to the Kansas geological Survey to drill a core hole between the two sites (Figure 14).

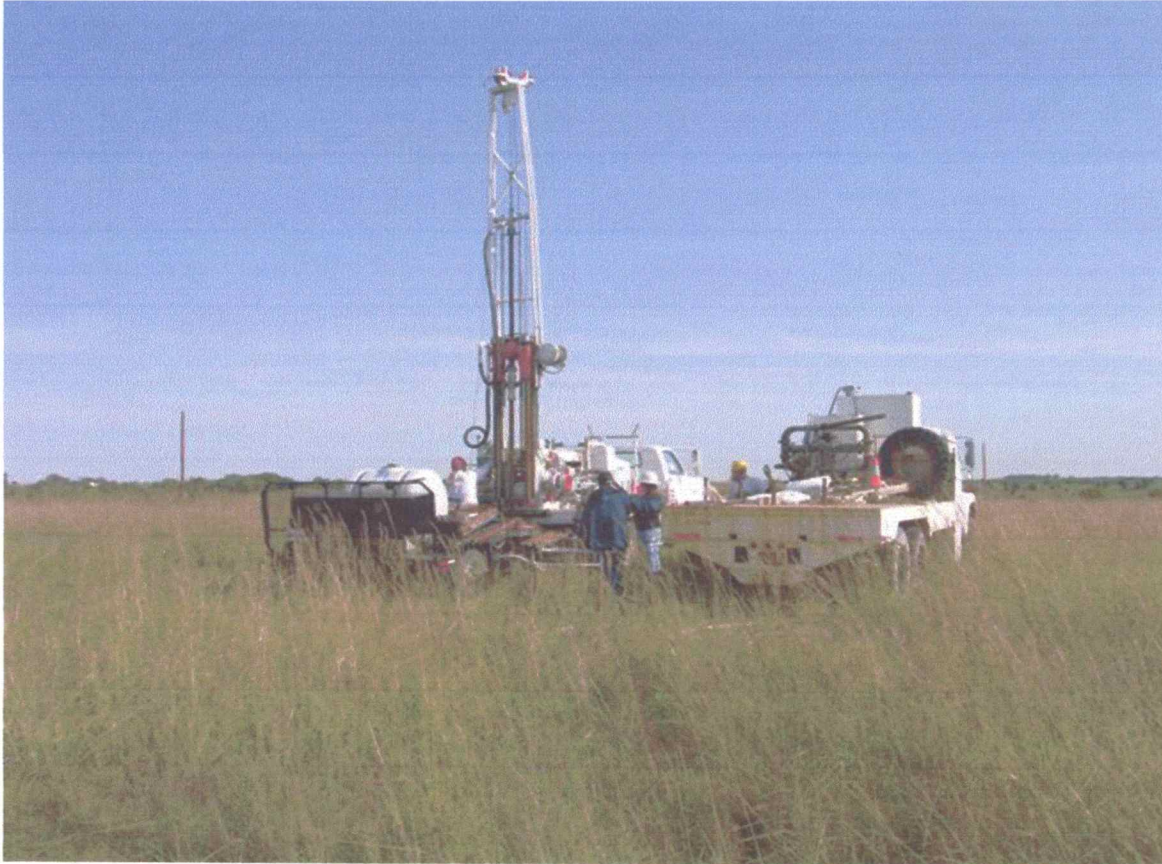


Figure 14 – Site of Kansas Geological Survey Core

This proposal was successful and on September 30, 2005, the Kansas Geological Survey drilled a core near the Dennis Quarry site (Figures 15 & 16).



Figure 15 – Core of the chert bed in the Threemile limestone at the KGS site.



Figure 16- Core showing the contact of the chert bed in Threemile limestone with the underlying unit.

The core is described in Figure 17.

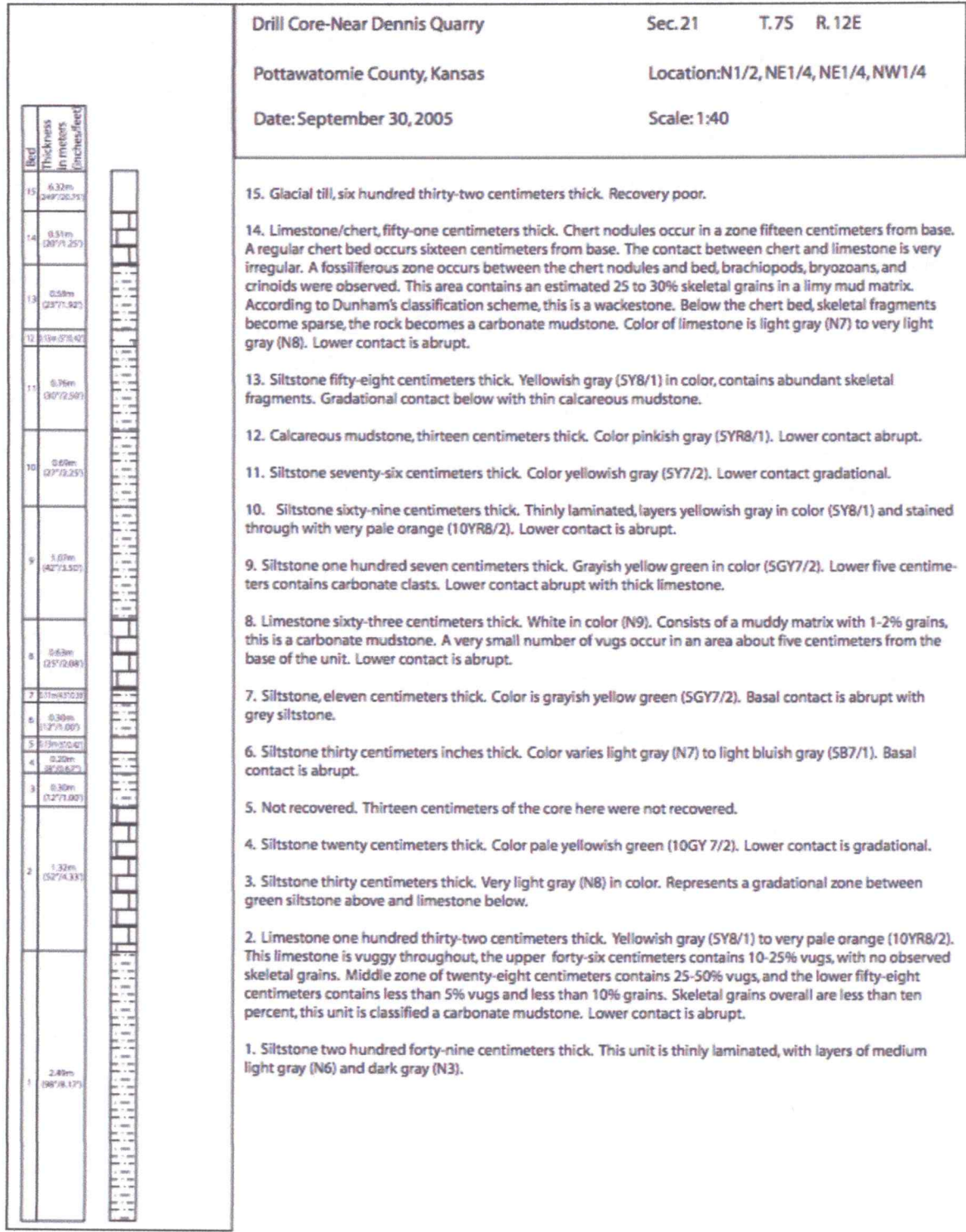
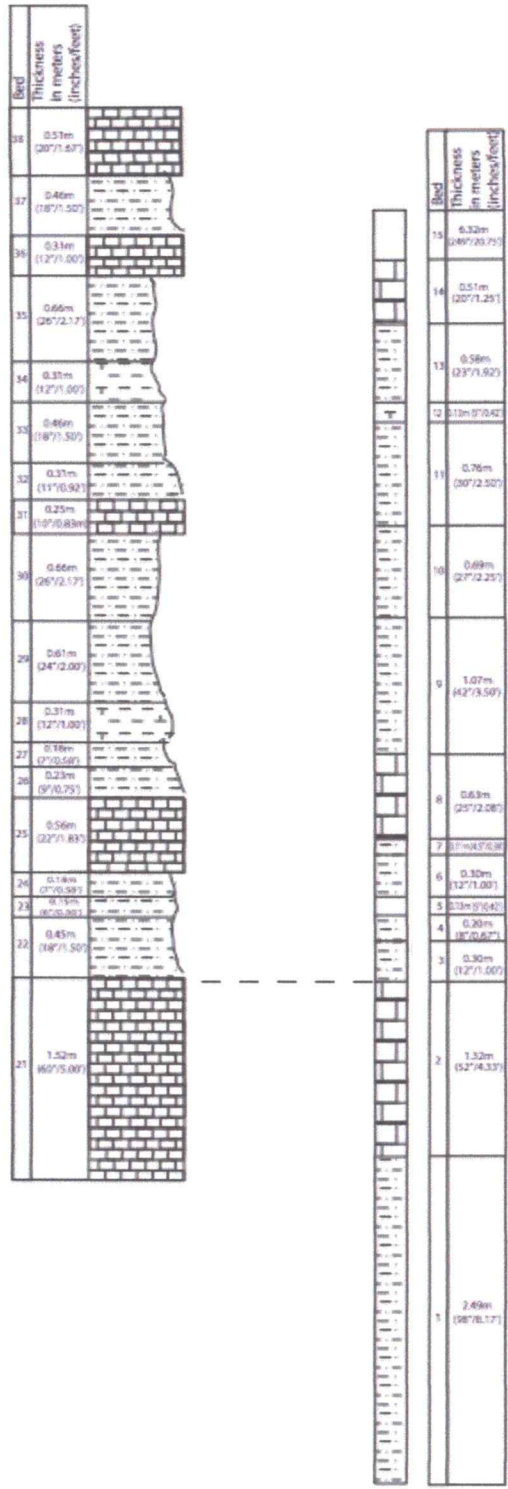


Figure 17 – Core description.

A comparison between the drill core and outcrop 2 at the active Bayer Quarry, using the top of the thick Funston limestone as datum is shown in Figure 18. The core and the stratigraphic section appear to correlate well, with thicknesses varying somewhat and an individual limestone bed, bed 31 at outcrop 2, absent in the core.



Correlation of Bayer Quarry, outcrop2 to core column
Scale 1:40

Figure 18 – Correlation of the sequence at outcrop 2 with the cored interval.

The very white, vuggy limestone at the base of the outcrop is the Funston limestone and is correlated with bed 14 of the core. The shale above the Funston is the Speiser Shale and the cherty limestone at the top of the core is the Threemile Limestone Member of the Wreford Formation. The Threemile is thicker at the active quarry than in the drill core. It is possible that the upper Threemile at the location of the core was either not recovered in the core, or was removed by erosion (glacial action).

ACKNOWLEDGEMENTS

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